

Ms. Jody Pellissey
Executive Director
Wek'èezhì Renewable Resources Board
102A 4504 49 AVENUE
YELLOWKNIFE NT X1A 1A7

JUN 14 2019

Dear Ms. Pellissey:

Submission of Tłıchǵ All-Season Road Wildlife Management and Monitoring Plan

The Government of the Northwest Territories Department of Infrastructure (GNWT-INF) respectfully submits Version 3.3 of the Wildlife Management and Monitoring Plan (WMMP) for the Tłıchǵ All-Season Road Project (the Project) to the Wek'èezhì Renewable Resources Board (WRRB) for review, as per Section 12.5.1 of the Tłıchǵ Agreement.

As you know, the WMMP has undergone revisions throughout the environmental assessment (EA 1617-01) with the involvement of the WRRB and other Parties, and through the regulatory process. Most recently, revisions to the WMMP were made in June 2019 following the public comment period on the Wek'èezhì Land and Water Board Online Review System for water licence W2016L8-0001 and land use permit W2016E0004, the conditions included in water licence W2016L8-0001 and the associated Reasons for Decision, and the Department of Environment and Natural Resources (GNWT-ENR) comments and recommendations in their June 3, 2019, letter. This includes changes made to the WMMP following recommendations from the WRRB through the Online Review System. A summary of the revisions made to Version 3.3, including those from the WRRB, are attached to this cover letter (Appendix A).

Please provide your comments back to the GNWT-INF and copy Ms. Loretta Ransom, Manager, Environmental Assessment and Monitoring, GNWT-ENR.

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The GNWT-INF trusts that the information provided in the WMMP is comprehensive and looks forward to working collaboratively with all stakeholders to begin construction in the fall of 2019. Should you have any questions or concerns please contact me at (867) 767-9049 ext. 31186 or by email at Cameron_Wilson@gov.nt.ca at your earliest convenience.

Sincerely,



Cameron Wilson
Regional Superintendent
North Slave Region
Department of Infrastructure

Attachment

c. Ms. Loretta Ransom
Manager, Environmental Assessment and Monitoring
Environment and Natural Resources

Ms. Laura Duncan
Tlicho Executive Officer
Tłıchǫ Government

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-1. Revision History of the WMMP

Version	Notes	Reviewers	Document Link
1	- Draft Wildlife Management and Monitoring Plan - Submitted with 2016 LUP application	ECCC WRRB TG YKDFN NSMA	http://registry.mvlwb.ca/Documents/W2016E0004/W2016E0004%20-%20TASR%20-%20PDR%20Appendix%20M%20-%20Draft%20Wildlife%20and%20Wildlife%20Habitat%20Protection%20Plan%20-%20Mar%2031%2016.pdf
2a	- Conceptual Wildlife Effects Monitoring Program - Prepared by ENR - Submitted during the EA	ECCC WRRB TG YKDFN NSMA	http://reviewboard.ca/upload/project_document/TASR%20draft%20Conceptual%20WEMP%20-%20for%20registry%20-%202017-08-03.pdf
2b	Incorporated updates from EA meetings, and consolidated the WMMP and WEMP into a single document	ECCC WRRB TG YKDFN NSMA	http://reviewboard.ca/upload/project_document/TASR%20GNWT%20draft%20WMMP%2022Sep17.pdf
3.1	- Incorporated EA Measures and Commitments - Provided to ENR for internal review	ENR	Document sent to ENR for internal review
3.2	- Incorporated NSMA traditional knowledge report - Submitted with the LUP and WL applications in January 2019 - WLWB did not approve and gave directives for Version 3.3	ECCC WRRB TG NSMA WLWB ENR	http://registry.mvlwb.ca/Documents/W2016E0004/W2016E0004%20-%20TASR%20-%20Wildlife%20Management%20and%20Monitoring%20Plan%20-%20Version%203.2%20-%20Jan%208%2019.pdf
3.3	- Revisions from the LUP and WL incorporated - Revisions from reviews by ECCC, WRRB, TG, NSMA, WLWB incorporated - Revisions from ENR in letter dated 3 June 2019 incorporated, plus additional changes made directly by ENR - Incorporated YKDFN traditional knowledge report	Under review	This document

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-2. Revisions Resulting from the Water Licence and Reasons for Decision (W2016L8-0001), 17 April 2019

Water Licence/Reasons for Decision Section	Request	Proponents Responses Revisions made to WMMP Version 3.3
Reason for Decision, Section 6.2.4, Page 14	The Board has decided that Version 3.2 is not considered to be approved, and it is expected that Version 3.3 will include all revisions and commitments outlined in these Reasons for Decision (Table 2), to be submitted to the WLWB for approval, following approval by the Minister, and at least 90 days prior to Construction.	The comments in Table 2 of the Water Licence Reason for Decision have been addressed in Version 3.3 of the WMMP. A list of the changes made in response to each comment are provided in Table A-3
Reason for Decision, Section 6.2.4, Page 15 Water Licence Schedule 1, Condition 1(n)	Updates on progress specific to the management and protection of boreal and barren ground caribou and caribou habitat according to measures 6-1, 6-2, and 6-3 of the REA; and Measures 7-1 and 7-2 of the REA, respectively	Section 6.1.2 updated to reference the wildlife information to be reported in the Water Licence Annual Report.
Reason for Decision, Section 6.2.4, Page 16 Water Licence Schedule 1, Condition 1 (n)	To include the results of available surveys and monitoring, such as caribou, bird (Measure 10-1), and moose surveys in the Water Licence Annual Report requirements.	Section 6.1.2 updated to reference the wildlife information to be reported in the Water Licence Annual Report.
Reason for Decision, Section 6.2.4, Page 16 Water Licence Schedule 1, Condition 2(a)	Findings of the program that uses Tłıchq harvesters' traditional knowledge and methods to monitor the state of barren-ground caribou (ᐃᓃᓄᓐ) winter habitat, during and after the construction of the Project while the WMMP is in place, as per measure 7-1(c) of the Report of EA	A report of the barren-ground caribou (ᐃᓃᓄᓐ) winter habitat study is not yet available. Section 6.1.2 and 6.1.3 include commitments to summarize and include traditional knowledge in the WMMP Annual Report. Section 6.2.3 added to the WMMP, listing the items that may trigger a WMMP update
Water Licence, Schedule 1, Condition 2(b)	A description of how the Plan has been updated based on results of available surveys and monitoring, such as caribou, bird (Measure 10-1), and moose surveys, as per Measure 10-2, Part 2	While this data is not yet available, Section 6.2.3 added to list new information that may trigger updates to the WMMP.

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Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-2. Revisions Resulting from the Water Licence and Reasons for Decision (W2016L8-0001), 17 April 2019

Water Licence/Reasons for Decision Section	Request	Proponents Responses Revisions made to WMMP Version 3.3
Water Licence, Schedule 1, Condition 2(c)	a description of the management and protection of migratory birds and bird species at risk, providing a description of potential habitat (e.g., borrow sources, nesting areas etc.) and its protection;	Provided in Sections 2.8.2, 2.9, Table 5, Section 4.1.1, Section 4.3.1. Associated monitoring is described in Sections 5.1.4, 5.1.6 and 5.1.7. Baseline studies for avian species at risk are described in Section 5.2.8.
Water Licence, Schedule 1, Condition 2(d)	include Traditional Knowledge from all Aboriginal groups that harvest in the area on ways to mitigate, monitor, and adaptively manage impacts from the Project to wildlife;	Cited throughout the document included in new information in Sections 4.0, 4.6, 5.2.2, 5.2.3, 5.2.4, Commitments to include new traditional knowledge in Sections 5.2.2, 5.2.3, 5.2.4, 6.1.2, 6.1.3 and 6.2.3
Water Licence, Schedule 1, Condition 2(e)	Construction activities, including clearing, consider sensitive wildlife periods, for example nesting periods of migratory birds	Provided in Section 2.9
Water Licence, Schedule 1, Condition 2(f)	references to any relevant monitoring plans.	Provided in Section 2.4
Reasons for Decision, Section 6.2.4, Page 17	The Board requires that the following text: “determine the abundance, distribution and habitat use of avian species at risk in the TASR study area before road construction”, be added as a primary objective in Section 5.2 of the WMMP.	This objective was added to Section 5.2, including a summary of the avian species at risk baseline study in a new Section 5.2.8.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
North Slave Metis Alliance (NSMA)-6	Section 5.2.2	Response provided in the Proponent Response to Comments on 14 March 2019. Additional detail from the Proponent Response was added to Section 5.2.2 to clarify GNWT's approach to decisions around the implementation of check stations.
NSMA-7	Section 5.2	Response provided in the Proponent Response to Comments on 14 March 2019. No changes to Section 5.2 of the WMMP were made in response to this comment.
NSMA-8	Section 6.2 Appendix F Appendix D – Table 1	The requested monitoring is included in Appendix F, which includes pre-clearing wildlife surveys. Section 6.2 and Appendix F was updated to include a pilot study to test thermal imaging technology to detect wildlife in low light conditions, prior to blasting in particular. Further details will be provided in the individual Blast Plans. No changes to Appendix D Table 1 were required. See also the response provided in the Proponent Response to Comments on 14 March 2019.
NSMA-9	Appendix D, Table 1 Appendix F Section 6.2.2	Response provided in the Proponent Response to Comments on 14 March 2019. The Appendix F was updated to include a pilot study to test thermal imaging technology to detect wildlife in low light conditions. Further details will be provided in the Blast Plans.
NSMA-10	N/A	Response provided in the Proponent Response to Comments on 14 March 2019.
NSMA-11	Section 4.3.1 Section 4.4.1 Section 4.4.2 Appendix D – Table 1	Speed limit reductions within 1km of large mammals on or near the road were added to Section 4.3.1, 4.4.1 and Section 4.6. 100 m stopping distance added to Section 4.4.1. A flow chart will be considered for later versions of the WMMP once the procedures have been field tested.
NSMA-12	Section 4.4.1 Section 6.2	Response provided in the Proponent Response to Comments on 14 March 2019. Additional details were added to Section 4.4.1 in response to this comment.
NSMA-13	Section 5.2.1 Section 5.2.3	Response provided in the Proponent Response to Comments on 14 March 2019.

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Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
NSMA-14	Section 5.2.3	Response provided in the Proponent Response to Comments on 14 March 2019. Further details were added to Section 5.2.3 to clarify how the boreal caribou study area was initially defined.
NSMA-15	Section 5.2.7	Response provided in the Proponent Response to Comments on 14 March 2019. Requested monitoring is included in Section 5.2.7.
NSMA-16	Section 4.3.1	Confirmed that WMMP calls for extra caution when groups of bison are present, section 4.3.1.
NSMA-17	Section 5.1.5 Section 5.1.6 Section 6.2 Appendix F	Further details on procedures and mitigation for blasting will be included in individual Blast Plans, as details are finalized for when and where blasting may be required. Pre-clearing wildlife surveys are included in Section 5.1.6 and Appendix F. Section 6.2 and Appendix F was updated to include a pilot study to test thermal imaging technology to detect wildlife in low light conditions prior to blasting and for general wildlife detection.
NSMA-18	Appendix F	Response provided in the Proponent Response to Comments on 14 March 2019. Search for mineral licks was added to the Pre-Clearing Bear Den Survey in Appendix F.
NSMA-19	Section 6.2 Appendix F	The requested monitoring is included in Appendix F, which includes pre-clearing wildlife surveys. Section 6.2 and Appendix F was updated to include a pilot study to test thermal imaging technology to detect wildlife in low light conditions prior to blasting, and for general wildlife detection. Further details will be provided in the individual Blast Plans. Search for other wildlife was added to the Pre-Clearing Bear Den Survey in Appendix F.
NSMA-20	N/A	Response provided in the Proponent Response to Comments on 14 March 2019. The rare and exotic plant survey will be provided to the public registry.
Environmental and Climate Change Canada (ECCC) - 9	Section 2.3 Appendix A	Table 1. has been updated to correct the prohibitions under SARA s. 32 and s.33. Appendix A did not contain the error.
ECCC-10	Section 2.3 Appendix A	Table 1 text has been revised to remove “cranes” and ‘Waterbirds” have been added.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
ECCC-11	Section 2,4	No changes were made to Section 2.4, as the comments apply to the Highway Operations Manual. NSI acknowledges ECCC comment. If removal of a historic dam is required, it will be scheduled prior to or after the nesting period to the extent possible. New mitigation added to Section 4.1.1 indicating that beaver dam removal should not be scheduled during the migratory bird nesting season.
ECCC-12	Section 2.5.1 Section 4.1.1	Section 2.5.1 references lessons learned on a previous project and therefore no changes were made to section 2.5.1. Section 4.1.1 text was revised to address ECCC recommendation.
ECCC-13	Section 2.8.2	Table 2 text was updated to address ECCC recommendation. Note: the relevant detail regarding bison and vehicle collisions did not change in the final version of the Recovery Strategy (Table 5 page 31).
ECCC-16	Section 3.0 Table 5	Table 5 text was revised to indicate that bird nest surveys are not required for wolverine. Pre-clearing surveys are intended for large mammals, so the terminology has been updated to differentiate between pre-clearing surveys for nests and pre-clearing surveys for wildlife. Baseline surveys for migratory birds are not monitoring, and so were not added to the table.
ECCC-17	Section 5.1.4	Section 5.1.4 text has been revised to clarify terminology between pre-clearing surveys for nests and pre-clearing surveys for wildlife. Added reference to the ECCC Guidelines to reduce risk to migratory birds. The Guidelines state that pre-clearing bird surveys should consider the available bird habitats, the migratory bird species likely to be encountered in such habitats, and the time periods when they would likely be present. As clearing during the nesting season is not planned, the required information available to prepare a plan for contingency.
ECCC-18	Section 5.1.4/ Appendix F	Survey details were moved from Section 5.1 to Appendix F, as requested by WRRB-13. Surveys are to be completed at least twice weekly.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
ECCC-19	Section 5.2	A new monitoring objective was added to the WMMP in Section 5.2, as required by the WLWB Reasons for Decision Section 6.2.4
ECCC-20	Section 5.1.7	ECCC contact information added to Appendix F for the Bird Nesting Activity Procedure and the Wildlife Incident Reporting Procedure
Wek' eezhii Renewable Resources Board: Laura Meiner WRRB-2	Section 2.8.1	This requested change was made to Section 2.8.1 and was already provided in Section 5.2.3.
WRRB-3	Section 4.2.1	The following information was to Section 4.2.1: -Visual cues (e.g. low visibility during driving, observed dust on vegetation at limits of work areas) would be the primary trigger for dust suppression. -Spot checks will be conducted using portable particulate meters. If levels are approaching the GNWT Ambient Air Quality Standards for Total Suspended Particulate dust suppression measures will be implemented. -Dust suppression will involve the application of water and/or Inspector approved chemical products such as calcium chloride using tanker trucks. -Trucks will apply water and/or products as needed to roads in use and producing dust. Only water will be used within 100 m of a water body. -Use of gravel construction entrances/exits where construction access meets public highways to avoid tracking material onto paved surfaces."
WRRB-4	Section 4.3.1	Section 4.3.1 - Removed text "valued component" and left reference to wildlife. Intent is to prevent injury or mortality to any wildlife.
WRRB-5	Section 4.3.1	The following information was added to Section 4.3.1 " The NSI Environmental Manager will communicate the reduced speed limit to Supervisors and equipment operators working in the area via site radios. The Manager will monitor equipment operations to ensure the reduced speed limit is followed."
WRRB-6	Section 4.7.1	Section 4.7.1 - Added reference "Education and Training for Project Workers". This section provides details on training project personnel will receive which includes wildlife right of way requirement.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
WRRB-7	Section 4.4.1	Section 4.4.1 - Revised the wording to better reflect the intent of the wildlife right of way as applying to general traffic and equipment operations in active construction areas.
WRRB-8	Section 4.4.1	Section 4.4.1 - Added additional information to expand on gently encouraging and to specify that personnel are to remain behind vehicle or equipment if approaching wildlife for protection. Re-worded section to clarify use of deterrents only in situations of imminent risk
WRRB-9	Section 4.4.1	Section 4.4.1 Added text "prior to start of work"
WRRB-10	Section 4.7.1	Section 4.7.1 Added text "immediately report observed nests to the NSI Environmental Manager"
WRRB-11	Section 4.7.1	Section 4.7.1 Added text " requirements of the Migratory Birds Convention Act" to the list of provided training.
WRRB-12	Section 4.7.1	Section 4.7.1 - text revised to include the requirement to complete a Wildlife Incident Report as described in Section F if a deterrent is used.
WRRB-13	Section 5.1	Section 5.1 and Appendix F updated for consistency. All monitoring details were moved to Appendix F and out of Section 5.1. No details were deleted or changed.
WRRB-14	Appendix F	Appendix F confirms that the surveys include borrow pits.
WRRB-15	Appendix F	Appendix F updated to confirm weekly surveys.
WRRB-16	Section 4.1.1 Section 5.1.4 Appendix F	Sections 4.1.1, 5.1.4 and Appendix F have been reviewed and updated. The primary course of action is to inform ECCC.
WRRB-17	Section 5.1.4	Section 5.1.4 text has been revised to include ECCC.
WRRB-18	Section 5.1.4	Section 5.1.4. text has been revised to include general information on non-intrusive surveys included.
WRRB-19	Appendix F	Appendix F Pre-Blasting Surveys have been updated to include a pilot study for thermal imaging technology.
WRRB-20	Appendix F	The requested change was made to clarify that Pre-Clearing ground surveys will occur no more than 48 hours before clearing.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
WRRB-21	Section 5.1.7	Section 5.1.7 was revised to include incidents related to migratory birds. Includes damage or disturbance to nests or eggs.
WRRB-22	Section 5.2.1 Section 6.2	Section 5.2.1 and Section 6.2 was corrected.
WRRB-23	Section 5.2.2	Section 5.2.2 updated to indicate that GNWT-ENR will continue to work with its co-management partners to develop the required monitoring and reporting program prior to the opening of the road.
WRRB-24	Section 5.3	Section 5.3 was updated to indicate that the requested analysis will be completed in the summer of 2019.
WRRB-25	Section 6.1	WRRB has been added to distribution list for the weekly reports
WRRB-26	Section 6.2.2	Section 6.6.2 was updated to define disturbance as "any activity that causes wildlife to abandon or defend their nest, eggs, den or young other than those authorized by a regulatory agency."
WRRB-27	Appendix C	Appendix was not updated, as the Responsibility Hierarchy is specific to the Proponent, as per the WMMP Guidelines (in this case ENR is both a regulator and a proponent, but no other regulators are included)
WRRB-28	Appendix D	Response provided in the Proponent Response to Comments on 14 March 2019.
WRRB-29	Appendix D	Appendix D was updated to confirm that the higher level of caution will be used until such time as collars indicate otherwise.
WRRB-30	N/A	Response provided in the Proponent Response to Comments on 14 March 2019.
Tlicho Government (TG)-4	Section 5.2.2 Section 6.2	Updates to the WMMP may be implemented following further discussion with the Tlicho Government and when more traditional knowledge is available. Section 6.1 outlines the commitment to include traditional knowledge in the annual reports.
TG-5	Section 5.2.5	Response provided in the Proponent Response to Comments on 14 March 2019.

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Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-3. Revisions Resulting from the Public Comment for W2016L8-0001, 14 March 2019

Reviewer	Section	Proponents Responses Revisions made to WMMP Version 3.3
TG-6	Section 6.2	No changes were requested. The Proponent looks forward to working with the Tlicho Government to incorporate traditional knowledge into the WMMP. Section 6.1 outlines the commitment to include traditional knowledge in the annual reports.
TG-7	Section 3.0 Table 4 Section 6.1.2	Section 6.1.2 highlights that any traditional knowledge studies completed in the area should be mentioned in the Annual Report and should include any traditional knowledge provided by the TG.
TG-8	Section 3.0 Table 4 Section 6.2	Response provided in the Proponent Response to Comments on 14 March 2019. Section 6.1.2 highlights that any traditional knowledge studies completed in the area should be mentioned in the Annual Report and should include any traditional knowledge provided by the TG.
TG-9	Section 3.0 Table 4	Response provided in the Proponent Response to Comments on 14 March 2019.
TG-10	Section 4.4.2	A consistency check completed.
TG-11	Section 4.4 Appendix F	Instances of bison deterrence, if ever required, will be documented as Incidents as per Appendix F.
TG-12	Section 6.1.2	No changes to the WMMP were requested. The GNWT and Tlicho Government have agreed to enter into a data sharing agreement.
TG-13	Section 6.1.2	Change made to Section 6.1.2 to reflect that TG may provide traditional knowledge for incorporation
TG-14	Appendix 1 in Appendix D	Traditional knowledge was included in the dates provided.
TG-15	Maps	No changes to the WMMP were requested.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-4. Revisions Resulting from the GNWT-ENR Review, 3 June 2019

Comment ID	Section	Proponents Responses Revisions made to WMMP Version 3.3
ENR-1	Section 2.8.2	Updates made to the title of Table 2 and species status in Section 2.8.2
ENR-2	Section 3.0	Reviewers with responsibilities under the Species At Risk Act require that each project show how impacts to species at risk are identified, mitigated and monitored (such as the EA IRs from ECCC requesting impact assessment for each species at risk individually). Table 5 is intended to provide the latter. The requested information has instead been added to the body text in Section 3.0, before Table 4.
ENR-3	Appendix F	Reference to surveys for bat hibernacula removed from Bird Nesting/Bat Roosting Activity survey in Appendix F
ENR-4	Section 4.1.1	Hibernacula may occur in abandoned buildings, mines and caves. Known buildings in the area are either burnt or in use. The GNWT Inventory of Landscape Change Web viewer confirms that there are no old mines in the area. Updated Section 4.1.1 to indicate that a search for hibernacula sites or potential within 200 m of the right of way will be included in the Bear Den Aerial Survey. Using this approach, a desktop assessment is not necessary.
ENR-5	N/A	Updated to confirm that pre-construction surveys for exotic and rare plants has been completed. The report has been cited and will be made publicly available. No changes to monitoring resulted from the study.
ENR-6	Section 4.3.1	Updates have been made as recommended in Section 4.3.1, related to temporary suspension of construction. Clarified that these situations trigger Wildlife Sightings Log or Incident Report entries.
ENR-7	Section 4.3.1	Updates have been made as recommended in Section 4.3.1, related to observation of wildlife in the right of way.
ENR-8	Section 5.1.6	Section 5.1.6 and Appendix F changed to include aerial survey for bear dens rather than ground surveys.
ENR-9	Section 4.3.1	Added to Section 4.3.1 that all wildlife observations should be reported in the wildlife sightings log, and so will be reported weekly to ENR.
ENR-10	Section 4.3.1 Section 6.1.1	See the third bullet in section 4.3.1, which confirms that all wildlife observations should be reported. The later bullet saying that all observations of species at risk should be reported is in response to a previous reviewer comment. Updated Section 6.1.1 accordingly.
ENR-11	Section 4.3.1 Section 4.4.1	Change made in both Sections 4.3.1 and 4.4.1.
ENR-12	Section 5.1.6 Appendix F	Section 5.1.6 updated to remove the ground-based bear den surveys and replaced with the Bear Den Aerial Survey. Overview of the methods provided in Appendix F.

Appendix A

Wildlife Management and Monitoring Plan Version 3.3 Revision Tables

Table A-4. Revisions Resulting from the GNWT-ENR Review, 3 June 2019

Comment ID	Section	Proponents Responses Revisions made to WMMP Version 3.3
ENR-13	Section 5.1.4 Appendix F	Reference to surveys for bat hibernacula removed from Bird Nesting/Bat Roosting Activity survey in Appendix F and Section 5.1.4
ENR-14	Section 6.2.2	Section 6.2.2 updated to clarify that snow will be managed similarly to Highway 3, and added a citation to PR#238 which gives the GNWT response to requests for snow clearing for wildlife
ENR-15	Appendix C	Environmental Monitors will report to the Environmental Manager, and the Environmental Manager will report to the Project Lead. No changes to Appendix C are required.
ENR-16	Appendix F	Column width changed. A poster will be developed, but also environmental monitors will be supplied with bird identification books.
ENR-17	Appendix F	Column width changed. A poster will be developed, but also environmental monitors will be supplied with bird identification books.
ENR-18	Appendix F	Added contact to ECCC to Appendix F. Removed reference to hibernacula
ENR-19	Appendix F	15-minute delay added to the Pre-blast survey in Appendix F.

Wildlife Management and Monitoring Plan
for the
Tịchọ All-Season Road Project

Plan Maintenance and Control

The North Star Infrastructure (NSI) Environmental Manager is responsible for the overall distribution, maintenance and updating of the Wildlife Management and Monitoring Plan (WMMP); however, Government of Northwest Territories Department of Environment and Natural Resources (GNWT-ENR) and Government of Northwest Territories Department of Infrastructure (GNWT-INF) are responsible for updating sections of the plan where they have a leading role in the implementation of specific WMMP programs (e.g. Section 5.2). Final plan details must be approved by the GNWT-INF and GNWT-ENR, and will be in accordance with conditions included in the land use permit issued by the Wek'èezhì Land and Water Board (WLWB). Prior to approval of the WMMP by the Minister of Environment and Natural Resources under s. 95(1) of the *Wildlife Act*, it will be submitted to the Wek'èezhì Renewable Resources Board (WRRB) for review as per section 12.5.1 of the Tłı̨chq Agreement.

This WMMP will be reviewed and possibly revised as needed but at least annually, taking into account changes in the law, environmental factors, monitoring results, GNWT-INF and Project Co. policies, and any other pertinent site-specific changes.

Changes to this WMMP that do not affect the intent of the plan are to be made as required on a regular basis (e.g., phone numbers, names of individuals, etc.).

Wildlife Management and Monitoring Plan Document History

Revision #	Section(s) Revised	Description of Revision	Prepared by	Issue Date
1	All	Original version (in draft) to accompany permit application to Board for preliminary screening. Submitted in March 2016 (PR #7 to EA1617-01). Primary focus was mitigation associated with direct effects to wildlife resulting from construction. In August 2017, the GNWT also submitted a conceptual Wildlife Effects Monitoring Plan (WEMP) to MVEIRB, which focused on effects to wildlife extending beyond the Project footprint (PR#151).	GNWT-ENR	March 2016
2	All	Incorporate conceptual Wildlife Effects Monitoring Program. Updated Revision 1 to reflect the content of the Adequacy Statement Response and the responses to information requests and to include commitments from the technical sessions (PR #110).	GNWT-INF GNWT-ENR	September 2017
3	All	Incorporation of relevant GNWT-INF commitments from the Environmental Assessment (EA).	GNWT-INF	March 2018
3.1	All	Incorporate Measures from the Report of EA Considered the North Slave Métis Alliance (NSMA) traditional knowledge report	GNWT-INF	April 2018

Wildlife Management and Monitoring Plan Document History

Revision #	Section(s) Revised	Description of Revision	Prepared by	Issue Date
3.2	All	Incorporated review by GNWT ENR Added details for the Preferred Proponent, North Star Infrastructure Provided to WLWB for approval under W201L8-0001 and W2016E0004	GNWT-INF	January 2019
3.3	All	Includes revisions required by the WLWB in the Reasons for Decision for W201L8-0001 and W2016E0004, and comments received from intervenors during the public review. Includes changes requested by GNWT-ENR to GNWT-INF in a letter dated 3 June 2019 and further edits provided on 10 June 2019 Considered the Yellowknives Dene First Nation traditional knowledge report	GNWT-INF NSI	June 2019

Additional copies of the WMMP can be obtained from the NSI Environmental Manager and/or the GNWT representative responsible for the Tłıchq All Season Road (Tłıchq ASR).

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Definitions and Acronyms

Adaptive management	Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. The term is commonly thought of as “learning by doing”. Active adaptive management typically involves active experimentation to simultaneously test a range of alternative management actions, whereas passive adaptive management may involve selecting only the “best” management option and evaluating the results to see if further adjustments are needed.
Construction Areas	Areas where there is active construction at that time.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
Danger Zone	Areas determined by blast supervisor.
DNA	Deoxyribonucleic acid
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
Environmental Monitor	Individuals who observe Project activities in relation to permit conditions, and report observations to the NSI Environmental Manager so that mitigation actions can be taken if necessary.
GNWT	Government of the Northwest Territories
GNWT-ENR	Department of Environment and Natural Resources, GNWT
GNWT-INF	Department of Infrastructure, GNWT
GNWT-Lands	Department of Lands, GNWT
GPS	Global Positioning System
Habitat	The area or type of site where a species or an individual of a species of wildlife naturally occurs or on which it depends, directly or indirectly, to carry out its life processes (NWT <i>Wildlife Act</i>).
MBCA	<i>Migratory Birds Convention Act</i>
Mitigation	Measures taken to eliminate or reduce a potential Project effect.
Monitoring	The process of observing and documenting Project activities. This document distinguishes between “mitigation monitoring” which is undertaken to identify the need to apply or modify mitigations for the protection of wildlife and wildlife habitat at the project site, and “effects monitoring” which consists of the design and implementation of monitoring studies for quantifying project-related effects both within the project footprint and region.
MVEIRB	Mackenzie Valley Environmental Impact Review Board
NSI	North Star Infrastructure (Design-Build-Finance-Operate-Maintain Contractor)
NT1	The Northwest Territories Range for boreal caribou, used for critical habitat identification in the Recovery Strategy for the Woodland Caribou, Boreal population in Canada.
NWT	Northwest Territories
Project	The Th̄cho All Season Road

Wildlife Management and Monitoring Plan
Tłıchq All-Season Road Project

Project Co.	The company that will be engaged to construct and operate the Tłıchq ASR.
Project site	The area encompassed by the Tłıchq ASR right of way, borrow pits, borrow pit access roads, and all equipment and infrastructure within this area.
SARA	<i>Species at Risk Act</i>
SARC	Species at Risk Committee
Tłıchq ASR	Tłıchq All Season Road
WEMP	Wildlife Effects Monitoring Plan
Wildlife	"wildlife" means (a) all species of vertebrates and invertebrates found wild in nature in the Northwest Territories, and individuals of those species, except (i) fish as defined in section 2 of the <i>Fisheries Act</i> (Canada), and (ii) other prescribed species and subspecies, (b) species of wildlife referred to in paragraph (a) that are domesticated or held in captivity, and individuals of those species, and (c) prescribed species or subspecies of vertebrates and invertebrates, and individuals of those species or subspecies. (NWT <i>Wildlife Act</i>).
WLWB	Wek'èezhì Land and Water Board
Worker	A person employed by the Developer or the Contractor to work on the Project.
WRRB	Wek'èezhì Renewable Resources Board
WMMP	Wildlife Management and Monitoring Plan

1.0 INTRODUCTION

The Government of the Northwest Territories (GNWT) is proposing to construct an all-season road from Highway 3 to the community of Whatì, called the Tłıchq All Season Road (Tłıchq ASR or the Project). The route will follow an old winter road route known as the ‘Old Airport Road’, that continues to be used for hunting, trapping and recreation (NSMA 2018, YKDFN 2018, Tłıchq Government 2014). Within the GNWT, this Project is led by the Department of Infrastructure (GNWT-INF). The Department of Environment and Natural Resources (GNWT-ENR) provided technical expertise on how potential highway impacts on wildlife and wildlife habitat could be mitigated and monitored.

The construction and operation of the Tłıchq ASR can impact wildlife and wildlife habitat in a number of ways, including direct habitat loss, habitat degradation, and functional habitat loss due to noise or other sensory disturbances, dust, accidental spills of toxic or hazardous substances, injury or mortality due to vehicle collisions, increased mortality associated with improved access for harvesters or wildlife-human interactions, increased mortality from facilitated predator movements, and wildlife attraction to construction camps. Particular concern over impacts to caribou from increased harvesting pressure, increased predation resulting from new access, increased road-induced mortality, and barrier effects, in addition to uncertainty regarding the effectiveness of mitigation measures were cited by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) as reasons for referring the Project to environmental assessment (EA; MVEIRB 2016).

This Wildlife Management and Monitoring Plan (WMMP) outlines mitigation measures that will be implemented to reduce Project impacts on wildlife and wildlife habitat, and the monitoring actions proposed to understand the impacts of the Tłıchq ASR on wildlife, test the predictions made during the EA, and inform adaptive management. This document is intended to meet:

- the requirements of s.95(2) of the *Wildlife Act* and other relevant legislation (see Appendix A),
- the various measures and commitments in the Report of Environmental Assessment ([PR #286](#); MVEIRB 2018), including the overarching guidance for WMMP updates and annual review described in Measure 10-2 and the monitoring requirements in the Report of Environmental Assessment Appendix C.
- water licence WL2016L8-0001 conditions

This document includes elements that are specific to the Tłıchq ASR Project, and some that are extensions of existing GNWT-ENR programs. In general, the monitoring described in Section 5.1 is Project-specific, while the monitoring described in Section 5.2 contains programs that will fit into or expand upon existing GNWT-ENR programs and operations, as well as Project-specific elements, which will be implemented regardless of this WMMP.

This WMMP describes mitigation and monitoring that applies to both road construction and operation phases of the Project. In some cases, mitigation is phase-specific, whereas other mitigation applies to both phases, as indicated.

This document refers to documents by their public registry number (i.e., the first version of the WMMP was [PR#7](#)) to facilitate cross-referencing with the Project Description Report and other relevant documents already submitted to the MVEIRB public registry for EA1617-01.

2.0 BACKGROUND

2.1 Project Description

The proposed Tłıchq ASR is an all-season two-lane gravel road (Appendix B). The Project footprint is comprised of the preferred route and is approximately 94 kilometres (km) in length with a 60 metre (m) right of way. A further 3 km of upgrades are required within Community Government of Whatì lands, bringing the total Project footprint to 97 km. The footprint also includes laydown areas, construction camps, and borrow sites with associated access roads with a 30 m right of way. An estimated 21 borrow sites/quarries may be developed with access roads. Construction camps and laydown areas will be located in either borrow sites or within the 60 m right of way, so are not expected to require additional land clearing. Almost all access roads are planned to overlap the preferred route right of way and borrow sites, and one borrow site may be accessed from the existing community access road from Whatì. Thus, access roads to borrow sites should not create additional direct physical disturbance to the landscape. The cleared driving surface of the preferred route is anticipated to be approximately 7 m wide. The Project follows a pre-existing overland winter road route, where possible, to minimize new disturbance to the landscape. The Project will also include water crossings that utilize culverts and four bridge structures. Some blasting is anticipated, the majority of which will be confined to the quarries. The road will have a posted speed limit of 70 kilometres per hour (km/h) during operations, and will allow for year-round use by commercial and private vehicles. Traffic levels are estimated at 20 to 40 vehicles per day, including potential traffic from a proposed mine northeast of Whatì. Construction of the Tłıchq ASR is expected to begin in winter 2019 and the road is scheduled to open by late 2022. Further Project description details are provided in the updated Project Description Report.

2.2 Objectives

The objectives of this WMMP include the following:

- Document and mitigate effects to wildlife from Tłıchq ASR construction and operation.
- Describe how adaptive management will be applied to wildlife mitigation and monitoring.
- Constitute part of the engagement with communities, regulatory agencies, and interested parties in wildlife effects mitigation and monitoring.
- Describe how the GNWT will meet relevant guidelines and regulatory requirements.

- Describe how wildlife monitoring for the Project will integrate with existing GNWT-ENR programs and initiatives, and with other wildlife monitoring in the area.

2.3 Statutory Requirements and Guidelines

Several federal and territorial acts and regulations apply to wildlife and wildlife habitat in relation to the Project, summarized in Table 1. Specific sections of the relevant acts are provided in Appendix A. The contents of this WMMP follow the requirements of Section 95(2) of the *Wildlife Act*.

Table 1: Regulatory Requirements for Wildlife and Wildlife Habitat Protection

Regulator	Regulatory Guidelines	Applicability to Wildlife Management and Monitoring Plan
Environment and Climate Change Canada (ECCC)	<i>Species at Risk Act</i> (SARA)	Under SARA, it is forbidden to kill, injure, harass, destroy the residence of, critical habitat of, capture or take an individual designated as extirpated, endangered, or threatened on federally-regulated lands (Sections 32 and 33) or territorial lands (Section 34 [1]). Birds listed under the Migratory Birds Convention Act are protected under SARA regardless of land tenure (Section 35(2)(a)). An order by the Governor in Council may, based on the recommendation of the Minister of Environment, apply Sections 32 and/or 33 on territorial lands if the territorial laws do not effectively protect the species or its residences in question (Section 34 [2] and [3]).
ECCC	<i>Migratory Birds Convention Act</i> (MBCA) and Migratory Birds Regulations	The MBCA protects migratory birds and their nests throughout Canada. Migratory birds covered under the act include: waterfowl, waterbirds, shorebirds, and songbirds. The MBCA is the enabling statute for the <i>Migratory Birds Regulations</i> , 1994. These regulations state that without authorization of a permit, the disturbance or destruction of a nest or eggs of a migratory bird is prohibited. See Appendix A for relevant excerpts of the MBCA.
GNWT-ENR	<i>Wildlife Act</i>	The Northwest Territories (NWT) <i>Wildlife Act</i> pertains to all wildlife harvesting and management within the NWT. The Act states that a Wildlife Management and Monitoring Plan is required for projects that may cause significant disturbance to big game, substantially alter, damage or destroy habitat, pose a threat of serious harm or contribute to cumulative effects. The Act also states that no person shall, without a permit, chase, disturb, or harass wildlife. It prohibits the destruction, disturbance, or taking of the eggs or nests of birds, and the damage or destruction of a den, beaver dam or lodge, muskrat push-up or hibernaculum. Permits to haze wildlife or engage in an activity that may result in disturbance to an animal or destroy/damage a den, dam, or lodge, or eggs or nests of birds not listed under the MBCA may be issued by GNWT-ENR under the Act. The Act also states that a person is permitted to kill wildlife in defense of human life or property. See Appendix A for relevant excerpts of the NWT <i>Wildlife Act</i> .

Table 1: Regulatory Requirements for Wildlife and Wildlife Habitat Protection

Regulator	Regulatory Guidelines	Applicability to Wildlife Management and Monitoring Plan
GNWT-ENR	<i>Species at Risk (NWT) Act</i>	The <i>Species at Risk (NWT) Act</i> applies to both public and private lands throughout the NWT and includes private lands owned under land claims agreements. The Act applies to any wild animal, plant, or other species managed by the Government of Northwest Territories (GNWT). The Act is intended to be complementary to the federal <i>Species at Risk Act</i> and addresses concerns at the territorial level.
Wek'èezhì Land and Water Board	Mackenzie Valley Land Use Regulations	Land use permits may include provisions for the protection of wildlife habitat. GNWT – Lands has compliance and enforcement responsibilities related to land use permits.

Other guidelines and documents that were considered in the preparation of this document include the following:

- Draft Wildlife Management and Monitoring Plan Guidelines 2: Content Requirements
- Fortune Minerals NICO Project Wildlife and Wildlife Habitat Protection Plan (Draft)
- Fortune Minerals NICO Project Wildlife Effects Monitoring Plan (Draft)
- Guidelines for Dust Suppression
- Northern Land Use Guidelines: Camp and Support Facilities
- Northern Land Use Guidelines: Pits and Quarries
- Northern Land Use Guidelines: Access Roads and Trails
- Forest Fire Prevention and Suppression Guidelines for Industrial Activities
- Tłıchǵ Government Traditional Knowledge Study for the Proposed All-Season Road to Whatì
- North Slave Métis Alliance Report of Traditional Knowledge Study for the Proposed Tłıchǵ All-Season Road
- Yellowknives Dene First Nation Traditional Knowledge Report Summary for the Tłıchǵ All-Season Road

- Various documents prepared by the GNWT for the Tłıchq ASR Project EA, including the Project Description Report ([PR #7](#)), Adequacy Statement Response ([PR #110](#)), Information Request responses, Technical Report responses and Closing Arguments ([PR #285](#)), available on the Mackenzie Valley Review Board public registry for EA1617-01.
- Report of Environmental Assessment and Reasons for Decision ([PR #286](#); MVEIRB 2018), Tłıchq ASR Project, Mackenzie Valley Review Board EA1617-01
- Comments made on 21 February 2019 during the public comment period for the document under the proceedings for the water licence WL2016L8-0001 and land use permit W2016E0004, and proponent responses made 14 March 2019, through the Wek'èezhì land and Water Board.
- Various conditions within water licence WL2016L8-0001.

2.4 Relevant Environmental Management Plans and Operating Procedures

Other environmental management plans or operating procedures that have some relevance to wildlife or wildlife habitat include the following:

- GNWT Erosion and Sediment Control Manual
- Tłıchq ASR Erosion and Sediment Control Plan
- Tłıchq ASR Water Monitoring Plan
- Tłıchq ASR Fish and Fish Habitat Protection Plan
- Tłıchq ASR Waste Management Plan
- Tłıchq ASR Spill Contingency Plan
- Tłıchq ASR Quarry Operations Plan
- Tłıchq ASR Adaptive Management Framework
- Highway Operations Manual – Beaver Dam Removal

2.5 Learnings from other NWT Highways

The GNWT has mitigation and monitoring in place to reduce the impacts of existing NWT highways on wildlife during construction, maintenance, and operations. This section summarizes some of the relevant practices and experiences.

2.5.1 Bird Nesting

The GNWT has recent experience with managing birds nesting on infrastructure. For example, swallows routinely nest on the sides and underside of bridges, particularly when there is a platform (such as at the bridge drains). While this does not present a concern during normal use and inspections, there may be a hazard to the nests when conducting maintenance. To prevent swallow nesting on the underside of the Buffalo River Bridge prior to major rehabilitation in 2016 and 2017, the underside of the bridge was enclosed by netting in the spring prior to the work to prevent bird access. As a result, swallows were not observed in the area and no nesting occurred on the bridge.

Conversely, spikes were tried with less success. To deter ravens from nesting in the overhead steel trusses of the Buffalo River Bridge, bird spikes were installed prior to nesting season. The ravens successfully built their nest regardless of the spikes, as the spikes appeared to provide a better foothold for their nest. Work on the bridge had to be delayed until the chicks were fledged.

Typically, no effort is made to stop birds from nesting on operational structures such as bridges when there is no immediate hazard to the nest. However, unoccupied nest material may be removed during bridge cleaning operations.

With regards to the potential for bank and barn swallows nesting in highway aggregate stockpiles, GNWT-INF follows Environment and Climate Change Canada (ECCC) guidance to manage stockpile slopes. Slopes are maintained at less than 70 degrees to prevent nesting (ECCC 2017a). Additionally, vegetation clearing is conducted as part of highway maintenance along right of ways, outside of the migratory bird nesting season.

2.5.2 Bison Interactions

Based on experience on other Northwest Territories (NWT) highways, the majority of bison-vehicle collisions occur in the months of August to November, with a peak in October. This may be due to shorter daylight hours, meaning that more vehicle collisions occurs in low light conditions, and lack of snow on the ground that makes it very difficult to see bison on the road (snow provides contrast). As driving conditions are generally still good at this time of year (no ice or snow), drivers may be driving faster than during the winter season. Bison tend to graze along the cleared right of way adjacent to roads and may do so more at this time of year than in mid-winter. Most collisions occur on straight and level sections of the road. Bison will travel on roads in winter, especially in years of deep snow.

In some winters, bison appear reluctant to leave the road, perhaps to avoid walking through deep snow. Plowing travel lanes for bison parallel to the road has been successful in reducing the number of animals on roads. In most cases, however, analyses of data available to the GNWT have not provided a clear explanation for why bison use roads or enter communities, how much time bison spend in places that result in conflicts, or how to prevent those incursions (Mackenzie Bison Working Group 2016).

Interactions with bison and highway operations occur during both construction and operation. During the four years of construction at the Deh Cho Bridge, bison were regularly present at open areas on the north approach. It was suspected that they selected these areas for the wind and associated shelter from insects. The bison did not seem to be disturbed by the construction activity, and often bedded within construction laydown areas. On rare occasions, bison got between an operator and the vehicle. In these instances, the operator would typically wait until the bison moved. During an anthrax outbreak, a bison monitor was hired to deter bison from the work area due to the human safety concerns. Significant efforts were also made to prevent bison from gaining access to the bridge during construction, and Texas Gates were added to the bridge to prevent access during operations.

With respect to highway operations, collisions with bison continue to be a significant concern. Bison collisions and mortalities were documented by the Mackenzie Bison Working Group (2016), reporting 270 bison-vehicle collisions on Highway 3 between 1989 and 2015. Although a full analysis of the available data has not been completed, the number of collisions varies year-to-year for unknown reasons and there appears to have been a general increase over time (Mackenzie Bison Working Group 2016).

To manage this risk, the GNWT includes wildlife-vehicle collisions in the “Drive Alive!” Program, with a focus on bison. This program includes public messaging and campaigns to reduce the number of bison collisions. The following advice is provided through the program to educate drivers:

- Check road bulletins before departing
- Drive at speeds appropriate for the conditions, particularly at dusk and dawn, and don’t overdrive headlights
- Avoid distractions
- If you see wildlife, flash your hazard lights to warn drivers behind you
- Do not swerve suddenly, rather stop and wait for bison to leave the road
- Remember that most bison travel in herds
- Use your high beams whenever possible

- Wear your seatbelt
- Do not approach an injured animal

Also included in the Program is signage reminding drivers of the presence of bison and current updates.

2.6 Roles and Responsibilities

The implementation of the wildlife effects monitoring programs (Section 5.2) will be led by GNWT-ENR, GNWT-INF, or North Star Infrastructure (NSI), the company that will be engaged to construct and operate the Tłıchq ASR. Mitigation monitoring activities will be led by NSI and conducted as required to fulfill the terms and conditions set out in regulatory approvals, licences and permits, to meet commitments, and to check the effectiveness of mitigation measures in avoiding or minimizing potential effects. Ultimately, the NSI Environmental Manager in conjunction with the GNWT representative responsible for the Tłıchq ASR will be responsible for ensuring that commitments in the WMMP are met and for monitoring the implementation of wildlife and wildlife habitat mitigation measures. Reporting hierarchy and contact information is provided in Appendix C.

2.7 Spatial and Temporal Scales

2.7.1 Spatial Boundaries

The WMMP uses different spatial boundaries, depending on the objective and the species. The spatial boundaries include:

- The Project footprint (i.e., the road, right of way, and quarries) was used for questions related to direct effects (such as habitat loss, vehicle collisions, disturbance to nests, and traffic levels).
- Study areas extending beyond the Project footprint were used for questions related to indirect effects and are defined for each monitoring program described.

2.7.2 Temporal Boundaries

The Project is planned to occur during two phases:

- Construction phase: the period from the start of construction to the start of operation (estimated at two to four years).
- Operation phase: encompasses operation and maintenance activities throughout the life of the Project, which is anticipated to be indefinite.

For the purposes of the WMMP, wildlife effects monitoring is proposed to continue for at least five years following the completion of construction.

2.8 Focal Wildlife Species

The WMMP focuses on mitigating and monitoring the impacts to caribou, species at risk, as well as big game species and prescribed species identified in the *Wildlife Act* General Regulations for which impacts were identified in the Adequacy Statement Response ([PR #110](#); e.g., moose and bison), and for which human safety concerns tend to arise (e.g., black bear). The WMMP also address a broader range of species for which general prohibitions under the *Wildlife Act*, *Species at Risk Act*, and *Migratory Birds Convention Act* and associated regulations apply. Mitigation and monitoring measures are meant to address impacts to individuals of these species and their habitat. Species descriptions can generally be found in the Adequacy Statement Response ([PR #110](#)), but relevant additional clarifications are included below.

2.8.1 Caribou

The Project may interact with both boreal and barren-ground caribou (Tłıchq Government 2014, NSMA 2018, YKDFN 2018; Tłıchq ASR EA PR#[189](#) & [190](#)). As these two ecotypes of caribou may be difficult to distinguish, the mitigation and monitoring described in this document applies equally to both, unless otherwise stated. A brief description of boreal and barren-ground caribou is provided. Further details on caribou habitat availability, habitat distribution, survival, and reproduction are provided in the Adequacy Statement Response ([PR #110](#)).

Boreal caribou are distributed across the forested regions of Canada, reaching the northern limit of their range in the NWT. Both traditional knowledge (Tłıchq Government 2014, NSMA 2018, YKDFN 2018; Tłıchq ASR EA PR#[178](#) & [179](#)) and science based studies of boreal caribou in Wek'èezhì suggest that boreal caribou have used areas along the proposed Project corridor, including some areas identified as traditional harvest sites and important habitat for boreal caribou (Tłıchq Government 2014). The Tłıchq ASR alignment is completely within the NT1 boreal caribou range as delineated in the national recovery strategy (EC 2012). Traditional knowledge indicates that the boreal caribou range includes parts of the proposed Tłıchq ASR route; however, the Elders indicated that the main habitat is to the west of the proposed corridor (Tłıchq Government 2014). The current population trend in the North Slave Region and Wek'èezhì region are unknown but areas except in southern NWT are believed to be stable or increasing (SARC 2012), and a recovery strategy is in place to guide the protection and recovery of boreal caribou in the NWT (Conference of Management Authorities 2017). Undisturbed habitat in the Wek'èezhì region may be limiting, as it is already above at or below the 65% disturbance threshold. GNWT is also engaging on a draft Framework for boreal caribou range

planning which will guide what factors regional Range Plans will consider, how disturbance will be managed, what kinds of actions are recommended for different levels of disturbance, and how those actions will be implemented (GNWT 2018). It is anticipated that the drafting and implementation of range plans will include regular reassessment of boreal caribou habitat. Boreal caribou prefer mature to old conifer forests since these habitats contain lichen, which is the boreal caribou's primary winter food source, and are present throughout the year (EC 2012).

Barren-ground caribou migrate from boreal habitats in winter, to calving grounds north of the treeline in summer. While the Project is nearest to the Bathurst and Bluenose East herd ranges, the Project likely occurs outside of the core seasonal range boundaries described by barren-ground collared caribou cows and regular interaction with the Project is not expected. However, traditional knowledge indicates that barren-ground caribou have in the past been present in areas near the north end of the Project during winter (Tłıchǵ Government 2014, YKDFN 2018), likely during periods of high abundance (Tłıchǵ ASR EA PR# [189](#) & [190](#)). Due to the current low population of the Bathurst herd, harvest controls have been in place since 2010, currently limiting harvest of Bathurst caribou to zero, and a Bathurst Caribou Range Plan has been prepared (GNWT-ENR 2018).

2.8.2 Species at Risk

The intent of the *Species at Risk Act*, and the *Species at Risk (NWT) Act* is to protect species at risk from becoming extirpated or extinct as a result of human activity. While the former was enacted by the Government of Canada, the latter was enacted by the GNWT and applies only to wild animals and plants managed by the GNWT. For example, species managed by the *Migratory Bird Convention Act* and Regulations are not covered by the *Species at Risk (NWT) Act*. For the purposes of this WMMP (and as recommended by ECCC 2017b), species may be considered to be of concern as a result of either their national, territorial or Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status (notwithstanding that COSEWIC does not provide legal protection). The list of species of risk that may be affected by the Tłıchǵ ASR Project is provided in Table 2. This table may be updated in the future to reflect the latest species assessments by the NWT Species at Risk Committee (SARC) and COSEWIC.

Table 2: Species At Risk Expected at the Project

Species	NWT SARC Assessment ^(a)	NWT List of Species at Risk	COSEWIC Listing ^(b)	SARA Listing ^(c)
Boreal caribou	Threatened	Threatened	Threatened	Threatened
Barren-ground caribou	Threatened	Threatened	Threatened	No Status
Wood bison	Threatened	Threatened	Special Concern	Threatened
Wolverine	Not at Risk	No status	Special Concern	Special Concern
Little brown myotis	Special Concern	Special Concern	Endangered	Endangered
Peregrine falcon	Not assessed	No status	Not at Risk	Special Concern
Short-eared owl	Not assessed	No status	Special Concern	Special Concern
Bank swallow	Not applicable	Not applicable	Threatened	Threatened
Barn swallow	Not applicable	Not applicable	Threatened	Threatened
Common nighthawk	Not applicable	Not applicable	Special Concern	Threatened
Olive-sided flycatcher	Not applicable	Not applicable	Special Concern	Threatened
Horned grebe (Western population)	Not applicable	Not applicable	Special Concern	Special Concern
Red-necked phalarope	Not applicable	Not applicable	Special Concern	No Status
Rusty blackbird	Not assessed	No status	Special Concern	Special Concern
Yellow rail	Not applicable	Not applicable	Special Concern	Special Concern
Gypsy cuckoo bumble bee	Data Deficient in the NWT	No status	Endangered	Endangered
Yellow-banded bumble bee	Not at Risk in the NWT	No status	Special Concern	Special Concern
Evening Grosbeak	Not applicable	Not applicable	Special Concern	No Status
Harris's Sparrow	Not applicable	Not applicable	Special Concern	No Status

All listings sourced from NWT Species at Risk (2019)

a) Northwest Territories Species at Risk Committee. Note that species included in the Migratory Bird Convention Act are not covered by the Species at Risk (NWT) Act and are labelled 'Not applicable'.

b) Committee on the Status of Endangered Wildlife in Canada

c) Species at Risk Act.

The WMMP is intended to be consistent with the Recovery Strategy for the Wood Bison in Canada (ECCC 2018a) by including mitigation to reduce vehicle collisions and including a mechanism for documenting and reporting bison observations along the Tłıchq ASR.

2.9 Sensitive Periods for Wildlife

Known sensitive periods for wildlife are listed in Table 3. Sensitive periods are not meant to imply that all construction activities will need to be suspended at these times; however, different types of pre-construction surveys and additional mitigation measures will be required during these times to minimize sensory disturbance and/or risk of wildlife injury or mortality.

Table 3: Sensitive Periods for Wildlife and Rationale

Wildlife	Period	Rationale
Boreal Caribou Moose Bison	Calving/Post-Calving: 05 April to 15 July (caribou) 15 May to 15 July (moose) 1 March to 15 July (bison)	Timing window captures parturition (birth) and the first month of life for offspring. Female ungulates entering the parturition period are usually in poorer physical condition from the harsher climatic conditions and limited food availability throughout the winter period. After parturition, females are subject to additional energy demands from lactation, and generally attain their lowest body condition post-calving. Disturbance during the calving/fawning period can induce fleeing, increased movement of young and increased nutritional demands, and higher susceptibility to predation.
Boreal Caribou	Late-winter: 16 March to 04 April	Boreal caribou are exhibiting their shortest daily movements at this time of year, likely reflecting the increased energetic costs of travelling through deep snow at this time of year, or limited areas that provide easier access for foraging on ground. As boreal caribou are depleting their stores of fat throughout the winter, and movement through deep snow or displacement from good foraging habitat could have high energetic costs, disturbance events at this time of year could have negative impacts on female body condition and subsequently have negative impacts on calving and calf survival.
Birds	Nesting season: 01 May to August 15	Prohibition against damage or destruction of nests or eggs of migratory birds under Migratory Birds Regulations and the <i>Wildlife Act</i> . This sensitive period should cover the majority of species, but it should be noted that some raptor species may initiate nests as early as late March, and may remain at the nest until mid-September. (Shank and Poole 2016)
Black Bear	Denning season: September 30 to March 30	Prohibition under the <i>Wildlife Act</i> against damage or destruction of a den. Disturbance of denning bears could jeopardize survival of both adults and young born in the den.

Appendix D provides further details on how construction activities may be modified based on sensitive periods and boreal caribou collar data.

3.0 POTENTIAL IMPACTS

The construction and operation of the Tłıchǵ ASR can impact wildlife and wildlife habitat in a number of ways, including direct habitat loss, habitat degradation and functional habitat loss due to noise, dust, spills of toxic or hazardous substances or other sensory disturbances, injury or mortality due to vehicle collisions, increased mortality associated with improved access for harvesters or wildlife-human interactions, increased mortality from facilitated predator movements, and wildlife attraction.

Follow-up monitoring under the *Mackenzie Valley Resource Management Act* is intended to evaluate the soundness of the EA. Potential impacts from the Project on wildlife are described in detail the Project Description Report (GNWT 2016) and the Adequacy Statement Response ([PR #110](#)), or are derived from traditional knowledge (Tłıchǵ Government 2014, NSMA 2018). Details of the proposed monitoring is provided in Section 5.0. To indicate the linkages between the EA and the proposed monitoring, Table 4 contains the Effects Pathways identified for wildlife in the Adequacy Statement Response ([PR #110](#)), and the associated monitoring that will address each identified pathway. Further, Table 5 indicates the monitoring proposed for each species at risk. Monitoring specific to bison, moose, black bear and wolves is described in Sections 5.2.5, 5.1.6 and 5.2.7.

Table 4: Project Effects Pathways to Wildlife and Applicable Monitoring

Adequacy Statement Response Effects Pathway	Pathway Category (Measurement Indicators)	Phase (Construction or Operation)	Pathway Assessment	Applicable Monitoring
Site preparation, construction and operation activities can result in the loss or alteration of vegetation and topography that may change habitat availability, use, and connectivity and influence wildlife abundance and distribution	Direct habitat loss (habitat availability, habitat distribution)	Construction Operation	Primary	- Spatial data for the footprint of the Project will be collected and reported when construction is complete to provide a precise record of direct habitat loss. - Boreal Caribou Collaring - Barren-ground Caribou Collaring - Moose and Bison Population Monitoring
Site preparation and construction may result in the destruction of roosting or hibernating bats (incidental take)	Direct habitat loss (habitat availability, survival and reproduction)	Construction	Primary	- Pre-clearing Bird Nest surveys (applies to roosting bats) - Wildlife Surveillance
Site preparation and construction may result in the destruction or disturbance of bear dens	Direct habitat loss (habitat availability) Sensory Disturbance (habitat availability, habitat distribution)	Construction	Primary	- Pre-clearing Wildlife Surveys - Wildlife surveillance monitoring at active construction areas
Site preparation and construction may result in the destruction of nests, eggs, and individuals of migratory birds (incidental take)	Direct habitat loss (habitat availability, survival and reproduction)	Construction	Primary	- Pre-clearing Bird Nest surveys - Wildlife Surveillance
Dust and air emissions, and subsequent deposition can change soil quality and vegetation, which can affect wildlife habitat availability and distribution	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Construction Operation	Secondary	- Boreal Caribou Collaring - Barren-ground Caribou Collaring
Surface water runoff from the Project area can alter surface water, soil, vegetation, which can change the availability and distribution of wildlife habitat	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Construction	Secondary	- Boreal Caribou Collaring - Barren-ground Caribou Collaring - Water Analysis Plan - Erosion and Sediment Control Plan

Table 4: Project Effects Pathways to Wildlife and Applicable Monitoring

Adequacy Statement Response Effects Pathway	Pathway Category (Measurement Indicators)	Phase (Construction or Operation)	Pathway Assessment	Applicable Monitoring
Changes to hydrology may alter drainage patterns and increase/decrease drainage flows and surface water levels that can cause changes to soils and vegetation, which can affect wildlife habitat availability and distribution	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Construction Operation	Secondary	• Boreal Caribou Collaring • Barren-ground Caribou Collaring • Water Analysis Plan • Erosion and Sediment Control Plan
Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) can change wildlife habitat availability, use and connectivity (movement and behaviour), which can lead to changes in wildlife abundance and distribution	Sensory disturbance (habitat availability, habitat distribution)	Construction Operation	Primary	• Road Surveys • Pre-blast Surveys • Traffic Monitoring • Boreal Caribou Collaring • Barren-ground Caribou Collaring • Moose and Bison Population Monitoring
Physical hazards on the Project site, and collisions with construction vehicles can cause injury or mortality to individual wildlife, leading to decreases in survival and reproduction	Direct mortality (survival and reproduction)	Construction Operation	Secondary	• Wildlife Sightings Log • Pre-blast Surveys • Road Surveys • Wildlife Surveillance • Traffic Monitoring • Wildlife Sightings and Collisions
Spills on the Project site can alter surface water quality, soils, vegetation, which can change the availability and distribution of wildlife habitat	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Construction Operation	No Linkage	• Water Analysis Plan
Increase in public access could affect wildlife survival and reproduction through vehicle strikes, and/or legal and illegal hunting	Access and harvesting (survival and reproduction)	Operation	Primary	• Traffic Monitoring • Access and Harvest Monitoring

Table 4: Project Effects Pathways to Wildlife and Applicable Monitoring

Adequacy Statement Response Effects Pathway	Pathway Category (Measurement Indicators)	Phase (Construction or Operation)	Pathway Assessment	Applicable Monitoring
Use of linear corridors and converted habitat (i.e., younger, more productive forest) by prey and predators leading to decreases in survival and reproduction of prey	Indirect habitat loss or alteration (survival and reproduction)	Operation	Secondary	• Boreal Caribou Collaring • Barren-ground Caribou Collaring • Moose and Bison Population Monitoring • Wildlife Sightings and Collisions • Wildlife sighting and collision reporting system
Use of linear corridors by bison may lead to range expansion and affect moose and caribou habitat	Indirect habitat loss or alteration (habitat distribution)	Operation	Primary	• Moose and Bison Population Monitoring • Wildlife Sightings and Collisions
Loss of functional habitat due to competition with other wildlife species (in particular bison)	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Operation	Primary	• Boreal Caribou Collaring • Barren-ground Caribou Collaring • Moose and Bison Population Monitoring
Altered movement patterns, including any changes to interactions with other caribou herds	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Operation	Primary	• Boreal Caribou Collaring • Barren-ground Caribou Collaring • Moose and Bison Population Monitoring
Reduced habitat availability and distribution due to any increases in fires resulting from use of the road.	Indirect habitat loss or alteration (habitat availability, habitat distribution)	Operation	Secondary	• Boreal Caribou Collaring • Barren-ground Caribou Collaring • Moose and Bison Population Monitoring • Access and Harvest Monitoring
Attraction of wildlife to the Project (e.g., food waste, petroleum based products, salt) during construction may increase human wildlife interactions and change predator-prey relationships, which can affect wildlife survival and reproduction	Direct mortality (survival and reproduction)	Construction Operation	Secondary	• Wildlife Sightings Log • Road Surveys • Pre-blast Surveys • Wildlife Surveillance
Introduction and spread of noxious and invasive plant species can affect plant community composition, which can affect wildlife habitat availability and distribution	Indirect habitat loss or alteration (habitat availability)	Operation	Secondary	• Herbaceous plant surveys

Table 5: Applicability of Monitoring to Species at Risk

Species	Bird Nesting and Bat Roosting	Wildlife Surveillance	Pre-Clearing Wildlife Surveys	Boreal Caribou Collaring	Moose and Bison Population	Road Surveys	Pre-blast Surveys	Wildlife Sightings and Collisions	Wildlife Incidents	Access and Harvest Monitoring	Wildlife Sightings Log
Boreal caribou			✓	✓		✓	✓	✓		✓	✓
Barren-ground caribou			✓	✓		✓	✓	✓		✓	✓
Wood bison			✓		✓	✓	✓	✓		✓	✓
Wolverine		✓						✓	✓	✓	✓
Little brown myotis	✓	✓									✓
Peregrine falcon	✓	✓									✓
Short-eared owl	✓	✓									✓
Bank swallow	✓	✓									✓
Barn swallow	✓	✓									✓
Common nighthawk	✓	✓									✓
Olive-sided flycatcher	✓	✓									✓
Horned grebe	✓	✓									✓
Red-necked phalarope	✓	✓									✓
Rusty blackbird	✓	✓									✓
Yellow rail	✓	✓									✓

4.0 MITIGATION

Mitigation for each of the Pathway Categories (Table 4) is described in the section below. Mitigation is derived from current standard practices on other NWT roads and highways, best practices or guidelines listed in Section 2.3, through recommendations provided to the developer through the EA process, through Measures from the Report of Environmental Assessment (MVEIRB 2018) or from suggestions emanating from traditional knowledge studies (Tłıchq Government 2014, NSMA 2018).

4.1 Mitigation for Direct Habitat Loss

4.1.1 Construction

- The current layout of the Project footprint will minimize the amount of new disturbance by following the existing Old Airport Road route to Whatì and intersecting areas previously burned where feasible.
- Limit the cleared Tłıchq ASR corridor to 60 m wide (not including the borrow sites and access corridors).
- Borrow source areas will be minimized and will be located close to the Tłıchq ASR right of way so that access roads are short. Most of the borrow sources also overlap the Tłıchq ASR alignment so additional disturbance to access these areas will be limited.
- If borrow pits and quarries are no longer required during the operations phase, reclamation will be conducted in consideration of the Northern Land Use Guidelines for Pits and Quarries. Once reclamation activities are complete, access will be blocked to quarries and borrow sources that are no longer required.
- Avoid disturbance or destruction of bird nests and eggs by clearing land outside of the bird nesting and fledging season (May to mid-August); however, if vegetation clearing is required within this time, non-intrusive pre-clearing nest surveys will be completed and no-work zones will be observed where there is evidence of nesting. Through consultation with GNWT-ENR and ECCC, bird nests will be protected by a buffer that protects the nest while allowing construction to continue, and will be monitored. Details of nests identified and the mitigation will be included in the weekly wildlife monitoring reports.

- Birds will be deterred from nesting on infrastructure by placing covers/screens on vents, holes, and crevices where birds could potentially nest, and if necessary, through active (but non-lethal) disturbance of birds to discourage them from establishing a nest on a construction site. Physical deterrents, if required, will be applied after the nesting period and prior to the arrival of birds in the spring. If bird nesting occurs, the nest will not be disturbed until after the birds have left the area, with clearance to be discussed in consultation with GNWT-ENR and ECCC.
- Beaver dam removal, if required to keep culverts clear, will be scheduled prior to or after the migratory bird nesting period.
- Destruction of bat roosts will be avoided by managing, to the extent possible, the incremental removal of vegetation so that it occurs outside of spring through fall. If vegetation clearing is required within this time, pre-clearing bat roost surveys and 'no work zones' for identified active maternity roost sites will be implemented to avoid disturbance.
- Avoid disturbance of hibernating bats by surveying for sites of hibernacula potential (i.e., abandoned buildings and mines and caves) within 200 m of the right of way for , during the Bear Den Aerial Survey.
- If any reclamation activities are planned for the terrestrial portions of the existing Tłıchǵ winter road, it will be managed and addressed jointly by the Tłıchǵ Government and the GNWT by way of a bilateral agreement.
- Operating machinery on highly saturated soil (primarily during freshet) outside of the highway alignment, borrow sources and borrow source access roads will be - avoided, where practical. Where it is unavoidable, suitable ground equipment will be used to prevent unnecessary soil damage through rutting.
- Herbaceous plant surveys of the Project footprint was completed in August 2018 by a qualified botanist and a Tłıchǵ assistant (Golder 2019). Further surveys will be completed at one year, five years and ten years following completion of construction. If rare plants and/or invasive species are found, GNWT-ENR will be consulted to determine next steps.
- Any required reseeding will be done so with an approved native, non-invasive, seed to avoid the introduction of noxious and invasive plants.

4.1.2 Operations

- Signs indicating the daily wildfire risk will be posted at the Th̄chq ASR junctions at Highway 3 and the existing Whatì community access road by the GNWT to minimize the risk of accidental fires.
- As the operational phase will require gravel, borrow pits will remain only accessible to Project Co. staff and blocked to unauthorized personnel. Protocols to follow the Quarry Operations Plan(s).

4.2 Mitigation for Indirect Habitat Loss or Alteration

4.2.1 Construction

- Dust suppression techniques (as per the GNWT Guideline for Dust Suppression and the GNWT-INF Erosion and Sediment Control Manual) will be utilized as required and feasible to reduce dust emissions onto vegetation outside of the right of way.
 - o Visual cues (e.g. low visibility during driving, observed dust on vegetation at limits of work areas) would be the primary trigger for dust suppression
 - o Weekly checks during dry summer conditions will be conducted using portable particulate meters. If levels are approaching the GNWT Ambient Air Quality Standards for Total Suspended Particulate dust suppression measures will be implemented.
 - o Dust suppression will involve the application of water and/or Inspector approved chemical products such as calcium chloride using tanker trucks
 - o Trucks will apply water and/or products as needed to roads in use and producing dust. Only water will be used within 100 m of a water body.
 - o Use of gravel construction entrances/exits where construction access meets public highways to avoid tracking material onto paved surfaces.
- Layout and location of quarries will consider the Northern Land Use Guidelines for Pits and Quarries.
- Reduced speed limits (50 km/h) during construction will reduce dust production.
- Clean and inspect Project vehicles and equipment prior to entering the NWT to avoid introducing noxious and invasive plants.
- Re-cleaning Project vehicles and equipment if an area of weed infestation is encountered, prior to advancing to a weed-free area to minimize the spread of noxious and invasive plants.

- Locating and managing cleaning locations on the Project site to avoid the spread of noxious and invasive plants (see the pamphlet “Invaders in the Northwest Territories” for more information on invasive plants in the NWT).
- Domestic and recyclable waste and dangerous goods will be stored on site in appropriate containers, as per the Waste Management Plan, to avoid exposure until they are shipped off site to an approved facility, and to prevent spills or leakage into the surrounding environment that would cause habitat degradation.
- Hazardous materials and fuel will be stored according to regulatory requirements to avoid contamination to the environment and workers
- Individuals working on-site and handling hazardous materials will be trained in the Workplace Hazardous Materials Information System and the Transportation of Dangerous Goods to avoid accidental spills.
- An approved Spill Contingency Plan will be followed by Project staff to prevent spills and if spills occur as a result of an accident, that they will be controlled to minimize the area impacted.
- Emergency spill kits will be available wherever toxic materials or fuel are stored and transferred during construction to minimize effects to vegetation and wildlife habitat.
- Spill response and containment will be completed expeditiously in accordance with the approved site specific Spill Contingency Plan to reduce the area impacted. Spills will be reported in a timely manner.
- Construction equipment, machinery, and vehicles will be regularly maintained to avoid accidental spills.
- Fuel storage areas will be equipped with spill kits, and will be located at least 100 m away from water bodies. Large fuel storage tanks (2,000 to less than 80,000 litres) will be double walled as per the regulations.
- Construction and maintenance vehicles will be equipped with spill kits and fuelled at least 30 m away from water bodies.
- The GNWT-INF Erosion and Sediment Control Manual, in conjunction with a suitable road design, will be utilized for erosion and sediment control and slope stabilization, which should minimize damage to riparian, stream, wetland, and lake habitat from altered hydrology.
- Workers will not travel off the Project site unless there is a specific requirement.

- Riparian areas will be maintained whenever possible to minimize erosion, with vegetation removal limited to the width of the right of way. At watercourse crossings, a riparian buffer will be maintained along the width of the right of way except at the actual crossing location.
- Removed vegetation/debris will be removed from site to prevent them entering the watercourse.
- Impacts to riparian vegetation at temporary crossings will be minimized by using structures such as snow fills and single-span bridges instead of fording, especially where banks are susceptible to erosion.
- Disturbed areas along the streambanks will be stabilized upon completion of work to minimize erosion.
- Culverts will be embedded as appropriate to maintain species and habitat present, and will be installed parallel to the existing channel to minimize changes to channel morphology.

4.2.2 Operation

- Dust suppression techniques (as per the GNWT Guideline for Dust Suppression and the GNWT-INF Erosion and Sediment Control Manual) will be utilized as required to reduce dust emissions onto vegetation outside of the right of way.
- Signs indicating the daily wildfire risk will be posted by GNWT at the Tłıchq ASR junctions at Highway 3 and the existing Whatì community access road to minimize the risk of accidental fires.
- Use of culverts and other design features will minimize changes to local flows and drainage patterns and drainage areas. Regular maintenance will occur along the Tłıchq ASR to ensure culverts are clear of debris (including ice during spring thaw).
- Culverts will be embedded as appropriate to maintain species and habitat present, and will be installed parallel to the existing channel to minimize changes to channel morphology.
- Disturbed areas along the streambanks will be stabilized upon completion of work to minimize erosion.

4.3 Mitigation for Sensory Disturbance

4.3.1 Construction

- Project staff will be provided with awareness training prior to working on the site as outlined in Section 4.7.1. This training will include the various procedures and protocols that are included in this section.
- Harassment, feeding or approaching wildlife by Project staff will be prohibited.
- Project staff will communicate, via radio, relevant observations of wildlife to the NSI Environmental Manager or designate. The NSI Environmental Manager will then relay this information to Site Supervisors and equipment operators working in the area. Any such observations should be included in the Wildlife Sightings Log.
- Construction will be temporarily suspended by the NSI Environmental Manager, or speed limits on the road temporarily reduced, when moose, caribou, bison, or any other wildlife that may be at imminent risk of injury or mortality, are known to be near the active construction site. An Incident Report will be prepared for each such occurrence.
- Blasting may only proceed if no large mammals (e.g., caribou, moose, and bison) are detected in the blast radius identified by Blast Supervisor. The Blast Supervisor or Environmental Monitor will conduct a visual scan of the blast radius prior to blasting to ensure no large mammals are present. All blasting will be preceded by air horn signals, which should deter wildlife from the area. Specific measures for each blast will be specified in the site-specific Drill and Blast Plan. Specific mitigation measures that apply to blasting during the late-winter and calving season for collared boreal caribou are included in Appendix D.
- Construction activities will consider sensitive periods. For example, vegetation clearing is planned to occur outside of the nesting season for migratory birds.
- Boreal caribou collar locations will be used to notify construction crews of their proximity to active construction areas during the late-winter and calving season, and increased mitigation measures will be triggered as described in Appendix D.
- If any big game species are observed within the cleared right of way adjacent to active construction areas, speed limits will be reduced to 30 km/h within 1 km on either side of the sighting. If bison are present on roads, Environmental Monitors will be contacted. Environmental Monitors should be aware that groups of bison with more than 5 individuals are likely to be nursery groups containing calves and juveniles. Any such observations should be included in the Wildlife Sightings Log.

- The NSI Environmental Manager will communicate, via radio, the requirements for a reduced speed limit to Supervisors and equipment operators working in the area. The Manager will monitor equipment operations to ensure the reduced speed limit is followed.
- In the event that an active mammal den or bird nest is identified during construction, GNWT-ENR and ECCC (for migratory birds) will be consulted to determine an appropriate strategy to avoid or minimize disturbance.
- Pre-clearing wildlife surveys will be used to detect the presence of dens and large mammals prior to vegetation clearing (Appendix F).
- Observations of caribou, moose, bison, and other big game and species at risk will be reported to Environmental Monitors. Observations of species at risk will be reported to GNWT-ENR through weekly reports.
- Fixed-wing and helicopter flights associated with highway construction will consider the minimum altitude guidelines outlined in the brochure “Flying Low? Think Again.”, and Appendix D of the WMMP, where safety permits. Flight paths will follow the cleared highway right of way to the extent feasible. Observations of big game should be documented in the Wildlife Sightings Log.
- If available, generalized calving locations of collared boreal caribou will be provided to pilots indicating areas to avoid during the calving season. Pilots will be expected to complete a visual scan for large mammals prior to landing.
- If caribou, bison, or moose are observed during helicopter flights, they will not be approached, followed, hovered above, or circled around.
- Pilots will increase altitude and follow flight paths that veer away from caribou, bison, and moose if the animals are observed running, panicking, or exhibiting other startled response.
- Road embankments will be gently sloped and use fine-grain materials (YKDFN 2018)

4.4 Mitigation for Direct Wildlife Mortality

4.4.1 Construction

- Project staff will be provided with awareness training prior to start of work on the site as outlined in Section 4.7.1. This training will include the various procedures and protocols that are included in this section.
- Quarry stockpiles, overburden, or exposed soil banks will be maintained with slopes of less than 70 degrees to prevent bank swallow nesting, following ECCC (2017a) guidance. Regular activity in the quarries will also help to deter nesting (ECCC 2017a). If a nesting colony is found, a buffer zone of at least 50 m will be established, and excavation of the nest area will not continue (ECCC 2017a).
- Awareness training provided to personnel, as outlined in Section 4.7.1, will include information on yielding the right of way to wildlife during construction. If wildlife are crossing or attempting to cross a road or active construction area, traffic and mobile equipment will stop and wait at a distance of at least 100 m back for the animal to cross unless they are posing a risk to personnel or themselves as noted in the following bullet point. The presence of large mammals (e.g., caribou, moose, and bison) and other wildlife will be communicated to construction workers, which will minimize risks of physical hazards through site-wide awareness.
- Project staff will communicate, via radio, relevant observations of wildlife to the NSI Environmental Manager or designate. The NSI Environmental Manager will then relay this information to Site Supervisors and equipment operators working in the area.
- If bison, caribou or moose are observed in areas where there are hazards, operations at that particular work site will be temporarily suspended by the NSI Environmental Manager to allow wildlife to move away from the area of their own accord. If they do not leave the area within 15 minutes, they may be gently encouraged to move away from construction activities. This will involve the slow approach of Environmental Monitors by vehicle towards the caribou/moose/bison or making their presence known by calling out and waving their arms to encourage them to move. This is to be done from behind a vehicle or piece of equipment to prevent personnel from going too close to the animal. An Incident Report will be completed for all deterrent actions. It is possible that females may be unwilling to leave the area if they have a calf hiding nearby (see Table 3). In these cases, operations in the area may be suspended by the NSI Environmental Manager.

- Bear-banger type deterrents are only to be used if there is an immediate need to mitigate risk to personnel or wildlife safety.
- Speed limits for construction vehicles will be limited to 50 km/h.
- If any big game species are observed within the cleared right of way adjacent to active construction areas, speed limits will be reduced to 30 km/h within 1 km on either side of the sighting. The NSI Environmental Manager will communicate, via radio, the requirements for a reduced speed limit to Supervisors and equipment operators working in the area. The Manager will monitor equipment operations to ensure the reduced speed limit is followed.
- Blasting may only proceed if no large mammals (e.g., caribou, moose, and bison) are detected in the blast radius identified by Blast Supervisor. The Blast Supervisor or Environmental Monitor will conduct a visual scan of the blast radius prior to blasting to ensure no large mammals are present. All blasting will be preceded by air horn blasts, which will deter wildlife from the area. Specific measures for each blast will be specified in the site-specific Drill and Blast Plan. Specific mitigation measures that apply to blasting during the late-winter and calving season for collared boreal caribou are included in Appendix D.
- Pre-clearing den surveys will be completed. If an active mammal den is identified during pre-clearing surveys, or during construction activities, GNWT-ENR will be consulted to determine next steps. Operations near the den will be temporarily suspended by the NSI Environmental Manager, and GNWT-ENR will be consulted.
- Project staff will be provided with environmental awareness training.
- An appropriately designated supervisor will provide field workers with Bear Aware training (see Appendix E) and general wildlife awareness.
- Environmental Monitors will document wildlife and manage and minimize risks to wildlife and workers.
- Harassment, feeding or approaching wildlife by Project staff will be prohibited.
- No hunting or fishing by Project staff will be permitted.
- To avoid wildlife harvest, firearms will not be allowed on-site during construction except for firearms in the possession and control of authorized Environmental Monitors or law enforcement officers.

- Camps and buildings will be designed to prevent wildlife interactions, including appropriate storage of non-waste wildlife attractants (e.g., food and petroleum products) and use of adequate lighting will be installed in areas where it is essential to detect bears that may be in the vicinity.
- Development and implementation of a Waste Management Plan to avoid access to food waste by wildlife. This will include:
 - o Waste products will be stored in secured containers and transported to approved facilities to avoid access by wildlife.
 - o Food waste will be collected in bear proof containers that minimize attraction or impact to wildlife.
 - o Littering and feeding of wildlife will be prohibited to avoid wildlife attraction to the site.
 - o All workers and visitors will be educated on waste management practices for the Project site to avoid wildlife attraction.
- Exposure of wildlife to contaminants will be avoided by use of appropriate deterrents (e.g., temporary fencing and noise makers) to discourage wildlife from entering an affected area.
- In case of wildlife exposure to contaminants, territorial (GNWT-ENR) or federal (ECCC) authorities will be contacted immediately to determine appropriate course of action, which may include capturing, relocating or treating contaminated wildlife.

4.4.2 Operation

- Speed limits will be established, posted, and enforced to reduce the risk of vehicle-wildlife collisions (NSMA 2018).
- GNWT can install temporary portable signage and temporarily lower speed limits on parts of the Tłıchq ASR if a localized wildlife collision hazard is present. This mitigation will be applicable to areas where groups of bison, caribou, or moose are seen or reported along the right of way, in areas where wildlife-vehicle collisions repeatedly occur, or where caribou are known to be nearby based on collar data.
- GNWT's "Drive Alive!" Program includes information on avoiding wildlife collisions (see Section 2.5.2). Information on this program will be disseminated at appropriate locations in the communities of Whatì and Behchokò.

- Quarry stockpiles, overburden, and exposed soil banks will be maintained with slopes of less than 70 degrees to prevent bank swallow nesting, following ECCC (2017a) guidance. Regular activity in the quarries will also help to deter nesting (ECCC 2017a). If a nesting colony is found, a buffer zone of at least 50 metres will be established, and excavation of the nest area will not continue (ECCC 2017a).

4.5 Mitigation for Access and Harvesting

4.5.1 Construction

- Firearms will not be allowed on-site except for firearms in the possession and control of authorized Environmental Monitors or law enforcement officers.
- No hunting or fishing by Project staff will be permitted.

4.5.2 Operation

- GNWT-ENR will enforce the NWT's hunting regulations which are in place to ensure that wildlife is conserved for future generations and that hunting is done safely (NSMA 2018).
- The Tłıchq Government will investigate the need for regulations and policies to manage the construction of cabins and design of hunting, trapping, and fishing in the area, in order to minimize impacts on local animal populations. Tłıchq Government will work to provide clear guidance on this topic (Mitigation 10 of PR#[96](#), Tłıchq [Government 2014](#)).
- Discuss use of windrows to limit access to spur trails with the Tłıchq ASR Corridor Working Group (Tłıchq [Government 2014](#), YKDFN 2018).
- Further mitigation and monitoring measures to address Access and Monitoring are described in Wildlife Effects Monitoring (Section 5.2 of this document).

4.6 Caribou Mitigation

In addition to the mitigation described in Sections 4.1 to 4.5, specific mitigation is required for boreal and barren-ground caribou during the Construction phase.

Barren-ground caribou show a distinct seasonal migration and tend to travel in groups. While the Tłıchq ASR is beyond the recent range of barren-ground caribou, traditional knowledge indicates that they are occasionally present in the area during winter. Further are considered a species at risk and require attention. As it can be difficult for inexperienced observers to distinguish barren-ground and boreal caribou, the same mitigation is applied to both if they are known to be in the Tłıchq ASR area, as described in Table 6. Protocols for the use of collared caribou locations to mitigate impacts from construction are provided in Appendix D.

Table 6: Construction Phase Mitigation and Monitoring for Boreal and Barren-ground Caribou

Threshold	Caribou-specific Mitigation	Caribou-specific Monitoring
Barren-Ground collared caribou within 10 km of the Tłıchq ASR	- GNWT-ENR will advise the NSI Environmental Manager if a collared caribou is within 10 km of the Project, and provide updates based on collar data as required. - GNWT-ENR will also notify GNWT-INF, Tłıchq Government, Wek'èezhıi Renewable Resource Board (WRRB) NSI Environmental Manager to notify all Project staff working in the area	Wildlife Road Surveys along the Tłıchq ASR by Environmental Monitors or patrols by GNWT-ENR wildlife officers to document caribou presence near the road and group size
Caribou (barren-ground or boreal) observed on or adjacent to the Tłıchq ASR right of way	- Caribou have the right of way on the road - Communicate location of caribou sightings to other Project staff working in the area via radio - Notify GNWT-ENR of the location and number of individuals - Decrease speed limits within 1 km on either side of the area to 30 km/h - NSI Environmental Manager may temporarily suspend construction traffic and other activities if caribou are on the road or within an active construction area (e.g. borrow source)	- Environmental Monitors will be informed of general location and time of caribou sighting and will initiate active monitoring of the area. - Continue monitoring the road within 1 km on either side of where caribou were sighted for 30 minutes after they leave the right of way, before increasing speed limits to 50 km/h again.

Table 6: Construction Phase Mitigation and Monitoring for Boreal and Barren-ground Caribou

Threshold	Caribou-specific Mitigation	Caribou-specific Monitoring
Collared boreal caribou within 0.5-3 km of the Tłıchǫ ASR right of way, borrow sources or borrow source access roads	See Appendix D for detailed mitigation measures	Boreal caribou collar-based monitoring; maps of collar locations will be provided on a more frequent basis if caribou occur within cautionary zones during late-winter and calving periods; see Appendix D for further details.

Tłıchǫ ASR = Tłıchǫ All Season Road; GNWT-ENR = Government of the Northwest Territories Department of Environment and Natural Resources; GNWT-INF = Government of the Northwest Territories Department of Infrastructure; NSI = North Star Infrastructure; km = kilometres; km/h = kilometres per hour.

4.7 Education and Training

4.7.1 Education and Training for Project Workers

Contractor(s) hired for road construction, and maintenance activities during the operational phase of the road, will be responsible for educating and training Project staff on applicable practices contained within the WMMP. All training will be documented and recorded in the WMMP Annual Report. Information provided to contract employees during training and prior to starting work will include the following:

- Review of the WMMP.
- An understanding of wildlife response protocols including reporting requirements and procedures related to wildlife observations, wildlife incidents, and wildlife-related accidents. Posters on display in camps illustrating species that require real-time reporting will reinforce the training information.
- Project staff must report wildlife observations using the Wildlife Sightings Log, and to report any incidents or concerns immediately to the Environmental Monitors.
- Understanding of confidentiality of observations made during work.
- Instructions not to disturb any birds or nests of observed birds and to immediately report discovered or observed nests to the NSI Environmental Manager.
- Requirements of the Migratory Birds Convention Act.
- Reporting procedures for all wildlife observations.
- Instructions regarding Project mitigation and operating protocols (e.g., wildlife right of way and speed limits).

- An understanding of Species at Risk, including identification (posters in camps) and reporting procedures.
- Wildlife legal requirements and policies (i.e., no feeding, no harassment, no hunting, and no trapping).
- Instructions on waste and wildlife attractant management including the implications of wildlife human-habitation, food conditioning, and unsecured wildlife attractants.
- An understanding of working safely in wildlife areas and avoiding wildlife encounters through familiarization with the ecology of potentially dangerous predators, including bears, wolves and wolverines. This will include education on the identification, behaviour, seasonal movements, and habitat preferences of these species, as well as specific bear awareness and safety training, referencing regulations, permit conditions, industry standards, and Project commitments/policies, and information on managing non-natural attractants. Appropriate videos/DVD's such as "Staying Safe in Bear Country" and "Working in Bear Country", as well as the GNWT Bear Safety Brochure (see Appendix E) will be provided as part of the bear awareness and safety training. Workers will be educated on proper procedures for exiting vehicles or buildings in bear areas, where high risk bear-human interaction areas are likely to occur (i.e., areas where vegetation or terrain limit visibility and might hide a bear, and locations where sounds may mask the sound of an approaching bear), and to watch for bear signs and avoid potential denning and feeding areas, if possible.
- Instructions regarding worker safety precaution protocols for working in remote areas. These include, working in pairs or larger groups, packing out waste for proper disposal, having adequate communication with supervisors and Environmental Monitors (i.e., through radios, cell phones, and/or satellite phones), and regular check-in times.
- Instructions for the Environmental Monitors and other designated/trained staff on how to use non-lethal deterrent materials (e.g., bear spray and bear bangers) and the requirement to complete a Wildlife Incident Report as described in Appendix F if a deterrent is used. These individuals will be given access to non-lethal deterrent materials while working and living on construction sites

4.7.2 Public Awareness

Public awareness will also reduce environmental impacts of the Tłıchǫ ASR. The GNWT conducts continual public education and information campaigns, including the “Drive Alive!” Program (Section 2.5.2), and information on preventing and reducing the risk of forest fires through the “FireSmart” Program. These campaigns will continue to be communicated through the GNWT website, social media, radio, newspapers, road checkpoints, and roadside signs. The public will be restricted from accessing the active construction areas, unless authorized and accompanied by Project Co. representatives.

5.0 MONITORING

5.1 Mitigation Monitoring

This section describes the monitoring that will take place to ensure that the wildlife and wildlife habitat protection measures identified for the Tłchq ASR are being implemented and functioning as intended, provide advance warning of wildlife issues that may require mitigation, and identify opportunities to improve mitigation through adaptive management. Detailed procedures and data sheets are provided in Appendix F.

5.1.1 Wildlife Sightings Log

Wildlife sighting logs provide a simple means for all Project staff to contribute to tracking wildlife activity at the Project. The value of the data is limited as it is not systematically collected and contains repeated observations, but it can provide an indication of the potential for wildlife incidents or problem wildlife and areas of concern at the Project.

5.1.2 Road Surveys

Environmental Monitors will be driving the Project site regularly. Documenting wildlife observations along the road may help to identify wildlife risks that should be communicated to Project staff in the area, or to identify areas with higher presence of wildlife.

Observations of wildlife on project roads (includes all spur roads such as quarry and water source roads) within the cleared right of way adjacent to the road, or within borrow pits will be documented by Environmental Monitors. Unlike the Wildlife Sightings Monitoring, this task will be only completed by the Environmental Monitors.

5.1.3 Wildlife Surveillance

Wildlife surveillance monitoring is intended to provide systematic and current information of wildlife activity at the Project construction camps and will provide direct feedback regarding the effectiveness of wildlife mitigation. Examples of wildlife activities that will be documented through the Wildlife Surveillance monitoring include presence of wildlife within camp areas, any instances where food or wastes may be improperly stored and use of buildings by wildlife for shelter or nesting. Through systematically and actively searching for and documenting the presence of all wildlife within and around the Project footprint, Environmental Monitors will remain apprised of current and emerging issues and will be able to manage issues as they arise.

Environment Monitors will undertake systematic tours of the Project construction camps to record all wildlife observations or recent wildlife sign (e.g., tracks and scat). Environmental Monitors will record the area surveyed, and the nature and location of all observations. The surveillance monitoring survey will include areas of the Project where there is risk of wildlife attractants or risk of wildlife finding shelter, denning or availability of food. This includes camps, construction areas, and waste management areas.

5.1.4 Bird Nesting and Bat Roosting

In addition to the Wildlife Surveillance monitoring described above, specific monitoring is proposed to detect bird nesting or bat roosting activity and mitigate impacts to active nests, bat roosting sites with particular emphasis on birds protected by the *Wildlife Act*, *Migratory Bird Convention Act* and the *Species at Risk Act* (Table 2). Early identification of birds showing nesting activity can help to avoid conflict, and nests that are found on Project infrastructure or in hazardous areas should be identified and monitored. Environmental monitors will establish buffer zones around nests to ensure they are adequately protected from disturbance on a case-by-case basis as advised by the Guidelines to Reduce Risk to Migratory Birds (ECCC 2018b). Nests will not be marked, as this may result in increased predation (ECCC 2018b).

Clearing of vegetation is scheduled to occur outside of migratory bird breeding season. However, there may be instances where vegetation removal is required during this period due to schedule changes or unforeseen circumstances. In these cases, non-intrusive pre-clearing surveys are required. This includes:

- Qualified biologists taking into consideration the type of habitat and species that are likely to be present during the specific time period.
- Searching for evidence of nesting by the presence of birds through observation of singing birds, alarm calls and distraction displays.
- Use of “point counts” to locate singing territorial males in the case of songbirds.

Plans will be developed case-by-case in consultation with ECCC and ENR, following the Guidelines (ECCC 2018b). The information collected will have relevance to Measure 10-1 of the Report of Environmental Assessment (MVEIRB 2018).

Any nest found will be protected with a buffer zone determined by a setback distance appropriate to the species, the level of the disturbance and the landscape context, until the young have permanently left the vicinity of the nest.

5.1.5 Pre-Blast Surveys

Blasting may be required on both the Tłıchq ASR route and in borrow pits. Blasting will be preceded by a scan for large mammals (specifically caribou, moose, bison and bears) to reduce the risk of injury and the impacts of sensory disturbance. The blast surveys are intended to apply the same standards to large mammals as are used for humans with regards to proximity to the blast radius. Note that it may not be possible to detect all large mammals within the blast radius if there is dense forest, but this will be partly mitigated by the drilling and horn signals that precede the blast, which will likely deter wildlife from the area.

Scans for large mammals within the blast radius will be completed prior to all blasts, regardless of blast size; although it is currently undecided if blasting will be required, and the magnitude of the blasts may be small as the Project is within a sedimentary rock region.

5.1.6 Pre-Clearing Wildlife Surveys

Clearing of vegetation will be required, primarily to widen the right of way. Limited clearing will also be required at the quarries, and at any quarry access roads. Clearing is scheduled to occur between September and April in 2019/2020, and 2020/2021. While clearing is timed to avoid the migratory bird season, other wildlife will be present and active. Two surveys are required:

- Pre-Clearing Wildlife Survey to detect large mammals ahead of clearing activities, completed during clearing operations
- Bear Den Aerial Surveys, completed in the fall to detect possible bear denning locations before denning is initiated

Black bears in northern Alberta were documented to initiate denning over a four to five week span beginning in early October. Dens were located in mixed forest or mature spruce stands and were generally excavated underground or beneath rootmasses of fallen trees but avoided muskeg (Tietje and Ruff 1980). When disturbed, denning black bears will abandon dens. Linnell et al. (2000) found that black bears will select dens within 2 km of human activity, but some abandoned dens when there was activity within 1 km of the den, particularly within 200 metres.

Pre-clearing surveys will be conducted as outlined in Appendix F – Monitoring Protocols and Data Sheets (Pre-clearing Survey Procedure and form) and will only be completed during the construction phase, ahead of the two fall and winter clearing seasons. The Pre-Clearing Wildlife Survey will be a ground-based survey, whereas the Bear Den Aerial Survey will be an aerial survey using techniques similar to that used for the Canyon Creek

Access Road, Oscar Creek and the Bear River Bridge. Timing of the Bear Den Aerial Survey should be flexible to select suitable weather and snow conditions, and to account for the construction schedule.

5.1.7 Wildlife Incidents

Wildlife incidents refer to a range of possible occurrences at the Project. Examples of wildlife incidents include:

- Human-wildlife interactions that present a risk to either people or animals
- Wildlife-caused damage to property or delay in operations
- Wildlife deterrent actions
- Wildlife injury or mortality (including vehicle collisions), or situations likely to cause injury or mortality
- Wildlife in hazardous areas or hazardous situations
- Incidental take of migratory birds.

Wildlife incidents during the operational phase of the road are addressed in the Wildlife Effects Monitoring section (Section 5.2).

Bear encounter response guidelines can be found in Appendix E.

5.2 Wildlife Effects Monitoring

The proposed monitoring of effects of the Tłıchq ASR on wildlife and wildlife habitat focus on boreal caribou, barren-ground caribou, moose, and bison. Specifically, effects monitoring will address concerns raised during the environmental assessment that the Tłıchq ASR will lead to direct and indirect loss of wildlife habitat, potential range expansion of bison, and increased wildlife mortality due to increased harvest pressure and traffic-related mortality along the highway.

The primary objectives of wildlife effects monitoring activities will be to:

- a) Determine if improved year-round access created by the Tłıchq ASR results in a level of harvest mortality or harvest patterns of any wildlife that would suggest a conservation concern.
- b) Determine the distribution, habitat use, and movements of boreal woodland caribou in the Tłıchq ASR study area and adjacent areas before, during and after road construction.

- c) Measure direct habitat loss at completion of construction.
- d) Monitor and measure changes in distribution and abundance of moose, bison, and boreal caribou as borrow site activities and Tłıchq ASR right of way construction progresses.
- e) Monitor and measure changes in distribution and abundance of moose, bison, and caribou for up to five years after construction of the highway is completed, and possibly longer if traffic levels increase substantially beyond predicted levels.
- f) Determine the amount and seasonality of wildlife injuries and mortality from vehicle collisions.
- g) Determine spatial and temporal distribution of wildlife movements, sightings, and collisions along the road to inform targeted mitigation actions.
- h) Use the information from monitoring to mitigate and manage highway impacts where possible.
- i) Use information from monitoring to inform best practices associated with future highway development and wildlife management in the NWT.
- j) Determine the abundance, distribution and habitat use of avian species at risk in the TASR study area before road construction

5.2.1 Traffic Monitoring

Rationale

Many of the predictions in the EA are contingent on the Tłıchq ASR having relatively low traffic volumes. Traffic levels for the proposed Tłıchq ASR have been estimated at 20 to 40 vehicles/day. This number was extrapolated both qualitatively and quantitatively by relying on the Tłıchq Winter Road Project Officer's numerous years of experience, Tłıchq winter road traffic counters, Tłıchq winter road community resupply details, and the estimated traffic volumes of a metals mine north of Whatì. Monitoring traffic levels is important for operational considerations related to road maintenance as well as for gauging the effects of the road. As roads tend to open other areas for new development, the potential exists for traffic levels to increase in future, along with associated risks to people and wildlife.

Monitoring Question

- Are maximum annual average daily traffic levels staying within predicted levels?
- What are average and maximum daily traffic levels during sensitive seasonal periods for boreal caribou, moose and bison, or during periods of higher known collision risk?

Proposed Approach

The NWT highway network consists of 2,200 km of all-weather roads and 1,620 km of winter roads. To monitor traffic using the highway system, the Department of Infrastructure operates a series of permanent and seasonal mechanical traffic counters and conducts periodic visual counts and surveys. Where counters are located, the stations provide hourly information on traffic for the full year, or selected portions of the year for counters located on winter roads or other seasonal access roads. These stations are positioned to capture the general flow of traffic on the highway network. GNWT-INF will install a permanent traffic counting station along the Tłıchq ASR, develop a regular schedule of visual counts and surveys to verify the accuracy of the unit.

Temporal scope

Traffic monitoring will occur indefinitely through the operations phase, and GNWT-INF will report to GNWT-ENR annually.

Thresholds

Part of adaptive management is identifying the need for increased monitoring or mitigation when conditions change, therefore, when traffic levels averaged over a three-year period indicate a 100% increase (40-80 vehicles/day) in traffic levels above the predicted annual average daily traffic levels (20-40 vehicles/day), or maximum daily traffic levels during sensitive periods exceed 200 vehicles/day, the need for extending or reinstating programs in this WMMP beyond the first five years of the operational phase of the road will be considered. Although literature reviews of effects of different traffic levels (see PR#[214](#) and Appendix G to the draft WMMP Revision 2, [PR#192](#)) suggests thresholds of 300 to 500 vehicles/day as levels associated with adverse impacts to carnivores and ungulates, respectively, a trigger of 200 vehicles/day is chosen both to be precautionary and to reflect the design criteria for the road. The monthly traffic data can be used as a covariate in analyses for other programs under this WMMP.

5.2.2 Access and Harvest Monitoring

Rationale

One of the key concerns associated with the Tłıchq ASR is increased wildlife mortality associated with a) hunting along the road; b) greater hunter access from the road into previously difficult-to-access harvesting areas and c) extended seasonal access into winter harvesting areas for barren-ground caribou beyond the Tłıchq ASR study area. There is concern that this increased access will change patterns of legal harvest in the region and increase illegal harvest such that harvested wildlife populations will experience higher total mortality. A comprehensive approach will be required, employing both greater collaboration between GNWT and the Tłıchq Government at the community level to support community-based programs (as per Measure 9-1 of the Report of Environmental Assessment [MVEIRB 2018]), as well as enhanced compliance monitoring by GNWT-ENR. Similarly, efforts will be made to align the monitoring with the Access Monitoring proposed for the NICO Project (Fortune Minerals 2013). The information collected will be used in assessing whether harvest levels are sustainable as per Measure 6-1 and 9-1 of the Report of Environmental Assessment (MVEIRB 2018).

Monitoring Questions

- Determine if the highway is resulting in a pattern or level of harvest mortality for moose and caribou that would suggest a conservation concern or need for additional harvest management actions.
- Identify who is using the road to access harvest opportunities.
- Determine the sex and age structure of the harvested population of moose in the North Slave Region.
- Determine if and where moose are being harvested near the Tłıchq ASR.

Proposed Approach and Temporal Scope

- i) Create a new GNWT-ENR Renewable Resource Officer position in Whatì. The GNWT-ENR Officer position in the community of Whatì will help to conduct and/or facilitate several of the recommended actions in the WMMP and address concerns related to harvest and access associated with the Tłıchq ASR. This position would also help to monitor for additional impacts to wildlife habitat associated with the road such as fire monitoring, spill response etc. (*Temporal scope*: This is proposed to be a permanent position, starting in the third year of construction.)

- ii) Once the Tłıchǵ ASR is operational, establish regular patrols along the Tłıchǵ ASR throughout the year, particularly during fall resident moose harvest seasons and fall/winter caribou harvest seasons. Currently GNWT-ENR regularly sends patrols out along the existing winter road for the duration of the winter road season; however, there will need to be patrols year-round with increased activity in peak harvesting seasons (i.e., fall moose hunt, fall/winter boreal caribou season, winter barren-ground caribou hunt, etc.). GNWT-ENR patrols contribute to harvest and access monitoring as well as enforcement of hunting regulations and promoting the “Report a Poacher” toll-free line. (*Temporal scope*: ongoing once the road is operational, with the frequency of patrols to be determined and modified in response to results of monitoring, availability of resources, or identified concerns).
- iii) Increase the length of the winter monitoring season. Once the Tłıchǵ ASR is operational, GNWT will establish a checkpoint station during the barren-ground caribou winter harvest season on the Tłıchǵ ASR south of Whatì and extend the period the checkpoint is open by one month on either end of the current winter road season, if there is evidence that barren-ground caribou are wintering in the region north of Whatì and if there is evidence that hunters are using the Tłıchǵ ASR to reach barren-ground caribou in that area. Decisions around the operation of the harvest check stations, including staffing and hours of operation, will need to meet operational needs and include flexibility. Such decisions will be based on harvest pressure, human resource capacity, animal locations and competing requirements. (*Temporal scope*: Ongoing, as needed, until harvest restrictions on barren-ground caribou are lifted, at minimum).
- iv) GNWT-ENR will work together with the Tłıchǵ Government and Wek’èezhì Renewable Resources Board (WRRB) to develop and implement a non-mandatory Aboriginal harvest monitoring and reporting program, with a target to have the program ready for implementation for the opening of the Tłıchǵ ASR. This would involve having someone within the community to collect information about how many animals are harvested based on conversations with people in the community. The harvest monitoring and reporting program will (*Temporal scope*: to be determined):
 - a. focus on boreal caribou, barren-ground caribou and moose population trends in areas accessed by winter roads and trails from the Project;
 - b. be community-based and involve collaboration between Tłıchǵ Government and the developer;

- c. involve traditional knowledge holders and harvesters in monitoring wildlife harvesting trends; and,
 - d. report on wildlife harvesting numbers and trends from monitoring checkpoints and/or other harvest monitoring methods annually to the Tłıchǵ Government, WRRB, GNWT-ENR and other wildlife co-management partners.
- v) Increased number of aerial surveys to monitor harvesting activities on either end of the winter barren-ground caribou harvest season. (*Temporal scope*: Ongoing until harvest restrictions on barren-ground caribou are lifted, at minimum).
- vi) Continue GNWT-ENR North Slave Region's moose jaw collection program. The GNWT-ENR North Slave Region has been running a voluntary moose jaw collection program since 2013/2014 whereby moose hunters in the North Slave Region are provided an incentive of \$50 plus a ball cap to supply GNWT-ENR with the lower jaws of harvested moose and general location of harvest on a 10 km by 10 km grid. Hunter information, specific locations, and personal details are kept confidential and results are saved to the GNWT-ENR Wildlife Management Information System. The program is run year-long. The information is used to generate the sex and age structure of moose harvested in the North Slave Region, identify areas of higher harvest pressure, and generate an interest in moose management among the public. This program can provide general indicators on patterns of harvest in the North Slave Region. For instance, the age structure of the harvested moose population can provide one broad indicator of the overall sustainability of the harvest. If, over time, there is a change in the age structure of the population (such as a shift to a younger average age of harvested moose) to suggest the harvest is no longer sustainable, increased monitoring and harvest management actions can be considered in areas of concern within the North Slave Region. Locations of harvests can provide a sense of the extent to which additional harvest areas are being targeted near the road during construction and operation. (*Temporal scope*: Ongoing, subject to funding).

Thresholds

The proposed approach in conjunction with other programs for monitoring species population trend (boreal and barren-ground caribou) and/or distribution (moose, bison) is expected to provide several lines of evidence to inform GNWT and the Tłıchǵ Government if there would be a need to consider management actions.

GNWT-ENR, in collaboration with the Tłıchǫ Government and WRRB, will consider wildlife management actions and mitigations based on the results of the monitoring above and the information collected by the GNWT's existing Resident Hunting Reporting Program, to help ensure sustainable Aboriginal harvesting of wildlife.

Given the paucity of baseline data and current absence of identified triggers defined by species-level management plans, setting quantitative thresholds is difficult at this time. However, as required by Measure 6-2 of the Report of Environmental Assessment (MVEIRB 2018), the GNWT-ENR, in collaboration with Aboriginal groups and in accordance with the requirements of the Tłıchǫ Agreement, will determine sustainable harvest levels for boreal caribou in the North Slave portion of the NT1 range prior to the road being opened to the public. In that same period, if current harvest levels are determined to exceed sustainable levels, management action will be undertaken in conjunction with the Tłıchǫ Government.

If harvest levels are observed to increase towards unsustainable levels once the road is opened to the public, GNWT-ENR and the Tłıchǫ Government will submit a wildlife management proposal under section 12.5.1 of the Tłıchǫ Agreement to the WRRB for the timely implementation of any measures necessary to ensure boreal caribou harvest in the region is kept within sustainable levels. Such measures may include the establishment of a no-hunting corridor along the Project route.

5.2.3 Boreal Caribou

Rationale

Boreal caribou are a culturally and ecologically important species in the NWT. They are listed as "Threatened" under the federal *Species at Risk Act* and as "Threatened" under the *Species at Risk (NWT) Act*. While the population in the continuous range in the NWT (NT1) identified in the federal Boreal Caribou Recovery Strategy is considered to be to be "likely self-sustaining" based on habitat conditions, population trends likely vary among NWT regions. For example, there is evidence of population declines in the southern NWT, yet it is unclear to what extent this applies across the rest of the range (SARC 2012). While GNWT-ENR has conducted boreal caribou population monitoring in the South Slave, Deh Cho and Inuvik regions, boreal caribou were only once formally surveyed in the North Slave Region in 2005, and no long-term population monitoring has ever been conducted in this region. Implementation of a collar-based boreal caribou program in the North Slave Region has become imperative with the Tłıchǫ ASR and with the "threatened" status of boreal caribou in the NWT. In other jurisdictions, linear features including roads have been shown to contribute to the loss of functional habitat for boreal caribou and to population declines associated with increased predation by wolves that use those features (EC 2012). Although the Tłıchǫ ASR is not predicted to change the self-sustaining status of boreal caribou at the

range-wide scale (NT1), the impact of the road on population trend of boreal caribou within the North Slave (Wek'èezhì) portion of the range is less certain given that there is currently less than 65% undisturbed habitat in the region. A collar-based program was initiated in March 2017, prior to construction of the road, to provide some baseline data on boreal caribou distribution, population trend, movements and body condition in the Tłıchq ASR Project area against which potential impacts of the road can be monitored. Collars are also necessary to complement aerial surveys to provide sightability metrics necessary for calculation of abundance when population surveys are undertaken by the GNWT in future (as required by Measure 6-1, Part 2 of the Report of Environmental Assessment). Information on habitat selection and areas where collared caribou frequently cross the Tłıchq ASR alignment can be used to target mitigations for preventing collisions.

To complement the collaring program, GNWT will support the Tłıchq Government in the design and implementation of a program that uses Tłıchq harvesters' traditional knowledge and methods to monitor the health of boreal caribou (tqdzı) and the state of their habitat, during and after the completion of the Tłıchq ASR Project (Tłıchq Government 2014, YKDFN 2018). Further details of the program, including monitoring questions and approach, will be determined following discussion with traditional harvesters and elders through engagement with Tłıchq Government. The expertise and advice of the WRRB will also be sought in the design of the program. The information collected will have relevance to Measure 6-1 of the Report of Environmental Assessment (MVEIRB 2018) and will be incorporated into the WMMP where appropriate.

Monitoring Questions

Information from a collaring program may help determine:

- Where collared boreal caribou are located in relation to construction activities
- If boreal caribou avoid the road during and after construction
- If and where boreal caribou cross the road
- If the rate of boreal caribou movements changes in proximity to the road and, if sample sizes allow, the potential zone of influence of the road on boreal caribou habitat use
- If rates of caribou mortality increase within the study area during and after highway construction
- The population trend of boreal caribou in the regional Tłıchq ASR study area

Proposed Approach

Collar-based monitoring

Global Positioning System (GPS) collars will be deployed up to 30 adult female caribou (model to be determined based on results of the tendering process) to monitor the movements, habitat use, survival, and responses of these caribou to disturbance. The study area for the Tłıchq ASR WMMP boreal caribou monitoring program was initially based on trying to get a sample of collared females that use areas close to the Tłıchq ASR alignment, and collared females that use areas far from the Tłıchq ASR alignment which would be unlikely to interact with the road to serve as a "control" sample. The initial study area boundary which delineated the area within which ENR searched for boreal caribou to deploy collars on has since been expanded to encapsulate the movements of those collared females, and will likely continue to evolve as new collars are added to the study area (see Figure 1 for the study area). Between 20 and 30 collars are required to monitor adult female survival rates and cow to calf ratios in order to provide sufficient statistical power to detect population trends over a minimum five-year period (Rettie 2017).

A total of 20 collars were deployed in the boreal caribou study area in March 2017, and five additional collars were deployed in March 2018. There are currently 23 active collars, as there have been two mortalities since the program began. GNWT-ENR intends to increase and maintain the number of collared females at 30 individuals annually during the construction phase. Additionally, for at least 5 years during the operational period of the road, to obtain more precise estimates of female survival, GNWT-ENR will attempt to ensure that at least 10 collars are deployed on females with home ranges in the vicinity of the road, in order to monitor effects of construction and operation of the road. To measure population trend, spring aerial recruitment surveys will be required annually to determine cow to calf ratios. When possible, collars will be retrieved from cows that have died to determine the cause of mortality.

The collars used in this study are equipped with a "geofencing" function that allows increased frequency of locations to be collected within a previously defined area programmed into the collar. In this study, collars are programmed to generate six locations per day, but this will increase to hourly locations within a buffer of 10 km from the proposed Tłıchq ASR. This will allow for a finer scale assessment of the behavioural response of boreal caribou to the construction and operation of the Tłıchq ASR, and to traffic along the existing highway.

During construction of the Tłıchǫ ASR, information on the location of collared boreal and barren-ground caribou will be provided to the NSI Environmental Manager to alert of the potential need to apply mitigations, such as temporary suspension of construction activities or the need for additional mitigations to avoid disturbing known animals (see Appendix D for further details).

Data collected during collar deployment will include pregnancy and body condition, diseases and parasites, and deoxyribonucleic acid (DNA).

Calf production will be determined by assessing pregnancy rates collected from blood serum during the capture of cows each year of the study and by assessing the movement rates of GPS-collared cows.

Ten-month calf recruitment will be determined from aerial surveys conducted each March by counting and classifying the number of calves and adults associated with collared caribou and other caribou observed during the survey. Animals will be classified as calves or adults (greater than or equal to 12 months) based on body size. Females will be identified by the presence of a black vulva patch and males by lack thereof. Recruitment will be expressed as the ratio of calves per 100 adult cows.

Pollock et al.'s (1989) staggered-entry modification of Kaplan and Meier's (1958) survivorship model and collared cow data will be used to estimate adult cow survival. For each year, the finite rate of population increase will be estimated from annual recruitment of females (assuming a 50:50 sex ratio in calf production and equal survival of sexes to time of census) and annual adult female survival using the formula outlined by Hatter and Bergerud (1991). The finite rate of population increase (λ) will be determined using a stochastic version of Hatter and Bergerud's (1991) equation ($\lambda = \text{adult female survival} / [1 - \text{female calf recruitment}]$) following Latham et al. (2010). The stochastic version of λ is the mean of 10,000 iterations calculating λ .

To assess the impacts of construction and operation of the Tłıchǫ ASR on distribution and movement behavior of boreal caribou, resource selection function (Manly et al. 2010) or step selection function (Fortin et al. 2005) models will likely be developed for boreal caribou using covariates such as vegetation type, proximity to the Tłıchǫ ASR and Highway 3, proximity of other linear features, traffic levels, and taking into account seasonality. Other potential approaches include comparing movement rates in proximity and far away from to the Tłıchǫ ASR, comparing crossing rates of the Tłıchǫ ASR to crossing rates of random roads or crossing rates of random caribou trajectories, or comparing percent overlap of home ranges with the Tłıchǫ ASR before, during and after construction (e.g., Leblond et al. 2012; Eftestøl et al. 2014). Depending on the data, other potential

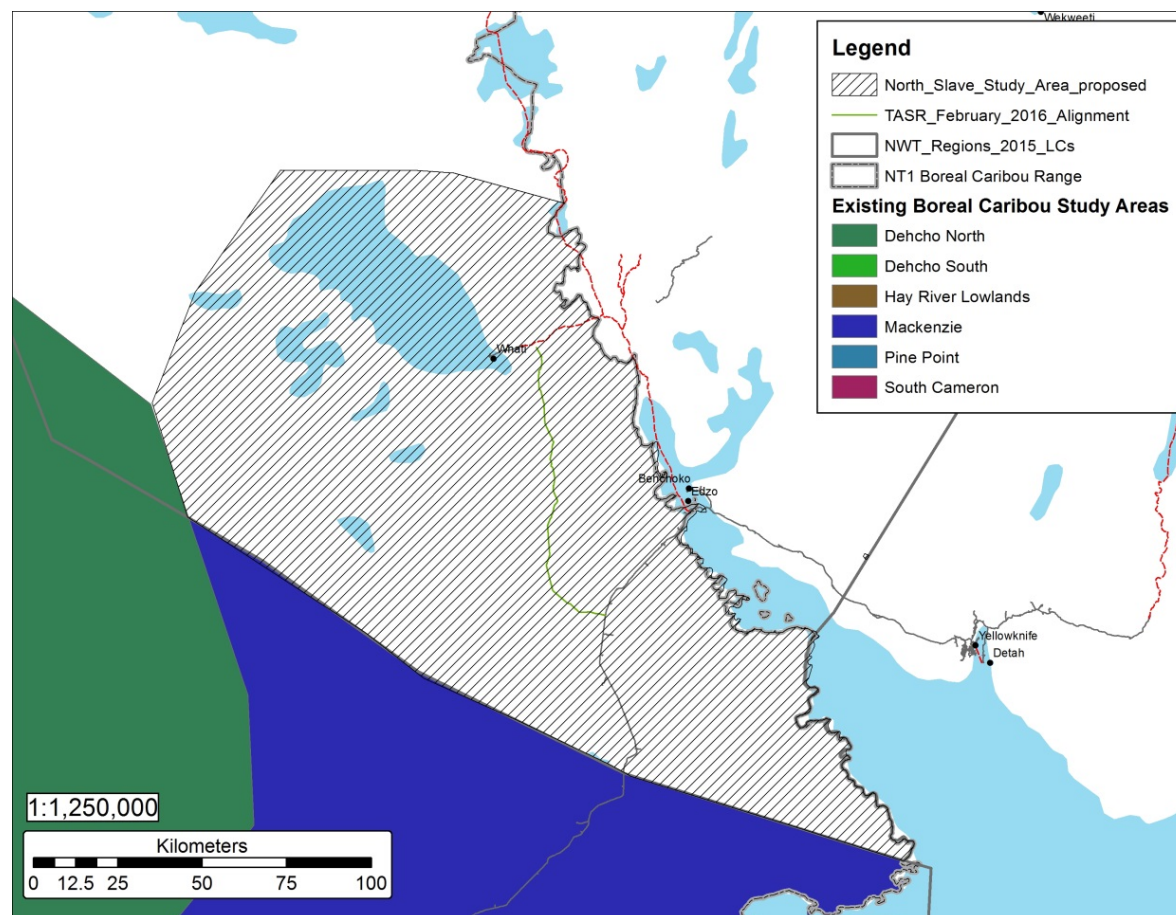
analyses include the use of multi-state models to test whether the construction of the highway influences the probability of caribou movement across the road and if proximity to the highway affects survival rates.

Monitoring to determine boreal caribou abundance

Measure 6-1, Part 2 of the Report of Environmental Assessment (MVEIRB 2018) requires GNWT to conduct monitoring to determine the abundance of boreal caribou in the North Slave portion of the NT1 range. The methods used to determine boreal caribou abundance will be determined in a future version of the WMMP but will most likely be based on either aerial survey methods, DNA-based methods from systematic collection of boreal caribou pellets, or a combination of the two (DeMars et al. 2014). The population estimate could be used to estimate changes in the number of boreal caribou in the region over time based on measures of annual rate of population change obtained from the collaring program.

Annual reporting and summaries of results will be distributed to co-management partners such as Tłıchǫ Government and the WRRB through the research permitting process and the Tłıchǫ ASR corridor working group; whereas more formal comprehensive analysis and reporting will occur: a) at the end of construction; and, b) after five years of operations.

Figure 1: Boreal Caribou North Slave Study Area



Temporal Scope

This collaring program is proposed for the duration of construction plus five years of operations. The need for continued monitoring will be re-evaluated at that time. A boreal caribou abundance survey will take place during the construction phase.

Thresholds

During construction, monitoring of collared animals will help to determine the proximity of some animals to the Tłı̨chų ASR for construction. In addition to visual on-the-ground monitoring conducted by Environmental Monitors to identify approaching wildlife, GNWT-ENR will provide location maps of collared boreal caribou to the NSI Environmental Manager to monitor the movements of collared caribou, and to trigger mitigation measures to reduce sensory disturbance and risk of caribou mortality or injury. Specific distance thresholds of collared caribou to the Tłı̨chų ASR alignment and to areas where blasting will occur that will trigger mitigations are defined for different seasons in

Appendix D. Maps of collar locations will be provided more frequently during the late-winter and calving seasons as per the standard operating procedure (Appendix D).

During the operational phase of the road, the results of this monitoring program will be used to identify where mitigation actions (such as reduced speed limits or signage at crossing locations or in sensitive seasons) should be applied. Formal analyses of resource selection and movement patterns related to the road can help to quantify the impact of the road and provide information for future resource planning in the NWT. Estimates of population trend and related statistics will support regional scale efforts such as range planning and help to identify larger issues with productivity and survival that may lead to consideration of management interventions among co-management partners.

5.2.4 Barren-Ground Caribou Collaring

Rationale

Barren-ground caribou are a highly valued species in the NWT. Barren-ground caribou have been assessed as “threatened” by the NWT list of species at risk. Several herds in the NWT have experienced substantial population declines. While barren-ground caribou have not been detected in the vicinity of the Tłıchǵ ASR in recent years of low population levels, the historical annual range of the Bathurst herd as determined by traditional knowledge, aerial survey data and collaring data has overlapped the northern section of the Tłıchǵ ASR corridor. It is possible that barren-ground caribou may re-occupy the area of the Tłıchǵ ASR corridor in the future, likely in winter. The current barren-ground caribou collaring program will help GNWT-ENR to detect whether barren-ground caribou are approaching the Tłıchǵ ASR corridor. Given that the Tłıchǵ ASR will occur on the very edge of the range, the risk of the road acting as a substantial movement barrier to barren-ground caribou is low, however, collar data may be used over time to evaluate the impacts of the road on barren-ground caribou movements if they move into the area.

To complement the collaring program, GNWT will support the Tłıchǵ Government in the design and implementation of a program that uses Tłıchǵ harvesters’ traditional knowledge and methods to monitor the state of barren-ground caribou (ʔekwǝ) winter habitat, during and after the construction of the Tłıchǵ ASR Project. Further details of the program, including monitoring questions and approach, will be determined following discussion with traditional harvesters and elders through engagement with Tłıchǵ Government, and WRRB engaged/consulted. The findings of the program will be incorporated into the WMMP while it is in place. The expertise and advice of the WRRB will also be sought in the design of the program.

Monitoring Question

Data from the existing barren-ground caribou collaring program may be used to determine whether barren-ground caribou are approaching the area of the Tłıchq ASR corridor.

Approach

GNWT-ENR attempts to maintain 50 GPS collars annually on the Bathurst caribou herd, 30 on cows and 20 on bulls. Some of these collars could be equipped with a “geofencing” function that allows increased frequency of locations to be collected within a previously defined area programmed into the collar, and the goal is to have all collars equipped with this capability over time with redeployments. Collars are generally programmed to generate three locations per day, but newly deployed collars can be programmed to generate hourly locations within a buffer of 10 km from the proposed Tłıchq ASR if caribou begin to spend more time in the region of the road. This will allow for a finer scale assessment of the behavioural response of barren-ground caribou to the construction and operation of the Tłıchq ASR, and to traffic along the existing highway if caribou do re-enter the area. Data are typically downloaded every four days. Given the slower and more limited movements of barren-ground caribou in the winter, current programming of three times daily is sufficient to detect their approach into the area and to initiate patrols to look out for them and determine how many individuals may be in the area.

Temporal Scope

Indefinitely, as this is a well-established, on-going program.

Thresholds

If collar data indicate that barren-ground caribou are approaching within 10 km of the Tłıchq ASR road, GNWT-ENR and GNWT-INF staff traveling the road will be notified to monitor for groups of caribou. In the event that GNWT staff either see or receive reports of groups of caribou on or adjacent to the road, GNWT-ENR will contact GNWT-INF to discuss the need or potential for temporary signage, speed reductions or road closures.

5.2.5 Moose and Bison Population Monitoring

Rationale

Moose are an important big game species in the North Slave Region, comprising a substantial portion of the Tłıchǵ subsistence harvest and supporting a resident fall harvest. Moose occur in low densities throughout the NWT, and the most recent targeted population survey in the North Slave Region conducted in 2012 identified densities of roughly 2.9 moose/100 square kilometres (km²) in the Taiga Plains (Cluff 2013). While GNWT-ENR conducts moose population surveys approximately every five years throughout the North Slave Region, these studies have not historically provided good coverage of the Tłıchǵ ASR regional study area and are not designed to detect changes in a targeted area. There are several factors affecting moose in the Tłıchǵ ASR study region that, in addition to the road itself, warrant tracking moose populations. Given harvest restrictions on barren-ground caribou, moose may be targeted more frequently by hunters, which will be further facilitated by the road. This could lead to the potential for localized over-hunting. In addition, community members have expressed concerns that the potential expansion of the Mackenzie bison northward towards Whatì will negatively impact moose and caribou in areas where they overlap. While the extensive recent burns in the vicinity of the Tłıchǵ ASR might be expected to increase moose habitat over time, the interaction of these factors introduces sufficient uncertainty to warrant more targeted regional monitoring. Having an understanding of how the population is changing in the regional study area is essential to placing the information generated by harvest and collision monitoring into context for making decisions about the need for management actions.

Wood bison, assessed as Threatened by the NWT Species at Risk Committee and listed as Threatened under the federal *Species at Risk Act* and *Species at Risk (NWT) Act*, are a species of management concern in the NWT. With construction of the Tłıchǵ ASR, it is possible that the Mackenzie bison herd will use the road corridor to expand its range northward, possibly entering the community of Whatì. This has raised the concern among community members that bison may begin to exclude moose and caribou in the region. Hunting of the Mackenzie bison population is currently closed following an anthrax outbreak in 2012, but a new road will increase hunters' access into bison habitat and may increase hunting pressure when hunting is reinstated. Traffic on a new road will also increase the number of bison-vehicle collisions, which is already a substantial cause of mortality on Highway 3. Collisions are a risk to human safety and a cause of bison mortality. Aerial surveys designed to monitor moose relative abundance and trend in the Tłıchǵ ASR study region can also be used to monitor bison abundance in the area, track any northward expansion, and inform the need for more targeted mitigation to minimize bison-vehicle collisions.

Monitoring Questions

Data obtained from population monitoring conducted in the regional Tłıchq ASR study area will help to determine:

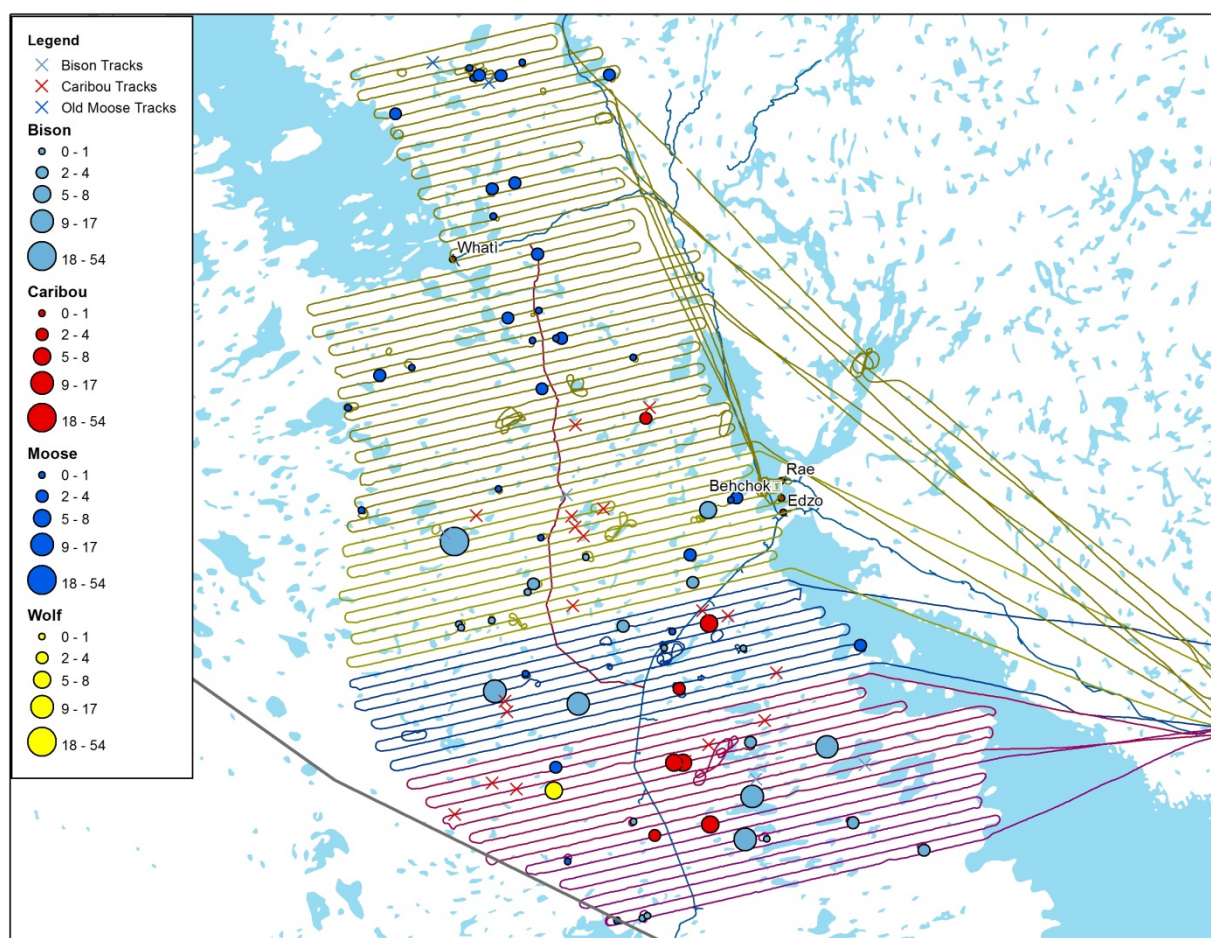
- If the relative abundance of moose in the Tłıchq ASR regional study area changes over time. This will help to identify potential conservation concerns related to the road and hunter access.
- Whether changes in the abundance of moose in the Tłıchq ASR regional study area are qualitatively similar to what is observed in North Slave Regional surveys.
- If and at what rate bison expand their range northward along the road corridor.
- If the relative abundance of bison in the Tłıchq ASR regional study area changes over time.

Proposed Approach

GNWT-ENR proposes late winter aerial surveys every three years for moose and bison to generate density estimates in the Tłıchq ASR regional study area, and look for impacts of the road for at least two rounds of surveys after the operations period of the road begins. The first survey occurred in February 2018, before road construction, to get a baseline estimate. Future surveys will be conducted in winters 2021, 2024, and 2027. Aerial surveys will be conducted within a ~10,000 km² study area centered on the proposed Tłıchq All-Season Road alignment (Figure 2), with survey transects be spaced 2 km apart. A distance-based sampling method (Buckland et al. 2001) will be used to estimate moose and bison densities within the study area. The distribution of the number of observations made at different distances to survey transects is used to estimate a detection function to model how the probability of recording observations decreases as a function of distance from the line. The detection function is then used to estimate the density of moose or bison in the study area while accounting for decreasing likelihood of recording animals that are farther from the transect. These surveys will also record boreal caribou and other wildlife sightings which, although not enough to provide reliable population estimates or trend information, could provide information on caribou occupancy throughout the study area. For this program, a summary report will be included in the annual WMMP report after every survey year (i.e., every three years), and at the end of the study. Analysis of the relative abundance of moose and bison in the Tłıchq ASR regional study area will be completed using the program Distance (distancesampling.org).

This monitoring approach and initial study design is subject to change pending an assessment of whether there are sufficient numbers of moose and bison sightings from which to estimate a detection function. In the event that distance-based aerial surveys sampling would not provide the statistical power necessary to reliably detect changes in abundance and distribution of moose and bison in the Tłı̨chǫ ASR study area, other methods of population monitoring (e.g., geospatial method, collared individuals, or indices such as track counts, browse or pellet surveys) will be assessed and considered.

Figure 2: Wildlife Observations Recorded During an Aerial Moose/Bison Survey



Note: Wildlife observations recorded during an aerial moose/bison survey conducted between February 23 and March 02, 2018 within a ~10,000 km² study area centered on the proposed Tłı̨chǫ ASR alignment. Symbol sizes for each observation are proportional to the number of individuals in each group. Coloured lines represent the aerial survey transects flown, starting in the northern end of the study area working south.

Temporal Scope

One baseline survey was conducted in Winter 2018, with one additional survey during the construction phase (2021), and two additional surveys during operations (2024 and 2027). This schedule is subject to change based on statistical analysis.

Thresholds

Moose and bison density estimates and distribution information within the Tłıchq ASR study area can help to detect changes in the region over time that may identify harvesting or collision issues and inform the need for management decisions to be considered with co-management partners. For example, if harvest monitoring indicates notable increases in moose mortality in the regional study area, the need to consider conservation actions would be informed by whether population level monitoring shows decreasing, stable or increasing populations. Specific management thresholds may be identified once baseline moose density and harvest levels have been determined.

5.2.6 Wildlife Sighting and Collisions

Rationale

Increased risk of wildlife injury and mortality due to vehicle collisions is one of the main concerns with the Tłıchq ASR. One difficulty in predicting the extent and the seriousness of harm to wildlife from vehicle collisions associated with a new road is that currently GNWT does not have a single source of baseline data on wildlife mortalities. GNWT-INF and GNWT-ENR have different processes and keep separate records of animal-vehicle collisions which makes assessing the true costs to humans and wildlife difficult. This particular impact pathway potentially affects all wildlife but was a particular source of uncertainty in the EA for Mackenzie bison which are more susceptible to collisions given their frequent use of roadways. There are currently harvest restrictions on Mackenzie bison in place until the population reaches 1000 animals, and additional mortalities due to vehicle collisions will slow recovery. Furthermore, there is no consistent, accurate, geo-referenced system in place for tracking wildlife-vehicle collisions or wildlife observations along the road to determine where potential hotspots may be that warrant dedicated mitigation efforts such as increased signage or heightened speed limit enforcement. Having a consistent method for reporting wildlife-vehicle collisions and wildlife observations will also provide information on potential range expansion of Mackenzie bison along the Tłıchq ASR, which addresses one of the questions of the EA.

Monitoring Question

- How many wildlife-vehicle collisions are occurring along NWT highways, and how will the Tłıchǵ ASR contribute to that?
- Where are wildlife-vehicle collisions occurring most frequently along the Tłıchǵ ASR, if they occur, and other NWT highways?
- Where are wildlife being observed most frequently along the Tłıchǵ ASR?
- Are the Mackenzie bison expanding their range further north along the road?
- Is snow cleared from the Tłıchǵ ASR making it difficult for wildlife to cross the right of way?

Monitoring Approach

GNWT will establish an inter-departmental working group co-chaired by GNWT-INF and GNWT-ENR to investigate, design and launch a wildlife collision and sighting reporting system for GNWT employees based on the Alberta Wildlife Watch Program (Alberta 2016). Alberta has designed a smartphone app for use by employees and contractors who travel the roads frequently to easily and accurately record wildlife sightings, carcasses and collisions in order to better understand the costs associated with collisions, impacts to wildlife, where mitigation is required and the effectiveness of mitigation. Alberta is making the platform available to other jurisdictions to tailor to their needs. GNWT will work on designing and launching the program during the construction phase of the Tłıchǵ ASR, with the intention of having the program operational in time for operation of the Tłıchǵ ASR. The app will include a mechanism for reporting instances of wildlife that show signs of having difficulty moving alongside the road due to snow removal. GNWT will encourage Fortune Minerals to align their monitoring of wildlife use of roads proposed for the NICO Project (Fortune Minerals 2013) with the GNWT's proposed methodology.

Temporal Scope

The timeline and appropriate review cycles necessary to generate the appropriate amount of data to support mitigation for the operations phase of the Tłıchǵ ASR would be determined by the working group based on periodic review of results. Wildlife-vehicle collision monitoring and wildlife sightings reporting along the Tłıchǵ ASR will be ongoing once the Tłıchǵ ASR is operational.

Thresholds

Depending on the rate of data acquisition, the program will identify regular intervals for analysis that will provide sufficient data to identify potential hot-spots along the road. When these are identified, GNWT-INF can implement mitigations such as lowered speed limits or temporary and permanent signage.

5.2.7 Predator monitoring

As required by Measure 6-1, Part 2, GNWT will undertake monitoring to assess predator population densities, movements and predation rates. Predation rates on boreal caribou will be assessed by investigating mortalities of collared boreal caribou to determine cause of death. Survey methods to assess wolf population densities will be developed in greater detail after the first annual review of the WMMP, but will likely employ similar methods as those used in the South Slave and Dehcho regions (Serrouya et al. 2016).

5.2.8 Avian Species at Risk

Measure 10-1 from the MVEIRB Report of EA (MVEIRB 2018) indicated the Proponent must complete pre-construction surveys for bird species at risk and migratory birds (birds) and consult with ECCC and the GNWT-ENR. Following multiple meetings and communications, a study design was agreed to and approved by ECCC and GNWT-ENR in June 2018 (Golder 2018). The study involves the deployment of 60 Autonomous Recording Units along the length of the Tłıchǵ ASR, to record bird song. The intent of the baseline study is to identify the presence, habitat associations and relative abundance of species with the potential to interact with the Project. The ARU were deployed among five habitats, and record bird song on a schedule provided by ECCC. The ARU were deployed in late March 2019 and will be retrieved in early July 2019. Reporting will be initiated immediately following ARU retrieval in early July 2019. A draft report of the findings of the field program will be included in a report to be provided to GNWT-ENR and ECCC by the end of August 2019 (prior to anticipated commencement of construction). Raw data will be provided to ENR and ECCC. As per Measure 10-1, Part 2(h), the report will include recommendations for new mitigation to reduce impacts to migratory birds, if any are required in addition to that already outlined in this document. For clarity, this is a baseline study intended to confirm environmental assessment conclusions and inform mitigation and is not a monitoring program to test the effectiveness of mitigation (as required by the Draft Wildlife Management and Monitoring Plan Guidelines).

5.3 Refinement of the Study Design

Statistical analysis will be conducted in the summer of 2019 to verify whether modifications of the initial study designs for wildlife effects monitoring proposed herein are required to ensure that the proposed programs obtain the information required. Part of this analysis may also consider the feasibility of using alternate methods to achieve similar objectives. The results of this review will be included in the first WMMP Annual Report.

6.0 REPORTING AND ADAPTIVE MANAGEMENT

6.1 Reporting

Three levels of reporting will be completed; weekly, annual, and cyclical comprehensive reports. The monitoring described here is exclusive of any immediate reports that may be required in the event of a wildlife emergency or required to fulfill research permit requirements. Weekly and monthly meetings will also occur during the construction phase.

6.1.1 Weekly Reports

During the construction phase, weekly reports will be prepared. The weekly reports will be submitted to the GNWT, the NSI Environmental Manager, the Tłıchō Government, the WLWB, ECCC, WRRB and other interested parties. The weekly reporting will include, but not be limited to the following content:

- Mitigation triggered or new mitigation implemented
- Wildlife incidents
- Wildlife collisions and mortalities
- Bird nests observed (and any mitigations implemented)
- Copies of the wildlife sightings logs, with reference to any observations of Species at Risk (and any mitigations implemented)
- Waste management concerns
- Project staff behaviour concerns
- Any other issues that may be pertinent to the protection of wildlife or the relevant legislation and regulations protecting wildlife
- Any reviews of or changes to WMMP mitigation.
- Anticipated construction and monitoring activities for the upcoming week.

6.1.2 Annual Reports

WMMP Annual Report

The GNWT and NSI will report on the progress and implementation of the WMMP in an Annual Report, which will document the previous year's activities. The WMMP Annual Report should include, but not be limited to, the following information:

- A summary of all data collected
- Occurrences of human-wildlife interactions, and incidents, accidents, injuries, or mortalities involving wildlife
- Records of disturbances to wildlife habitat that were not predicted
- Observations of recreational, traditional, or non-traditional activities near the Project
- A discussion of the effectiveness of the mitigation outlined in the WMMP, based on the mitigation audit
- A summary of annual reviewer comments on the WMMP
- Any reviews of or changes to WMMP mitigation
- Report on relevant scientific or traditional knowledge reports for the Tłıchq ASR area that became available in the previous year
- Traditional knowledge provided by the Tłıchq Government.
- Report on monitoring results and management actions, as required by Measure 10-1, Part 2 of the Report of Environmental Assessment.

The GNWT-ENR will require an annual public review of the Tłıchq ASR WMMP, as required by Measure 10-2, Part 3 of the Report of Environmental Assessment (MVEIRB 2018). Recommendations received during the WMMP public review from parties, responses on how recommendations were incorporated and reasons for recommendations which were not incorporated will be made public.

Water Licence Annual Report

Further information specific to wildlife but resulting from undertakings outside the scope of the WMMP will be included in the Water Licence Annual Report, as required by water licence W2016L8-0001, Schedule 1 Conditions 1(n) and 1(o).

6.1.3 Comprehensive Reports

Two comprehensive reports that compile and synthesize information from all previous years and monitoring programs will be prepared, the first following the final year of construction, and the second five years after monitoring during operations start. The comprehensive report will consider analysis of the following, in addition to any other relevant issues:

- The efficacy of mitigation
- Road-related mortalities
- Available information on changes in wildlife distribution, trend and abundance
- Answers to the specific wildlife effects monitoring questions posed in section 5.2
- Wildlife conservation concerns related to the Tłıchq ASR
- Suggested mitigation for any unacceptable effects observed
- Description total direct habitat loss
- Relevant scientific or traditional knowledge reports for the Tłıchq ASR area

The second comprehensive report will include recommendations for the termination of the WMMP or continuation of aspects of the WMMP.

6.2 Adaptive Management and Response Framework

The Tłıchq ASR Adaptive Management Framework outlines approaches to adaptive management, and the components of a Response Framework. Adaptive management is defined by the Adaptive Management Framework as a formal process for continually improving management policies and practices by learning from their outcomes. The Adaptive Management Framework further identifies four categories of adaptive management; Active, Passive, Impromptu and Adaptive Co-Management. Of these strategies, all are applied in the WMMP except for Active Adaptive Management.

A response framework is a system of pre-determined thresholds, which trigger actions when exceeded. A response framework can be used in passive adaptive management, as it involves applying one mitigation action at a time and proposes specific and pre-defined solutions before monitoring begins.

This section outlines how adaptive management is applied to the WMMP, in accordance with Suggestion 14-1 and Appendix B of the Report of Environmental Assessment (MVEIRB 2018), and Part B Condition 15 of water licence WL2016L8-0001.

6.2.1 Adaptive Management

Adaptive management during the construction and operation phase will occur primarily using the Adaptive Co-Management approach, based on the proposed weekly and annual reports. The reports will be circulated to regulatory agencies, Tłıchǫ ASR Corridor Working Group members, and other interested parties. Through these reports, all incidents, relevant wildlife observations and concerns regarding the environmental management of the Project will be documented, and the WMMP mitigation triggered or any new mitigation implemented will be described. Through the Adaptive Co-Management process, stakeholders will collaborate to find consensus on a solution.

Passive adaptive management will be applied through the application of best management practices, and the response framework actions listed in Section 6.2.2.

Where appropriate, Impromptu Adaptive Management will also be implemented. This approach is suitable in situations where risk is low, and solutions may be implemented on an impromptu basis by experienced environmental staff. Examples include implementing additional waste management procedures at a location where scavenging wildlife are observed or closing access to an area where sensitive wildlife are present. These occasions will also be reported in the weekly and annual reports.

During the construction phase, a mitigation audit will be undertaken annually, specific to the mitigation listed as part of the WMMP Annual Report, to document instances of Impromptu Adaptive Management, and the success of the proposed mitigation. The mitigation audit will investigate:

- If all mitigation has been implemented
- Which mitigation is perceived to be or shown to be successful
- If new mitigation has been implemented in response to new issues
- If some mitigation is redundant

The results of the mitigation audit will be included in the Annual Report, and the WMMP will be revised if necessary to reflect lessons learned.

6.2.2 Response Framework

The phase response framework identifies the thresholds and actions listed below. In each case, exceeding a threshold will also lead to an incident report, and will trigger an immediate review of the WMMP mitigation.

Thresholds and actions during the **construction phase** include:

- One caribou, moose or bison killed or injured as a result of construction operations.
- Destruction or disturbance of one bird nest, one bat roost site or hibernaculum, or one mammal den. Disturbance includes any activity that causes wildlife to abandon or defend their nest, eggs, den or young other than those authorized by a regulatory agency.
- One bear or other carnivore killed in defense of life and property as a result of attraction to camp facilities or other work areas.
- Initiate more frequent Bird Nesting surveys if nests or nesting activity is observed.
- Boreal caribou harvest levels that exceed sustainable levels will initiate management actions to reduce harvest levels in conjunction with Tłıchǫ Government.
- Initiate a pilot study to determine if thermal imaging devices can improve detection of large mammals. If the pilot study indicates that detection is improved, monitoring protocols will be updated to include this technology (see Appendix F: Pre-Blast Surveys and Thermal Imaging Pilot Study).

Thresholds and actions during the **operations phase** include:

- If monitoring indicates that there are recurring areas, times of year or times of day associated with wildlife-vehicle collisions, GNWT will evaluate the implementation of temporary/permanent signage, reduction of speed limits in high risk zones or at high risk times.
- If there is evidence of specific sections of the road that are repeatedly crossed by big game species, based on monitoring of collared boreal and barren-ground caribou or reporting of sightings of big game species, GNWT will install signage to warn of collision risk in these areas.
- If collared barren-ground caribou are within 10 km of the Tłıchǫ ASR, or there are reports of sightings of barren-ground caribou along the Tłıchǫ ASR, GNWT will initiate patrols along the road, to determine the number of individual caribou involved. GNWT-ENR will contact GNWT-INF to discuss any required mitigations.
- When traffic levels averaged over a three-year period indicate a 100% increase in traffic levels above the predicted annual average daily traffic levels (of 20-40 vehicles/day), or maximum daily traffic levels during sensitive wildlife periods exceed 200 vehicles/day, the need for extending or reinstating programs in this

WMMP beyond the first 5 years of the operational phase of the road initial operations timelines will be considered.

- Snow will be managed as it is on Highway 3, to maintain a slope on the side of the road (to maintain permafrost and reduce snowdrifts on the road). If there is evidence that the snow removal practices are causing difficulty for wildlife, snow removal procedures will be reviewed (see also the GNWT Response to Technical Reports from the environmental assessment [PR#238](#))
- If there is evidence that boreal caribou harvest levels are increasing towards or exceeding unsustainable levels, GNWT-ENR and the Tłıchǫ Government will submit a wildlife management proposal under section 12.5.1 of the Tłıchǫ Agreement to the WRRB for the timely implementation of any measures necessary to ensure boreal caribou harvest in the region is kept within sustainable levels. Such measures may include the establishment of a no-hunting corridor along the Project route.
- If there are concerns about unsustainable levels of harvest of other wildlife species along the Tłıchǫ ASR corridor, GNWT will initiate discussions with Tłıchǫ Government, WRRB, North Slave Métis Alliance (NSMA), YKDFN and other relevant Indigenous government organizations to determine an appropriate response, using an Adaptive Co-Management Response.
- Changes observed that require implementation of wildlife management actions will occur through formal Adaptive Co-management processes with the WRRB.

6.2.3 WMMP Updates

Updates to the WMMP may be required when the following information becomes available:

- Findings of the of the program that uses Tłıchǫ harvesters' traditional knowledge and methods to monitor the state of barren-ground caribou (ʔekwǫ̀) winter habitat, during and after the construction of the Project while the WMMP is in place, as per Measure 7-1(c) of the Report of EA (see water licence W2106L8-0001 Schedule 1 Condition 2(a))
- Findings of the baseline surveys and monitoring, including caribou surveys (Sections 5.2.3 and 5.2.4), moose and bison surveys (Section 5.2.5), and avian species at risk surveys (Section 5.2.8, as required by Measure 10-1), (see water licence W2106L8-0001 Schedule 1 Condition 2(b))
- Findings of the study design refinement, describe in Section 5.3

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Appendix A: Statutory Requirements Relevant to Wildlife and Wildlife Habitat

NWT Wildlife Act		
Topic	Section of NWT Wildlife Act	Notes
Birds and nests	51. (1) Subject to section 17, no person shall, unless authorized by a licence or permit to do so, destroy, disturb or take (a) an egg of a bird; (b) the nest of a bird when the nest is occupied by a bird or its egg; or (c) the nest of a prescribed bird.	In the NWT <i>Wildlife Act</i> , prescribed birds will likely include raptors from the following families: • Falconiformes • Strigiformes • Accipitriformes Bullet (c) of the NWT <i>Wildlife Act</i> does not specify that the nest has to be active.
Wildlife abodes	51. (2) Subject to section 17, no person shall, unless authorized by a licence or permit to do so, break into, destroy or damage a den, beaver dam or lodge, muskrat push-up or hibernaculum.	
Disturbance and harassment	52. Subject to section 17, no person shall, unless authorized by a licence or permit to do so, (a) engage in an activity that is likely to result in a significant disturbance to big game or other prescribed wildlife; or (b) unnecessarily chase, fatigue, disturb, torment or otherwise harass game or other prescribed wildlife.	"big game" means species of wildlife prescribed as big game, or an individual of a species of big game;
Chasing Wildlife	55. Notwithstanding any other provision of this Act or the regulations, a person may chase wildlife away from a dwelling place, camp, work site, municipality or unincorporated community, or its immediate vicinity, if doing so is necessary to prevent injury or death to a person or damage to property.	"wildlife" means (a) all species of vertebrates and invertebrates found wild in nature in the Northwest Territories, and individuals of those species, except (i) fish as defined in section 2 of the <i>Fisheries Act</i> (Canada), and (ii) other prescribed species and subspecies, (b) species of wildlife referred to in paragraph (a) that are domesticated or held in captivity, and individuals of those species, and (c) prescribed species or subspecies of vertebrates and invertebrates, and individuals of those species or subspecies.

Defence of life and property	56. (1) Notwithstanding any other provision of this Act or the regulations but subject to subsection (4), a person may harvest and consume wildlife or take and consume the eggs of birds if it is necessary to prevent starvation of a person. (2) Notwithstanding any other provision of this Act or the regulations but subject to subsection (4), a person may kill wildlife if it is necessary to prevent injury or death to a person. (3) Notwithstanding any other provision of this Act or the regulations but subject to subsection (4) and any regulations specified as applying in respect of this section, a person may kill wildlife if it is necessary to prevent damage to property. (4) Subsections (1), (2) and (3) do not provide a defence to a contravention of this Act or the regulations for a person who resorts to harvesting or killing wildlife as a result of his or her mismanagement.	
Reporting	57. Subject to the regulations, a person shall, as soon as is practicable, report the harvest or kill of big game or other prescribed wildlife to an officer, if (a) under section 56, the person harvested big game or other prescribed wildlife to prevent starvation, or killed big game or other prescribed wildlife to prevent injury or death to a person or damage to property; and (b) the harvest or kill would, but for subsection 56(1), (2) or (3), be a contravention of this Act or the regulations.	
Accidental kill or wounding	58. A person who, with a motorized vehicle, accidentally kills or seriously wounds big game or other prescribed wildlife on a highway as defined in section 1 of the <i>Motor Vehicles Act</i>, shall report the event to an officer within the time fixed in the regulations.	

Feeding wildlife	65. (1) Subject to subsection (2), no person shall intentionally feed big game, fur-bearers or other prescribed wildlife. (2) Subsection (1) does not apply in respect of a person feeding wildlife lawfully kept in captivity or in circumstances permitted by the regulations.	
Wildlife Attractants	66. (1) No person shall deposit, place or leave in, on or about land or premises food, food waste or another substance if there is a reasonable likelihood that it could attract big game or other prescribed wildlife to the land or premises and endanger a person, a domestic animal or wildlife. (2) Subsection (1) does not apply in respect of (a) the drying or caching of meat, pelts or hides, except in a manner contrary to regulations respecting the treatment, caching and identification of wildlife and parts of wildlife left temporarily on the land; (b) a person lawfully harvesting fur-bearers with bait; or (c) other persons and circumstances exempted by the regulations.	
Damage to habitat	93. (1) No person shall substantially alter, damage or destroy habitat. (2) A person who establishes that he or she acted with legal justification in altering, damaging or destroying habitat shall not be convicted of an offence under subsection (1).	“habitat” means the area or type of site where a species or an individual of a species of wildlife naturally occurs or on which it depends, directly or indirectly, to carry out its life processes;
Requirement for Wildlife Management and Monitoring Plan	95. (1) A developer or other person or body may be required, in accordance with the regulations, to prepare a wildlife management and monitoring plan for approval by the Minister, and to adhere to the approved plan, if the Minister is satisfied that a development, proposed development, or other activity is likely to (a) result in a significant disturbance to big game or other prescribed wildlife; (b) substantially alter, damage or destroy habitat; (c) pose a threat of serious harm to wildlife or habitat; or (d) significantly contribute to cumulative impacts on a large number of big game or other prescribed wildlife, or on habitat	

Contents of the Wildlife Management and Monitoring Plan	95. (2) A wildlife management and monitoring plan must include (a) a description of potential disturbance to big game and other prescribed wildlife, potential harm to wildlife and potential impacts on habitat; (b) a description of measures to be implemented for the mitigation of potential impacts; (c) the process for monitoring impacts and assessing whether mitigative measures are effective; and (d) other prescribed requirements.	
Species at Risk (NWT) Act		
Topic	Section of the Act or Regulations	Notes
Designated Habitat	80. No person shall destroy any part of designated habitat.	
Species conservation	151. (1) The Commissioner, on the recommendation of the Minister, may make regulations respecting the conservation of pre-listed species or listed species, including but not limited to (a) requiring the doing of things that may conserve the species; (b) prohibiting activities that may adversely affect the species; (d) imposing prohibitions against (i) killing, harming, harassing, capturing or taking an individual of a species,	For up-to-date information on Regulations and Permits issued under the Act go to http://nwt-species-at-risk.ca/en/Regulations
Habitat conservation	152. The Commissioner, on the recommendation of the Minister, may make regulations respecting the conservation of habitat of pre-listed species or listed species or the area in which the habitat is located or the surrounding area, including but not limited to (a) requiring the doing of things that may conserve the habitat or area; (b) prohibiting activities that may adversely affect the habitat or area; (c) imposing prohibitions against damaging or destroying the habitat or area; (d) controlling, restricting or prohibiting any use of, access to, or activity in the habitat or area; and (e) controlling, restricting or prohibiting the release of any substances in or into the habitat or area.	For up-to-date information on Regulations and Permits issued under the Act go to http://nwt-species-at-risk.ca/en/Regulations

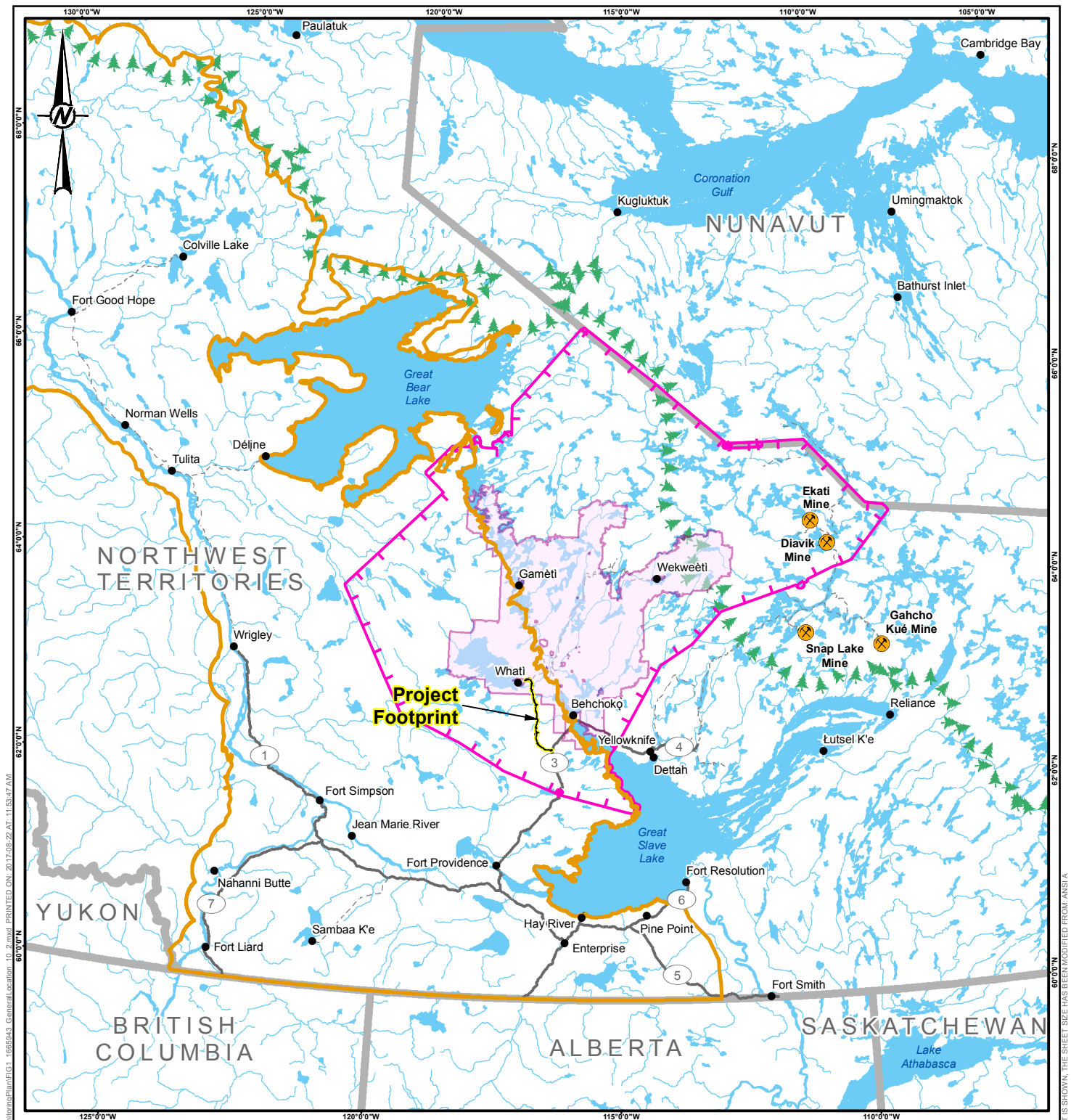
Designating habitat	153. (1) The Commissioner, on the recommendation of the Minister, may, by regulation, designate habitat, or a component or combination of components of habitat, of a pre-listed species or a listed species.	For up-to-date information on Regulations and Permits issued under the Act go to http://nwt-species-at-risk.ca/en/Regulations
Designated habitat	154. The Commissioner, on the recommendation of the Minister, may make regulations respecting the conservation of designated habitat or the area in which designated habitat is located or the surrounding area, including but not limited to (a) requiring the doing of things that may conserve the designated habitat or area; (b) prohibiting activities that may adversely affect the designated habitat or area; (c) imposing prohibitions against damaging the designated habitat or area; (d) controlling, restricting or prohibiting any use of, access to, or activity in the designated habitat or area; and (e) controlling, restricting or prohibiting the release of any substances in or into the designated habitat or area.	For up-to-date information on Regulations and Permits issued under the Act go to http://nwt-species-at-risk.ca/en/Regulations
Migratory Birds Convention Act		
Topic	Section of the Act or Regulations	Notes
Deposit of harmful substances	5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.	

Migratory Birds Regulations (federal) enabled under the <i>Migratory Birds Convention Act</i>		
Topic	Section of the Act or Regulations	Notes
Disturbance and/or destruction of migratory birds, their nests and eggs	5(1) of the Migratory Bird Regulations states that no person shall hunt a migratory bird except under authority of a permit. 6. Subject to subsection 5(9), no person shall (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, or	"Hunt" means to chase, pursue, worry, follow after or on the trail of, lie in wait for, or attempt in any manner to capture, kill, injure or harass a migratory bird, whether or not the migratory bird is captured, killed or injured. Currently, the regulations do not provide for authorizations or permits for the inadvertent harming or killing of migratory birds and the disturbance or destruction of their nests and eggs (a.k.a. "incidental take") in the course of industrial or other activities. For further advice on how to avoid incidental take or reduce risks to migratory birds and their nests and eggs, refer to the avoidance guidelines and frequently asked questions related to the protection of migratory bird nests and eggs as well as the fact sheet "Planning Ahead to Reduce Risks to Migratory Bird Nests" at: http://www.ec.gc.ca/paom-itmb/
Species at Risk Act (federal)		
Topic	Section of the Act or Regulations	Notes
Killing, harming, etc., listed wildlife species	32. (1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.	"individual" means an individual of a wildlife species, whether living or dead, at any developmental stage and includes larvae, embryos, eggs, sperm, seeds, pollen, spores and asexual propagules.
Damage or destruction of residence	33. No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.	"residence" means a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating.

Destruction of critical habitat	58. (1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if (a) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada; (b) the listed species is an aquatic species; or (c) the listed species is a species of migratory birds protected by the Migratory Birds Convention Act, 1994.	“critical habitat” means the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.
Destruction of critical habitat	61. (1) No person shall destroy any part of the critical habitat of a listed endangered species or a listed threatened species that is in a province or territory and that is not part of federal lands. (1.1) Subsection (1) does not apply in respect of (a) an aquatic species; or (b) the critical habitat of a species of bird that is a migratory bird protected by the <i>Migratory Birds Convention Act, 1994</i> that is habitat referred to in subsection 58(5.1). (2) Subsection (1) applies only to the portions of the critical habitat that the Governor in Council may, on the recommendation of the Minister, by order, specify.	

Agreements and Permits	73. (1) The competent minister may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed wildlife species, any part of its critical habitat or the residences of its individuals. 2) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that (a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons; (b) the activity benefits the species or is required to enhance its chance of survival in the wild; or (c) affecting the species is incidental to the carrying out of the activity. (3) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that (a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted; (b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and (c) the activity will not jeopardize the survival or recovery of the species.	
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Appendix B: Tłchq ASR Project Maps



LEGEND

- EXISTING MINE
- POPULATED PLACE
- ALL-SEASON ROAD
- WINTER ROAD
- TREELINE
- WATERCOURSE
- PROVINCIAL/TERRITORIAL BOUNDARY
- TŁİCHQ LAND
- WATER BODY
- PROJECT FOOTPRINT
- BOREAL CARIBOU NT1 RANGE
- WEK'ÈEZHÌ RESOURCE MANAGEMENT AREA

REFERENCE(S)

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: CANADA LAMBERT CONFORMAL CONIC

CLIENT

GOVERNMENT OF NORTHWEST TERRITORIES

PROJECT

TŁİCHQ ALL-SEASON ROAD
WILDLIFE MANAGEMENT AND MONITORING PLAN

TITLE

LOCATION OF THE TŁİCHQ ALL-SEASON ROAD PROJECT

CONSULTANT



YYYY-MM-DD 2017-08-22

DESIGNED DC

PREPARED LMS

REVIEWED DP

APPROVED DP

PROJECT NO.

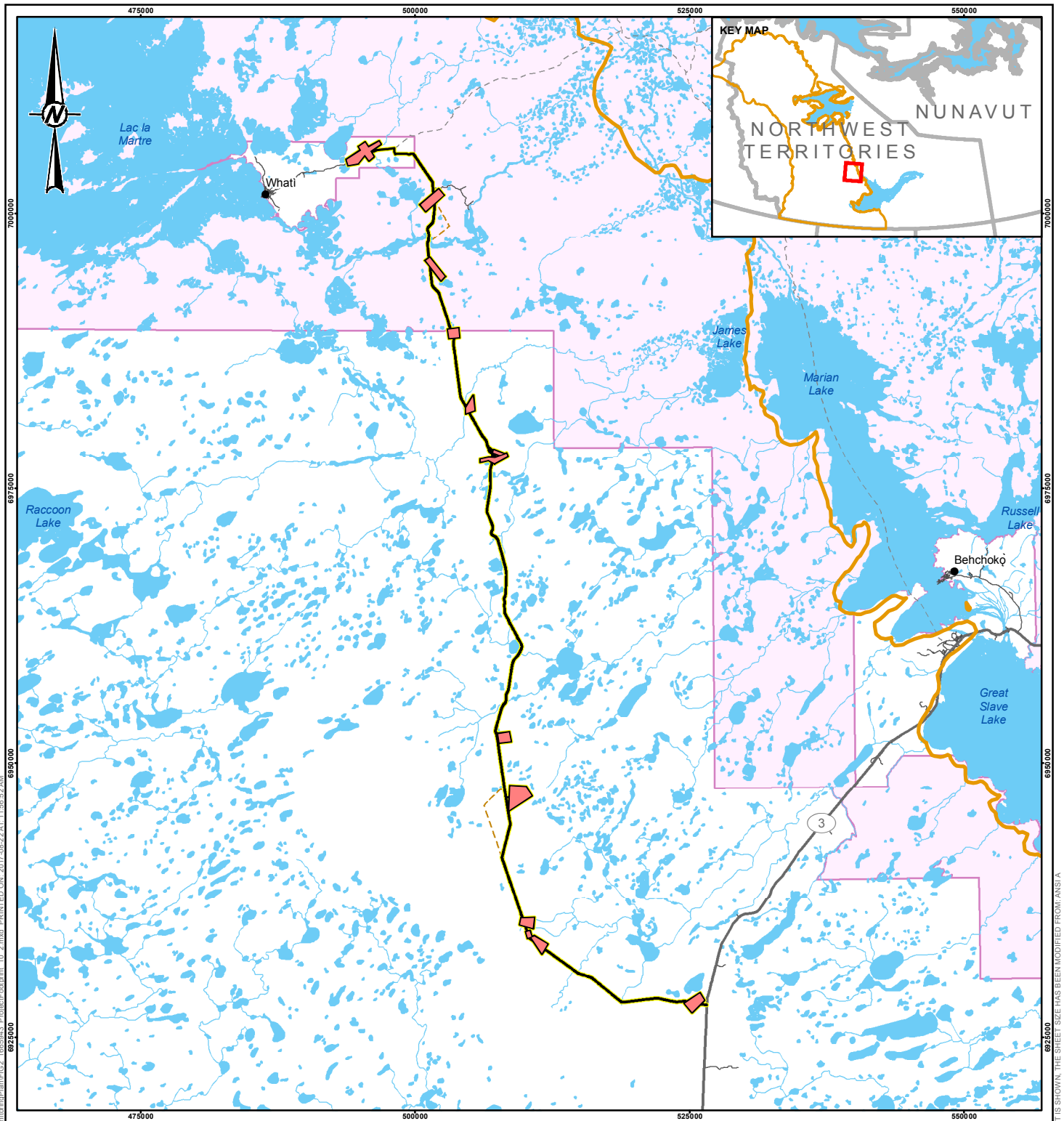
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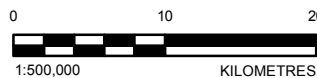
FIGURE

1



LEGEND

- POPULATED PLACE
- ALL-SEASON ROAD
- LOCAL ROAD
- - - WINTER ROAD
- - - OLD AIRPORT ROAD
- WATERCOURSE
- Tłı̨chǫ LAND
- WATER BODY
- ✚ PROJECT FOOTPRINT - BORROW SOURCE
- ✚ PROJECT FOOTPRINT - ROAD
- BOREAL CARIBOU NT1 RANGE



REFERENCE(S)

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 11 DATUM: NAD83

CLIENT
GOVERNMENT OF NORTHWEST TERRITORIES

PROJECT
Tłı̨chǫ ALL-SEASON ROAD
WILDLIFE MANAGEMENT AND MONITORING PLAN

TITLE
PROPOSED Tłı̨chǫ ALL-SEASON ROAD PROJECT FOOTPRINT

CONSULTANT



YYYY-MM-DD 2017-08-22

DESIGNED DP

PREPARED LMS

REVIEWED DP

APPROVED DP

PROJECT NO.
1665943

REV.
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FIGURE
2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A 25mm

Appendix C: Responsibility Hierarchy and Contact Information

Wildlife Management and Monitoring Plan
Appendix C: Responsibility Hierarchy and Contact Information
June 2019

Agency	Role	Position	Reports to	Roles	Name	Contact
GNWT-INF	Developer	Project Sponsor	GNWT-INF Deputy Minister	Overall Project Lead	Ziaur Rahman	Ziaur_Rahman@gov.nt.ca (867) 767-9086 ext. 31117
GNWT-ENR	Regulator/ Support	Renewable Resource Officer	GNWT-ENR Regional Superintendent	- Enforce the Wildlife Act - Provide advice to NSI Environmental Manager	As required	24 hour Wildlife Emergency (867) 873-9238
GNWT-ENR	Regulator/ Support	Wildlife Biologist	GNWT Wildlife Division Manager	Implement WMMP monitoring in Section 5.2	James Hodson	James_Hodson@gov.nt.ca (867) 767-9237 Ext. 53227
NSI	Private Partner	Project Manager	GNWT Project Sponsor	Overall Project delivery for NSI	Robert Cornell	(514) 609-9965
NSI	Private Partner	Environmental Manager	NSI Project Lead	- Oversee the implementation of the relevant WMMP mitigation - Oversee construction and operations in relation to Land Use Permit conditions - Implement WMMP monitoring in Section 5.1 - Contact GNWT Project Manager and ENR Renewable Resource Officer as required	Kerry Pike	Kerry.pike@kiewit.com (514) 337-4004
NSI	Private Partner	Environmental Monitors	NSI Environmental Manager	- Implement the relevant WMMP mitigation - Implement WMMP monitoring in Section 5.1 - Contact GNWT Project Manager and ENR Renewable Resource Officer as required	TBD	TBD
Associated Engineering	Owners' Engineer	Project Manager	GNWT Project Sponsor	- Ensure that all Owner requirements have been met by NSI - Provide technical advice to regarding Project modifications - Direct audits of construction activities	Leslie Mihalik	mihalikl@ae.ca (604) 293-1411 Ext. 391
Golder Associates	Owners' Engineer	Environmental Lead	Owners' Engineer Project Manager	- Provide technical advice to regarding Project modifications - Undertake site environmental audits during construction on behalf of GNWT	Damian Panayi	(867) 444-8805 dpanayi@golder.com

Appendix D: Operating Procedure for Use of Boreal Caribou Collar Data to Mitigate Impacts from Construction

OPERATING PROCEDURE

Use of Boreal Caribou Collar Data To Mitigate Impacts From The Construction Of The Tłıchǵ All-Season Road

Purpose

This protocol outlines the procedure for communication between the Government of Northwest Territories (GNWT) Department of Infrastructure (INF), Department of Environment and Natural Resources (ENR), and Project Co. regarding the location of collared boreal caribou near the proposed Tłıchǵ All Season Road (Tłıchǵ ASR) during road construction carried activities carried out under land use permit W2016E0004.

The objective of this protocol is to alert Project Co. and INF when collared caribou approach construction activities within pre-defined distances, or “cautionary zones”, so that mitigation measures can be implemented to:

- Reduce sensory disturbance and unnecessary energy expenditure by caribou during the most sensitive periods – late-winter and calving
- Avoid sensory disturbance that would reduce the likelihood of calf survival during the calving period
- Avoid injury or mortality of caribou, or risk of personal injury

This protocol is intended to address the following construction activities:

- Vegetation clearing along the Tłıchǵ ASR right of way, at borrow sources, and borrow source access roads in advance of road bed construction and borrow source operations
- Blasting at borrow sources, quarries and, if required, along the right of way
- Other construction activities along the cleared right of way, and at borrow sources/quarries such as hauling granular materials to construct the road embankment and driving surfaces, extraction of granular materials at borrow sources/quarries, any grading, cutting or filling necessary to construct the road embankment, preparation of the driving surface, construction of water crossing and bridges, etc.

Limitations of using the collar data to trigger mitigation measures:

- ENR will attempt to increase the number of collared female caribou in proximity to the Tłıchq ASR alignment in winters 2018 and 2019, but it must be recognized that only a small portion of the boreal caribou population will be collared. Therefore, an absence of collar locations in proximity to Tłıchq ASR construction activities cannot be considered to indicate an absence of boreal caribou near construction activities. Collar data needs to be supplemented by visual surveys conducted by environmental monitors in and around active construction areas to verify that no boreal caribou are present.
- ENR receives updated collar data every 24 hours, and when the updated collar data is received it is already 24 hours old. If ENR provides INF and Project Co. with updated maps of collar locations every 48 hours during the most sensitive periods, the collar locations will already be 48-72 hours out of date. Therefore collar data indicates where boreal caribou were 2-3 days ago, not where they are presently located. Again, the use of collar data must be supplemented by real-time visual surveys of active construction areas by environmental monitors to confirm presence or absence of boreal caribou.
- If updated maps of collar locations cannot be provided within the time intervals specified in Table 1, and, if one or more caribou were observed within the cautionary zone at the time the last map was provided, the associated mitigation will be observed until a new map is provided that indicates the caribou have left the cautionary zone.

Assumptions:

- Given the low density of boreal caribou within the Regional Study Area for the Tłıchq ASR, interactions with boreal caribou will be infrequent and unlikely.
- Boreal caribou are expected to avoid active construction areas during most times of the year due to the noise associated with these activities. However, exceptions may occur during times of the year where boreal caribou exhibit restricted daily movements, i.e. the late-winter period (mid-March to early April) and the calving period (early April to mid-July), and construction activities advance upon areas where boreal caribou are residing or if caribou choose to use an area where there is currently little to no construction activity and activities subsequently start up in that area.
- Boreal caribou tend to aggregate in small groups during the winter season, thus the use of location data from collared individuals to trigger mitigation measures should help to protect more than just those collared individuals.

- Prior to calving (pre-calving period), females increase their movement rates to locate suitable calving areas.
- During calving season, female boreal caribou spread out to calve individually; therefore the use of collar data to trigger mitigation measures will only protect the collared females and their calves.
- Most vegetation clearing will take place between September and April to avoid the migratory bird nesting season, and therefore most vegetation clearing required for the project will occur outside of the calving season for boreal caribou.

Sensitive periods:

Although boreal caribou may be sensitive to disturbance from construction activities throughout the year, ENR considers there to be two key periods when boreal caribou should receive additional protection from sensory disturbance to increase the likelihood of successful calving and thus recruitment of new individuals into the population. The following sensitive periods are based on the seasonal activity periods reported in Table 6 in the status report for boreal caribou in the NWT (Species at Risk Committee 2012), but some year-to-year variation should be expected based on snow and weather conditions:

- Late-winter (16 Mar – 4 April): Boreal caribou are exhibiting their shortest daily movements at this time of year, likely reflecting the increased energetic costs of travelling through deep snow at this time of year, or limited areas that provide easier access for foraging on ground lichens (wind swept areas and closed canopy forests with shallow snow). As boreal caribou are depleting their stores of fat throughout the winter, and movement through deep snow or displacement from good foraging habitat could have high energetic costs, disturbance events at this time of year could have negative impacts on female body condition and subsequently have negative impacts on calving and calf survival.
- Calving (05 April – 15 July): Female boreal caribou spread out during the pre-calving period (05-30 April) and increase daily movements to find suitable calving locations. Females spread out during calving as an anti-predator strategy to make themselves and their calves rare in the midst of other prey species and predators. Once a calving location is selected, daily movement rates drop considerably during calving (30 Apr – 6 June). During the calving period, sensory disturbances that may cause energetic stress to the calving female, or cause the calving female to flee and leave her calf temporarily may reduce the odds of calf survival. There are high energetic demands on females while they are lactating and raising their calves. Caribou tend to avoid suitable calving locations that are close to sensory disturbance from development (Carr *et al.* 2007; Schaefer and Mahoney 2007; Vors *et al.* 2007; Vistnes and Nellemann 2008 cited in OMNR 2014), so they may avoid calving in close proximity to active Tłı̨ch̓q ASR

construction areas. However, in instances where construction activities may advance upon or be in close proximity to an area where a female has chosen to calve, displacement of the female from that area could have negative impacts on calf survival. Calves appear to be most vulnerable to predation during the first six weeks after birth (Pinard et al. 2012), therefore the calving season includes the period up to July 15 (i.e. to address the case that calves are born as late as May 30).

Boreal caribou are considered to be less sensitive to sensory disturbance at other times of the year, as they are moving greater distances on a daily basis and will likely avoid active construction areas or move away from them quickly if and when they encounter them.

Protocols for sharing information:

- Project Co. will provide ENR and INF with weekly updates of where construction activities will take place (i.e., which sections of the alignment will be active, which borrow sources/quarries will be active), and the type of activities taking place (e.g. vegetation clearing, blasting, embankment construction, etc.). Specifications in regards to how information will flow, to be determined.
- ENR will provide INF and Project Co. with maps of collar locations according to the schedule outlined in Table 1 for different periods of the year. Project Co. will provide the maps to its Environmental Monitors and any other relevant designated staff and sub-contractors. Project Co. will inform ENR of who the maps are being shared with.
- The maps will illustrate the location of collared caribou in proximity to the Tłıchǫ ASR alignment, borrow sources and Whatı access road and the date of the collar location information.
- Implementation of mitigation measures will be determined by the proximity of collared caribou, the time of year, and the type of construction activity taking place as outlined in Table 1.
- INF and Project Co. will provide ENR with weekly records of the timing and location of all planned blasting events.
- The data provided by ENR is to be used only for the purpose of assisting Project Co. and INF in conducting construction work as provided for under land use permit W2016E0004.
- Collar data should be considered sensitive information. INF and Project Co. will not share the data provided by ENR with anyone other than the Site Supervisor.
- INF and Project Co. acknowledge that collared caribou represent only a portion of the caribou in the North Slave Region. INF and Project Co. recognize that the lack of collared caribou in an area does not mean that caribou are not present and will make

an effort to visually confirm that caribou are not present when undertaking construction work in a new area, and will remain vigilant for the presence of caribou that choose to move into or across an active construction area.

- A project management team will host monthly and weekly meetings.
- An oversight committee will receive regular updates from the project management team.

Table 1: Protocols for sharing boreal caribou collar data, cautionary zones and resulting mitigation measures during periods of the year when boreal caribou are “Sensitive” and “Less Sensitive” to sensory disturbance from construction activities.

Construction Activity	Sensitive Periods		Less Sensitive Periods
	Late-winter (16 Mar – 4 Apr)	Calving (05 April – 15 July)	Summer, Fall, Early to Mid-Winter (16 July – 15 Mar)
Vegetation clearing of the right of way	Cautionary Zone: 2 km Maps will be provided every 2 days to evaluate presence of collared caribou within 2 km of the Tłı̨chʼo ASR alignment and borrow sources. Mitigation: If collared caribou are within 2 km of an area that will be cleared within the next 48 hours, wildlife monitors will survey 500 m ahead of vegetation clearing operations, to confirm whether or not caribou are present. If fresh caribou sign is detected within 500 m, delay clearing and re-evaluate every 24 hours until the collar data or on the ground surveys for caribou sign indicate that they have moved out of the 2 km cautionary zone.	Cautionary Zone: 3 km Maps will be provided every 2 days to evaluate presence of collared caribou within 3 km around the Tłı̨chʼo ASR alignment and borrow sources. Mitigation: If collared caribou are within 3 km of an area that will be cleared within the next 48 hours, suspend vegetation clearing in the active construction area. ENR will re-evaluate the collar locations every 24 hours and will notify INF and Project Co. when the collared caribou moves out of the 3 km cautionary zone. At this point, vegetation clearing can resume.	Cautionary Zone: 500 m No regular collar data maps will be provided. It is assumed that since boreal caribou move greater distances during this period, the disturbance associated with vegetation clearing will cause them to avoid the area, thus reducing the risk of injury or mortality. As collar data is always at least 24 hours out of date, and caribou are moving greater distance each day during these times of year, it will not be as useful for providing advance warning of caribou presence near active construction areas. Wildlife monitors will conduct visual scans ahead of clearing operations to determine presence of caribou. This will involve travelling along the existing road/trail ahead of the vegetation clearing operations to look for boreal caribou or fresh sign such as tracks or scat, using the Pre-Clearing Survey Protocol. Mitigation: If a caribou is seen within 500 m ahead of clearing operations, operations will be temporarily suspended by the Project Supervisor to allow wildlife to move away from the area of their own accord. If they do not leave the area within 15 minutes, they will be gently encouraged to move away from construction activities, and an incident report will be completed. This will involve the slow approach of Environmental Monitors towards the caribou to encourage them to move. If a caribou is reluctant to leave the area, this could be a sign that it is a female that is hiding a calf in close proximity. If this is the case, suspend operations, and contact regional ENR biologist for advice.

Table 1: Protocols for sharing boreal caribou collar data, cautionary zones and resulting mitigation measures during periods of the year when boreal caribou are “Sensitive” and “Less Sensitive” to sensory disturbance from construction activities.

Construction Activity	Sensitive Periods		Less Sensitive Periods
	Late-winter (16 Mar – 4 Apr)	Calving (05 April – 15 July)	Summer, Fall, Early to Mid-Winter (16 July – 15 Mar)
Blasting	Cautionary Zone: 2 km Collar data maps will be provided every 2 days to evaluate the presence of collared caribou within 2 km around areas where blasting will take place in the next week. Mitigation: If collared caribou are within 2 km in the last 48 hours of an area where there will be blasting, Environmental Monitors will survey within 500 m of blast the blast site (using the Pre-Blast Survey Protocol). Blasting will be delayed if fresh caribou sign is found within 500 m. Blasting will proceed once no caribou are found or seen within 500 m by the Environmental Monitors. Collar data will be re-evaluated every 24 hours, and if collared caribou remain within the 2 km cautionary zone, on the ground surveys within 500 m of the blast site, will be repeated before every blast. Project Co. will be notified when collared caribou have moved out of the 2 km cautionary zone, at which point the on-the-ground surveys will no longer be needed before blasting. At all times, environmental monitors and the blast manager will also visually confirm that no caribou are present within the danger zone of the blasting site before blasting proceeds.	Cautionary Zone: 3 km Collar data maps will be provided every 2 days to evaluate the presence of collared caribou within 3 km around areas where blasting will take place in the next week. If collared-caribou are within 1 km of blast site, delay blasting for 48 hours to determine if caribou is calving (relatively stationary, e.g. hourly locations <1 km apart). If the caribou is calving, suspend blasting until an ENR biologist indicates that calving is completed. If the caribou is moving more than 1 km/day, suspend blasting and re-evaluate every 48 hours until the caribou moves out of the area or it is confirmed that the caribou is calving within the 1 km buffer, in which case suspend blasting until an ENR biologist indicates that calving is completed.	Cautionary Zone: the danger zone of the blast area, as determined by the blast manager. Mitigation: Blasting will be proceeded by a horn signal which should scare any nearby caribou away from the area prior to the blast. Blasting can proceed, subject to approval by the blast manager and completion of a Pre-Blast Survey.

Table 1: Protocols for sharing boreal caribou collar data, cautionary zones and resulting mitigation measures during periods of the year when boreal caribou are “Sensitive” and “Less Sensitive” to sensory disturbance from construction activities.

Construction Activity	Sensitive Periods		Less Sensitive Periods
	Late-winter (16 Mar – 4 Apr)	Calving (05 April – 15 July)	Summer, Fall, Early to Mid-Winter (16 July – 15 Mar)
Other construction activity along the cleared right of way and borrow sources and quarries Applies to activities taking place within areas that have already been cleared of vegetation	Cautionary Zone: 2 km Collar data maps will be provided every 2 days to evaluate presence of collared caribou within 2 km around the Tłıchʼo ASR alignment and borrow sources. Mitigation: If collared caribou are within 2 km of sections of the road that have regular vehicle traffic (e.g. trucks travelling to and from borrow pits to lay down the road embankment), speed limits along the road within 2 km on either side of the collar locations shall be reduced to 30 km/h to reduce the likelihood of wildlife-vehicle collisions should collared caribou cross the right of way.	Cautionary Zone: 3 km Collar data maps will be provided every 2 days to evaluate presence of collared caribou within 3 km around the Tłıchʼo ASR alignment and borrow sources. Mitigation: If a collared caribou chooses to calve within 3 km of an already active construction area, then activities other than blasting can continue as it assumed that noise from construction is not bothering them since they chose to calve there. If a situation arises where a caribou chooses to calve within 500 m of an active construction area, there may be a risk to calving success. Construction activities will be suspended, and collar locations re-evaluated every 24 hours, until the ENR biologist confirms that the individual has moved >500 m away. If a collared caribou is calving within 3 km of a cleared construction area, that is not presently active but is planned to become active within the next 48 hours, collar locations will be re-evaluated every 24 hours, and construction in that area shall be delayed until the caribou moves out of the 3 km cautionary zone.	Cautionary Zone: the cleared Tłıchʼo ASR right of way, cleared areas along access roads, and cleared areas of borrow sources. It is assumed that since boreal caribou move greater distances during these periods, the disturbance associated with construction activities will cause them to avoid the area, thus reducing the risk of injury or mortality. As collar data is always at least 24 hours out of date, and caribou are moving greater distances each day during these times of year, it will not be as useful for providing advance warning of caribou presence near active construction areas. Mitigation: Environmental Monitors will conduct daily patrols along active sections of the Tłıchʼo ASR alignment, borrow source access roads and at active borrow sources. See the Wildlife Road Survey Protocol. Project Co. staff will immediately report any caribou sightings within cleared areas surrounding construction activities to the Environmental Monitors who will record the time and location of the sightings. Speed limits along the road within 2 km on either side of caribou sighting will be reduced to 30 km/h while the caribou remains within the cleared right of way in order to reduce the risk of wildlife-vehicle collisions.
Aircraft	Follow GNWT “Flying low? Think Again...” guidelines.	Cautionary zone: 3 km Collar data maps will be provided every 2 days to evaluate location of collared caribou within Tłıchʼo ASR Regional Study Area. No low-level flights (<1000 FT) within 3 km of known calving sites based on collar data.	Follow GNWT “Flying low? Think Again...” guidelines.

Contacts

Environment and Natural Resources contacts
James Hodson, Wildlife Biologist, Environmental Assessment/Habitat (867) 767-9237 Ext. 53227 James.hodson@gov.nt.ca
Andrea Patenaude, Wildlife Biologist, Environmental Assessment/Habitat 767-9237 Ext. 53228 Andrea.patenaude@gov.nt.ca
ENR North Slave Regional Biologist or Wildlife officer TBD
Department of Infrastructure contacts
Ziaur Rahman , GNWT-INF Project Lead (867) 767-9086 ext. 31117 Ziaur.Rahman@gov.nt.ca
Project Co. contacts
Kerry Pike, North Star Infrastructure (NSI) Environmental Manager Phone: 514-337-4004 Email: Kerry.pike@kiewit.com

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Appendix E: Bear Occurrence Procedures Manual

2014

Bear Occurrence Procedures Manual



Photo by Dean Cluff/ENR

Environment & Natural Resources

Bear Occurrence Procedures Manual

Implementation of these procedures will allow ENR a greater ability to provide advice and assistance in preventing harm to humans, bear(s) or property. In addition, it will provide guidance on safely deterring bears that find themselves in areas of development, tourism camps or cabins with the aim of preventing habituation and unnecessary destruction.

Report any incidents such as sightings, encounters, injuries and/or mortalities to the ENR. The GNWT Phone Directory can be found at <http://rdirectory.gov.nt.ca/rDirectory.aspx> Regional contacts are listed below:

North Slave Region

Wildlife Emergency	(867) 873 - 9238 (24 Hours)
Yellowknife	(867) 873 - 9238
Fax:	(867) 873 - 6230

South Slave Region

Wildlife Emergency	(867) 872 - 0400 (24 Hours)
Fort Smith	(867) 872 - 6400
Fax:	(867) 872 - 4250

Inuvik Region

Wildlife Emergency	(867) 678 - 0289 (24 Hours)
Inuvik	(867) 678 - 6650
Fax:	(867) 678 - 6659

Sahtu Region

Wildlife Emergency	(867) 587 - 2422 (24 Hours)
Norman Wells	(867) 587 - 3500
Fax:	(867) 587 - 3516

Deh Cho Region

Wildlife Emergency	(867) 695 - 7433 (24 Hours)
Fort Simpson	(867) 695 - 7450
Fax:	(867) 695 - 2381

BEAR AWARENESS TRAINING

ENR supports the NWT Mine Health and Safety Regulations (s.15.05), which requires that all field personnel involved in mineral exploration undertake bear-safety training. However, human/wildlife incident prevention is a key component to the training.

Training of personnel in preventing and responding to wildlife incidents can reduce the likelihood of injury to personnel and wildlife. Therefore, all field personnel working on the project must receive bear awareness training, preferably from a professional trainer.

The training should include:

1. Recognizing the causes of human/wildlife conflicts;
2. How to prevent and respond to bear incidents;
3. Proper storage, transfer and disposal of camp waste; and
4. Proper use and safe application of deterrents.

INCIDENT PREVENTION

Refer to the ***Camp Waste and Wildlife Attraction Guideline***. This resource provides guidance on how to minimize or prevent attraction from bears to your camp, cabin or work site.

OCCURRENCE RESPONSE

Small scale exploration and tourism camps should develop and implement Bear Incident Standard Operating Procedures (SOPs) that can be used in the field. The SOPs will allow all members on site to have knowledge of how to minimize or prevent any loss of life or property if there is a bear within the vicinity of your camp area or work site. SOPs may include such things as:

- a) Response team
- b) Equipment
- c) Action level
- d) Emergencies
- e) Reporting Requirement

1. *SIGHTING - Bear in the general vicinity (>1km)*

1. If it is within sight of your camp/cabin and it is safe to do so, use a ***Wildlife Sightings Log*** to record and report information regarding your observations.
2. Continue to monitor, if necessary.

2. *ENCOUNTER - Bear In Camp (<1km)*

1. If safe to do so; take a quick note of the location, direction of travel and general behaviour of the bear(s).
2. Sound the bear alarm.
3. If necessary, phone the ENR Regional contacts listed above for guidance on necessary next steps to ensure human/wildlife safety and protection of property.
4. If necessary, stay indoors or in your vehicle. **DO NOT APPROACH THE BEAR.**
5. Keep all doors and windows closed.

6. If necessary and safe to do so; continue to monitor the behaviour and movement until either the bear leaves on its own, deterrence is successful or response personnel arrive.
7. If possible, start deterrence procedures.
8. Report status of bear encounter to the ENR Regional contacts listed above when safe to do so.

3. Injury

1. Any injuries a bear may have obtained from direct or indirect contact with the camp or persons must be reported to the appropriate ENR Regional contact listed above.

4. Mortality

1. A bear may be destroyed if human life is in danger or destruction of property is imminent.
2. Under the NWT Wildlife Act, mortalities must be reported to the appropriate ENR Regional contact listed as soon as is practicable. In some cases, the responsible party may be asked to:
 - a) Skin the bear leaving the claws and head attached.
 - b) Preserve the hide by freezing and/or salting it and store it in a cool place. Turn in the hide, the skull, evidence of sex and any other biological samples requested when filing the report to the nearest ENR Regional office or to an ENR Renewable Resource Officer.

If or when possible, the attached **Bear Occurrence Checklist** should be completed prior to calling ENR. It is critical that as much information as possible be provided in order for ENR to provide appropriate advice and guidance.

DENNING BEARS

- A. For exploration camps, if a bear is located in, at or near a den site, work in the area must halt. All employees should safely retreat from the area and report the incident to the Site Supervisor and/or Wildlife Monitor and the appropriate ENR Regional contact listed above for further advice and assistance.
- B. For cabin owners, if a bear is located in, at or near a den site, safely retreat from the area and report the incident to the appropriate ENR Regional contact listed above for further advice and assistance.
- C. Staff from ENR will be required to assess the den site and may implement measures to ensure both human safety and that the bear(s) remain undisturbed. This may include the establishment of a buffer zone of at least 300 meters around the den.
- D. Work inside the buffer zone may not be permitted until after den emergence.



Environment & Natural Resources (ENR)

Bear Occurrence Checklist

Office Use Only

File#:

- Fill out or check all that apply

1. Complainant Details:					
Name, job title and affiliation:					
Contact information:					
Location of complainant: <i>(coordinates, lake or property name)</i>					
Other on-site contact information: <i>(wildlife monitors/site supervisors)</i>					
2. Bear Occurrence Details:					
Date/Time:			Location: <i>(coordinates, lake or property name)</i>		
Type of bear occurrence:	☐ sighting	☐ encounter	☐ injury	☐ mortality	<i>Ear tag/tattoo #</i>
	☐ Other, explain:				
Number of bears:			# of cubs		
Type:	☐ black	☐ grizzly	☐ unknown		
Sex :	☐ male	☐ female	☐ unknown		
Age Class:	☐ cub (<1)	☐ juvenile	☐ adult	☐ unknown	
Behaviour:	☐ fearful	☐ not fearful	☐ aggressive	☐ other	
General Observations	☐ moving toward site		☐ moving away from site	☐ at site	
Other observations: <i>(i.e. walking, resting, eating, mortality, injury, den site, number of cubs, etc.)</i>					
Has bear(s) been involved in a previous incident:	☐ No ☐ Yes	If yes, explain:			
Did the bear obtain a reward	☐ No ☐ Yes	If yes, explain:			
Any property damage or loss of life:	☐ No ☐ Yes	If yes, explain:			

3. Detection/Deterrent:

Detection system on site:	☐ Alarm	☐ Dog	☐ Motion detector	☐ Other:
Deterrence on site:	☐ Bear boards	☐ Auditory (Yelling/Flares/Alarm/Horn/Bell/Whistle/Cracker shells)		☐ Projectile (Rubber Bullets/Firearms)
	☐ Electric Fence	☐ Chased (Dog, vehicle)		☐ Other:
Was deterrence used:	☐ No ☐ Yes	Explain:		
Was the deterrence successful:	☐ No ☐ Yes	Explain:		
Present status of bear with dates:	☐ at large	☐ captured	☐ deterred	☐ other

4. Additional Comments

[illegible]

Appendix F: Monitoring Protocols and Data Sheets

Tłıchǫ All-Season Road Project

Wildlife Management and Monitoring Plan

Appendix F: Monitoring Protocols and Data Sheets

June 2019

WILDLIFE SIGHTINGS PROCEDURE

PURPOSE

The purpose of this procedure is to describe the management of the Wildlife Sightings that are observed during the construction phase of the Project.

RESPONSIBILITY

All staff are responsible for reporting wildlife sightings. The Environmental Monitors are responsible for collecting the log sheets weekly, entering them into a database. Environmental Monitors are also responsible for entering wildlife observations reported by radio into the log sheets.

PROCEDURE

1. Wildlife sighting logs will be posted on various bulletin boards in camps and work areas for Project staff to record observations of wildlife.
2. Project staff will be made aware of which species are a priority to report.
3. All Project staff will be encouraged to add observations to the log, including the species, number, location, and date of the observation.
4. Environmental Monitors will check the logs weekly for evidence of problem wildlife or problem areas that may pose a risk to wildlife.
5. Observations of wildlife may be called in by radio and entered into the Wildlife Sightings Log by the Environmental Monitors.

EQUIPMENT REQUIREMENTS

None. Data sheets to be posted for all Project staff use.

REPORTING

Observations relevant to human or wildlife safety, such as observations of bears, caribou, moose, bison, species at risk or nesting birds, will be included in the Weekly Report. Copies of all Wildlife Sightings Logs will be provided in the Weekly Report. All information including surveys and monitoring will be summarized in the Annual Report.

Tịchọ ASR Wildlife Sightings Log

Date	Time	Species	Number	Location (km marker, or coordinates)	Notes (any behavioural response or reactions?)	Name	Company

WILDLIFE ROAD SURVEY PROCEDURE

PURPOSE

The purpose of this procedure is to describe the management of the Wildlife Road Survey. This procedure will be used during the construction phase only.

RESPONSIBILITY

The Environmental Monitors are responsible for completing wildlife road surveys and entering them into a database.

PROCEDURE

1. The Wildlife Road Survey is to be completed each time Environmental Monitors drive a section of road.
2. Observations of wildlife on the roads, within the cleared right of way adjacent to the road, or within borrow pits will also be documented by Environmental Monitors. This survey may be completed as a stand-alone survey, or while driving the road for other purposes. To provide sufficient survey effort, a minimum distance of 10 km is suggested when completing a stand-alone survey and the entire drivable length of road should be covered at least twice per week.
3. At the start of a survey, the date, start time, start location and observers will be document on the Wildlife Road Survey data sheet provided.
4. All observations of wildlife or wildlife sign along the road will be documented, including the species, number of individuals, location (UTM or kilometre) and photo if relevant.
5. Speed should be limited to 50 km/h, the maximum driving speed for Project vehicles. Any notes on mitigation actions taken or suggested follow up will also be reported.
6. Observations of large mammals on the road will be reported to other drivers in the area, to reduce risk of collision.
7. At the completion of the survey, document the end time and the end location. File the original hard copy in the Environmental Office and update the Wildlife Sightings Form database.

EQUIPMENT REQUIREMENTS

- Truck
- Binoculars
- Data Sheet

- Field guide to birds
- GPS
- Project map
- Digital camera

REPORTING

Observations relevant to human or wildlife safety, such as observations of bears, caribou, species at risk or nesting birds, will be included in the Weekly Report. All information including surveys and monitoring will be also summarized in the Annual Report.

Wildlife Road Survey

Date: Start time: End time: Observer(s):

Survey start at (km marker, GPS location or other landmark):

Survey completed at:

Time	Species	Number	Age/sex	Location (general feature describe)	Location	Photo ID	Notes (any behavioural response or reactions?)
					UTM or Km Marker		

Additional notes (e.g. details on wildlife interactions, behavioural responses, or response to mitigation):

WILDLIFE SURVEILLANCE MONITORING PROCEDURE

PURPOSE

To prevent wildlife incidents through systematically documenting wildlife activity. This procedure will be used during the construction phase only.

RESPONSIBILITY

The Environmental Monitors are responsible for completing surveys of all camps and construction areas for evidence of wildlife presence and entering them into a database.

PROCEDURES

Environment Monitors will undertake systematic tours of the Project construction camps to record all wildlife observations or recent wildlife sign (e.g., tracks and scat). Surveys will be completed at least once per week. Observers will travel to defined Project location, and record the following at each location:

1. Time upon arrival at location / monitoring site
2. Location or monitoring site
3. Presence of wildlife or wildlife sign (Yes or No)
4. Species or sign observed
5. Number of individuals
6. Wildlife Activity
7. Photo number (if photo taken)
8. Record any relevant comments about the observation, or relevant information from people working at the location.
9. Observations of any birds nesting or mammals denning adjacent to the cleared right of way, access roads or borrow sources will also be recorded.
10. Record any relevant comments about improper storage or segregation of wastes or other wildlife attractants, any evidence of wildlife gaining access to wastes or attractants, and any reports of dangerous wildlife interactions from people working at the location.
11. Report wildlife sign (such as tracks or scat) or observations of wildlife from Project staff working in the area shall be recorded on the data sheets in the additional comments section on the reverse side of the data sheet. Photos of sign and wildlife should be taken where possible to help in identification of species after completion of the survey.

12. Record the photo number on the data sheet and download and file the photos by date.

13. If no wildlife is observed, no sign seen and no reports of wildlife from staff, then an “N” should be recorded on the data sheet and in the database for that monitoring site or location.

LOCATIONS FOR SYSTEMATIC MONITORING

The following areas / sites should be visited at least once a week:

- Accommodations camps (entire perimeter)
- Waste transfer areas (entire perimeter)
- Quarries

EQUIPMENT REQUIREMENTS

- Truck
- Binoculars
- Data Sheet
- Field guide to birds
- GPS
- Project map
- Digital camera

REPORTING

Any wildlife concerns that come to light during the survey should immediately be brought to the attention of the Project Supervisor so that appropriate action can be taken. Any wildlife incidents observed or reported during this survey should be reported in the Wildlife Incident Report Form (see separate form). Observations relevant to human or wildlife safety, such as observations of bears, caribou, moose, species at risk or nesting birds, will be included in the Weekly Report. All information including surveys and monitoring will be summarized in the Annual Report.

Wildlife Surveillance Monitoring Form

Observers:

Date:

Page:

of:

Wildlife Observed or Wildlife Sign

Time	Location	Wildlife Present? (Y/N)	Species Or Sign	Number	Activity	Photo #	Observations from people working at the location / other comments

Record any additional comments on reverse page

Additional comments or notes:

Reviewed by:

Date:

Follow up:

BIRD NESTING ACTIVITY PROCEDURE

PURPOSE

The purpose of this procedure is to detect and mitigate impacts to active nests and bat roosting sites. This procedure will be used during the construction phase only, except for quarries which will be monitored during operations as well.

Clearing of vegetation is scheduled to occur outside of migratory bird breeding season (1 May to 15 August). However, there may be instances where vegetation removal is required during this period due to schedule changes or unforeseen circumstances. In these cases non-intrusive pre-clearing surveys are required, to be developed on a case-by-case basis.

RESPONSIBILITY

The Environmental Monitors are responsible for completing the surveys and entering them into a database.

PROCEDURE

Environment Monitors will undertake systematic monitoring of the Project site to detect bird nesting activity, bird nests on the Project infrastructure. Environment Monitors will document all avian nests and nesting behaviour in the areas surveyed, as well as for little brown myotis maternal roosting sites. The surveillance monitoring survey will include areas of the Project where there is risk of birds or bats nesting or finding shelter. This will include buildings, stockpiles of supplies, mobile and stationary equipment.

The surveys will occur at least twice per week prior to and during the migratory bird nesting season (April to mid-July) and more frequently in particular areas if nests are found or nesting activity is observed.

LOCATIONS FOR SYSTEMATIC MONITORING

The following areas / sites should be visited at least once a week:

- Accommodations camps (entire perimeter and buildings)
- Waste transfer areas (entire perimeter and buildings)
- Heavy equipment that has been stationary for more than two days
- Waterbodies within 100 m of camps
- Stream crossing locations
- Quarries
- Borrow sources

Observers will travel to defined Project locations, and record the following at each location:

1. Time upon arrival at location / monitoring site
2. Location or monitoring site
3. Presence of bird nesting behaviour, active bird nests or bat roosting sites
4. Number of individuals
5. Photo number (if photo taken)
6. Any relevant comments about the observation, or relevant information from people working at the location.
7. Any reports of sign or observations of species from Project staff working in the area shall be recorded on the data sheets in the additional comments section on the reverse side of the data sheet.
8. If no nests, nesting behaviour or roosting sites are observed, no sign seen and no reports of wildlife from staff, then an “N” should be recorded on the data sheet and in the database for that monitoring site / location.
9. Quarries in particular should be checked for signs of swallow and nighthawk nesting. Quarry pile slopes should be less than 70 degrees to discourage swallow nesting (Refer to the ECCC pamphlet Bank Swallow in Sandpits and Quarries).
10. Monitoring will initiate in April and continue at least until mid-July (or until all identified nests are inactive), and focus on areas where scheduled construction activities are expected during the migratory bird nesting season.
11. Incidental observations of avian species at risk in particular should be documented. These include:
 - Peregrine falcon
 - Short-eared owl
 - Bank swallow
 - Barn swallow
 - Common nighthawk
 - Olive-sided flycatcher
 - Horned grebe

- Red-necked phalarope
- Rusty blackbird
- Yellow rail

EQUIPMENT REQUIREMENTS

- Truck
- Binoculars
- Data Sheet
- Field guide to birds
- GPS
- Project map
- Digital camera

Reporting

Any bird nesting observed during the survey should immediately be brought to the attention of the Project Supervisor. The Project Supervisor will email ECCC at ec.dalnorth-wednorth.ec@canada.ca to determine an appropriate course of action. Through consultation with GNWT-ENR and ECCC, bird nests will be protected by a buffer that protects the nest while allowing construction to continue, and will be monitored. Details of nests identified and the mitigation will be included in the weekly wildlife monitoring reports.

All observations of nesting activity or risk of nesting on Project infrastructure should be included in the Weekly Report. All information including surveys and monitoring will be summarized in the Annual Report.

Bird Nesting / Bat Roosting Activity Monitoring Form

Observers: _____ Date: _____ Page: _____ of: _____

Location: _____

Wildlife Observed or Wildlife Sign

Time	Location	Species Observed	Photo #	Nesting behaviour observed	Nests Roost observed (describe)

Record any additional comments on reverse page

Additional comments or notes:

Reviewed by:

Date:

Follow up:

PRE-BLAST SURVEYS PROCEDURE

PURPOSE

This procedure is to search for and document large mammals (specifically caribou, moose, bison and bears) within the blast radius prior to blasts. Refer also to the relevant Blast Plan for each blasting operation for any additional site-specific procedures.

RESPONSIBILITY

The Environmental Monitors or the Blast Supervisor are responsible for completing the survey. The Environmental Monitors are responsible for entering the results into the database.

PROCEDURES

1. The Environmental Monitor or the Blast Supervisor will ensure that blasting does not conflict with the Operating Procedure for Use of Boreal Caribou Collar Data to Mitigate Impacts from Construction of the Tłıchʔ ASR (Appendix E).
2. Refer to the relevant Blast Plan for any additional blast-specific direction.
3. The Environmental Monitors or the Blast Supervisor will survey a pre-determined buffer around the blast zone perimeter (as defined by the Blast Supervisor and Blast Plan) by foot or truck, to the extent that it is safe to do so. The survey area should include a buffer that extends beyond the blast zone perimeter.
4. Both binoculars and thermal imaging device will be used to survey the blast zone buffer and perimeter. The intent is to determine if the thermal imaging device improves the detectability of wildlife.
5. All large mammals observed will be documented, and it will be noted on the data sheet whether the detection was made with the thermal imaging device.
6. If large mammals are detected in the blast radius they will be given at least 15 minutes to move away from the blast area before deterrent procedures will be considered. Deterrents will only be used if there is a risk to human or wildlife safety.
7. Once the blast zone perimeter is cleared of large mammals, the blast should occur as soon as possible to avoid other large mammals from entering the blast zone.
8. Using the form provided, the Environmental Monitors or the Blast Supervisor will document efforts to detect wildlife, document any wildlife observed and document any deterrent actions taken.

The following will be recorded for during each survey:

- Date, time and location of blast
- Magnitude of the blast

- Time spent on wildlife survey
- Area of blast radius that cannot be surveyed due to vegetation
- Photo number (if photo taken)
- Wildlife observed and efforts to deter the wildlife

Equipment Requirements

- Truck
- Binoculars
- Thermal Imaging Device
- Data Sheet
- GPS
- Digital camera

Reporting

All relevant observations for each blast will be documented in the Weekly Report. A summary of all surveys completed will be included in the Annual Report.

Pre-blast Survey Form

Observer:

Date:

Page: of:

Location:

Blast Plan Reference Number:

Estimated area of blast radius:

Start and end time of Survey:

Time of blast:

Wildlife Observed:

Notes on wildlife detection using binoculars versus night vision device (Were any large mammals observed using one technique and not the other? Please describe.):

Deterrent Actions Required and Wildlife Response:

PRE-CLEARING SURVEY PROCEDURE

PURPOSE

The purpose of this procedure is to detect large mammals ahead of the clearing activities, as well as to detect any possible denning locations. This procedure will be used during the construction phase of the Project.

RESPONSIBILITY

The Environmental Monitors are responsible for completing the surveys and entering them into a database. Surveys will be overseen by the NSI Environmental Supervisor.

PROCEDURE

WILDLIFE SURVEY PRE-CLEARING SURVEY

1. Environmental Monitors will travel (by foot, ATV or snow machine) the length of the right of way that will be cleared, ahead of the clearing activities.
2. The Monitors will travel at no more than 10 km per hour along the road alignment, one person on each side of the alignment, and looking into the forest on either side of the alignment for wildlife or fresh wildlife sign.
3. Any large mammals (caribou, moose, bison, bears, wolves) or sign observed in the forest to either side of the alignment will be documented and reported to the NSI Environmental Manager. The Environmental Monitors should aim to survey areas to be cleared no more than 48 hours prior to the vegetation clearing.
4. For each day of surveys, the following information will be recorded using the datasheet provided: the start and finish coordinates, the observer names and any observations. Communications with the NSI Environmental Manager and any follow up actions will also be documented.

PROCEDURE FOR BEAR DEN AERIAL SURVEYS

Helicopter-based bear den surveys will be completed surveys by GNWT-ENR. Detailed methods will be prepared prior to the survey, but will include the following elements:

1. The survey will be conducted by one ENR biologist and two environmental monitors in the fall of 2019 and 2020, during den initiation, targeting all areas where vegetation clearing is planned for that winter season, plus an 800 m buffer around those areas.
2. Flights lines will be flow between 200-300m apart
3. A rotary wing aircraft will be used to allow for low and slow flying opportunities for the observers

4. If any wildlife dens are observed, the pilot will slow down and circle the area to obtain photographs and GPS waypoints of the den location. In some cases, where it is safe to do so, the helicopter may need to land so that observers can verify the presence of a suspected den on the ground. Surveyors will be equipped with bear deterrents and firearms in the event there is an active bear in the area.
5. Mineral licks, raptor nests and landscape features that might provide suitable habitat for bat hibernacula will also be documented.
6. Any other wildlife sightings during the survey will also be recorded.

Mitigation options in the event that a denning bear is detected:

If a bear is located in, at or near a den site that is within 800 m of an area that will be cleared of vegetation during the winter, the following mitigation options will be evaluated by ENR and NSI (in decreasing order of preference):

- If feasible, adjust the road alignment, access road alignment, borrow source boundaries or camp location to avoid the bear den by 800 m.
- Do not use all or a portion of a borrow source for that winter of construction in order to avoid the den by 800 m.
- Reduce the size of the exclusion zone and proceed but implement continual monitoring of the den to ensure the denning bear is not disturbed by activities.
- If a den is located directly on the ROW for the road, and no other mitigations can be applied, contact the Tłıchǫ Government and Wek'èezhì Renewable Resources Board to preselect a potential hunter(s) from the closest Tłıchǫ community to harvest the bear(s) in a den.

Mitigation options in the event that a mineral lick is detected:

If a mineral lick is document during the aerial bear den survey that is within 250 m of an area that will be cleared of vegetation during winter, the following mitigation options will be evaluated by ENR and NSI (in decreasing order of preference):

- If feasible, adjust the road alignment, access road alignment, borrow source boundaries or camp location to avoid the mineral lick by 250 m.
- Do not use all or a portion of a borrow source to avoid the mineral lick by 250 m.
- Reduce the size of the exclusion zone but maintain a vegetated buffer between the mineral lick and the cleared area, maintain connectivity of the vegetated buffer to adjacent forested areas, and avoid disruptions to drainage and groundwater near the mineral lick.

Mitigation options in the event that a raptor nest(s) is detected:

If an unoccupied raptor nest is documented during the aerial bear den survey that is within 500 m of an area that will be cleared of vegetation during winter, the following mitigation options will be evaluated by ENR and NSI (in decreasing order of preference):

- If feasible, adjust the road alignment, access road alignment, borrow source boundaries or camp location to avoid the raptor nest by 500 m.
- Do not use all or a portion of a borrow source to avoid the raptor nest by 500 m.
- Reduce the size of the exclusion zone but maintain a vegetated buffer around the raptor nest. Leave the tree(s) supporting the raptor nest(s) standing if safety permits.
- If the tree(s) supporting the nest(s) is directly within an area that must be cleared, and the mitigations listed above are not feasible, obtain a permit from ENR to destroy the raptor nest.

Equipment Requirements

- Data Sheet
- GPS
- Project map
- Transect lines
- Digital camera
- Rotary Wing Aircraft

Reporting

Observations of large mammals or fresh sign will be reported immediately to the NSI Environmental Manager. Survey effort and a summary of results will be included in the Weekly Report. All information including surveys and monitoring will be summarized in the Annual Report.

Pre-Clearing Wildlife Survey

Date: Start time: End time:

Observer(s):

Survey Type (circle): Pre-Clearing Wildlife Survey Bear Den Survey

Feature (circle one): Quarry Quarry access road Road right of way

Start location (UTM): End location:

Wildlife and Wildlife Sign Observations

Time	Species	Observation (observed, tracks, other sign)	Location (UTM)	Comments

Document follow-up actions resulting from any wildlife observations

THERMAL IMAGING DEVICE PILOT STUDY PROCEDURE

PURPOSE

This procedure will provide evidence to determine if thermal imaging devices are a useful tool for detecting wildlife. If the tests are successful, the devices may be integrated into the WMMP monitoring.

The procedure will be initiated when large mammals have been observed. Once observed, the Environmental Monitors will use both the thermal imaging device and traditional binoculars to estimate if detectability is improved.

RESPONSIBILITY

The Environmental Monitors are responsible for completing the survey. The Environmental Monitors are responsible for entering the results into the database. Guidance will be provided by the Environmental Supervisor.

PROCEDURES

1. The Environmental Monitors will initiate this survey opportunistically when a large mammal is observed, and no other immediate actions are required to manage hazards to the wildlife. Large mammals include moose, bison, caribou and wolves.
2. Upon observation of a large mammal, the data sheet will be initiated to document details of the wildlife (such as species and group size) and the environmental setting (such as daylight, season, temperature, habitat).
3. Initiate monitoring by watching the individual until it is no longer visible with either binoculars or the thermal imaging device. Do not follow the wildlife.
4. Collect photos, preferably while the large mammal is still visible.
5. When the wildlife is no longer visible with either binoculars or the thermal imaging device, complete the data sheet and continue with the original task.

The following will be recorded for during each survey:

- Date, time and location
- Large mammal details (species, group size)
- Environmental setting details (time of day, light conditions, weather, forest density)
- Time spent on the task
- Photo number
- Environmental Monitor observations on the effectiveness of the thermal imaging device for detecting and tracking large mammals

Equipment Requirements

- Binoculars
- Thermal Imaging Device
- Data Sheet
- GPS
- Digital camera

Reporting

A summary of all surveys completed will be included in the Annual Report, with a recommendation for the continued use of thermal imaging devices.

Thermal Imaging Device Pilot Study Form

Observer:

Date:

Location:

Photo numbers:

Start and end time of Survey:

Large mammal species and group size:

Sky (% overcast): Precipitation (rain or snow):

Daylight (day, night, twilight):

Binoculars make and model:

Thermal imaging device make and model:

How was the large mammal originally detected?

Approximately how far away was it when last observable?

Please check the appropriate box:

	Binoculars	Thermal Imaging Device	Naked Eye
What was the best way to first detect the large mammal?			
What was the best way to track the large mammal?			
Which were you using when you last saw it?			
Overall, what was the best way to observe the large mammal?			

Please record any other useful information, and your suggestions for use of the thermal imaging device:

WILDLIFE INCIDENT REPORTING PROCEDURE

Purpose

The following procedure is intended as a guideline to identify wildlife that requires immediate reporting and sampling (if necessary). ENR encourages all those conducting activities on the land or residents to record and report all instances of injury or possibility of disease in wildlife. The Project will document all such incidents to prevent future incidents or escalation of problems, and report to GNWT-ENR and ECCC if migratory birds are involved.

RESPONSIBILITY

All project personnel are responsible for providing recording wildlife incident to the on the Project site.

As per Section 57 of the *Wildlife Act*, any defense of life and property kills must be reported without delay to ENR. All reasonable efforts must be made to ensure the hide and other valuable parts do not spoil and that these are turned over to an ENR Officer to avoid any wastage.

As per Section 58 of the *Wildlife Act*, and sub-section 8(1) of the Wildlife General Regulations, any person who accidentally kills or seriously wounds big game or other prescribed wildlife with a motorized vehicle on a highway must report the event to an officer within 24 hours after the incident.

PROCEDURES

Report wildlife incidents when:

- wildlife is determined to be injured.
- wildlife is suspected of being diseased.
- wildlife is found dead.
- there is the potential for human/wildlife conflict such as an occupied bird nest or wolf or bear den.
- wildlife was deterred from camp or other work area.
- there is a defensive kill.
- property is destroyed by wildlife.
- wildlife is injured or killed due to collision with a vehicle.

Complete the Wildlife Incident Record Form, providing information such as:

- Behaviour and movements
- Loss of life or property
- Reason for attraction to area
- Estimation of how long the animal was dead
- Any other animals seen in the area

Collect photographs:

- Add photo name/label
- Show general area
- In case of mortality, photograph the animal (one from each side, head, and tail), including anything unusual and any obvious injuries or marks

REPORTING

Environmental Monitors should report all incidents immediately to the NSI Environmental Manager. When the Wildlife Incident Report is complete, the NSI Environmental Manager is to contact:

- GNWT-ENR North Slave Emergency number at (867) 873 - 7181 (24 Hours), Fax: (867) 873 - 6230.
- Environment and Climate Change Canada at ec.dalfnort-wednorth.ec@canada.ca

All Incident Reports will be included in the Weekly Reports.

Occurrence Date/Time:

Date Reported:

Wildlife Incident Record

MAIN CONTACT INFORMATION			
NAME:			
ADDRESS:			
PHONE NUMBER:			
Location of Complaint: (coordinates, km marker, lake, camp)			
Details Taken by:			
Location of Incident (coordinates, km marker, lake, camp):			
Type of Incident:	☐ Encounter ☐ Nuisance ☐ Wildlife Mortality ☐ Wildlife Injured ☐ Defensive ☐ Other:		
Species:	☐ Black Bear ☐ Bison ☐ Fox ☐ Wolverine ☐ Wolf ☐ Caribou ☐ Moose ☐ Bird ☐ Other:		
Sex:	☐ Male	AGE CLASS:	☐ Adult
	☐ Female		☐ Juvenile
	☐ Unknown		☐ Cub
			☐ Unknown
Details of Incident: (movement, behaviour, reason for attraction, property damage, vehicle collision, etc.)			
Details of Action Taken: (reporting, deterrence type, disposal, removal of attractant, etc.)			
DATE: mm/dd/yy			
Was the incident resolved?			☐ Yes ☐ No
Has Environment & Natural Resources been contacted?			
Contact Name:			☐ Yes ☐ No
Date/Time Reported:			