

PRAIRIE CREEK ALL SEASON ROAD: PHASE 1 - WINTER ROAD

WILDLIFE MANAGEMENT AND MONITORING PLAN

OCTOBER 2022





The proposed mine expansion plan does not affect the Phase 1 Winter Road (WR), or the management plans for it, in any way. The WR is to allow further investigation of the all-season road (ASR) alignment to inform Phase 2 design. That design will not be affected by the mine expansion either since the proposed traffic will still be relatively low.

Conformity Table A: Permit Conditions*

Permit Requirement	Section of Plan
71. The Permittee shall take all reasonable measures to prevent damage to wildlife and fish Habitat during this land-use operation.	Throughout this WMMP, particularly Section 7.0
16. Beginning March 31, 2020 and no later than every March 31 thereafter, the Permittee shall submit an Annual Permit Report to the Superintendent, to his or her satisfaction, which shall include, but not limited to, the following information about activities conducted during the previous calendar year: x) A summary of activities conducted in accordance with the approved Wildlife Management and Monitoring Plan, including: i. A summary and interpretation of any monitoring results; ii. A list of any Action Level exceedances and a description of actions taken in response to Action Level exceedances; and iii. A summary of approved updates or changes to the WMMP.	Section 10
70. A minimum of 90 days prior to commencement of Phase 1 activities, the Permittee shall submit to the Superintendent, for approval, a revised Wildlife Management and Monitoring Plan (WMMP). The Permittee shall not commence any Phase 1 activities prior to Superintendent approval. Subsequent revisions shall be in accordance with Part C, condition 128.	-
71. The Permittee shall comply with the Wildlife Management and Monitoring Plan (WMMP), once approved. The Plan shall include, but not be limited to, the following information:	-
a) Revisions that address reviewer comments (ORS, May 15, 2019), technical session commitments (ORS, June 7, 2019), and post technical session commitments (Tetra Tech email, July 10, 2019);	Tables A and B
b) A description of how the WMMP has been updated based on results of baseline data, including but not limited to data required by Measure 6-1 Part 1 of the Report of EA;	Sections 8.1.2, 8.2.3, and 8.2.4
c) Formalized monitoring plans as per Measure 6-1, Part 3 and Measure 6-3, including:	Section 8.0
i. Monitoring locations and methodology, with supporting rationale or power analysis, that maximize the ability to detect adverse impacts or residual effects (e.g., control sites, covariate measurements, etc.);	Section 8.0 Appendix D
ii. Timing and frequency of monitoring, including details for ensuring survey repeatability;	Section 8.0 Appendix D
iii. Connections between related monitoring programs;	Section 8.0
iv. Mechanisms for incorporating Traditional Knowledge;	Section 11.0 Appendix D
v. Metrics and methods for analysis and interpretation of the data;	Section 8.0
vi. A comprehensive assessment of data from complementary or related monitoring programs;	Section 8.0, where applicable
vii. Mechanisms for reporting the monitoring data; and	Section 8.0 Section 10.0
viii. Quality assurance and quality control measures.	Section 8.0

Conformity Table A: Permit Conditions*

Permit Requirement	Section of Plan
d) A description of how the monitoring data links with action levels and adaptive management actions in the WWMP and related plans such as the Traffic Control Mitigation and Road Operations and Maintenance Plan, etc;	Section 8.0
e) Detailed plans for managing human-wildlife conflict that are specific to Permittee planned operations and activities, including but not limited to the following:	-
i. Pro-active approaches to mitigate conflict;	Section 8.1, SOPs #1-2
ii. The types of responses and deterrents that will be used for responding to different human-wildlife conflict situations;	SOP #1
iii. A Bear Management Plan that:	Provided as a separate document
a. defines all relevant terms;	
b. includes a clear protocol for assessing risk; and	
c. links risk assessment with response options.	
iv. A plan for euthanizing critically injured wildlife, including communication with the Superintendent.	SOP #1
f) An appropriate level of baseline, effects assessment, monitoring program and adaptive management for all Species at Risk listed under Schedule 1 of the Species at Risk Act (SARA) that could be potentially affected by the proposed project.	Table C
g) A description of an adaptive management framework that satisfies the requirements of Report of Environmental Assessment Appendix B, including but not limited to:	Adaptive Management detailed in Section 9.0
i. A decision tree which outlines the path of adaptive management decisions based on results of the monitoring program.	Figure 10 Section 9.0

* Conformity Table per Land Use Permits MV2014F0013 Condition Number 71 and PC2014F0013 Condition Numbers 16, 70 and 71.

Conformity Table B: 2020 Environment and Climate Change Canada (ECCC)*

Item	Requirement	Review Comment Reference	Section of Plan
a	CZN to provide a revised draft report to ECCC and Parks Canada based on ECCC guidance and recommendations, prior to Phase 1 construction. The report will include a power analysis to evaluate the efficacy of the current sampling design, and in order to inform the effects monitoring schedule. Note: Effects monitoring is for all migratory birds, not just Species at Risk The analysis approach is not clear from the response, and should be discussed with ECCC / Canadian Wildlife Service	ECCC1	Refer to the Birds Baseline report (September 2021) ¹
b	CZN to provide an effects monitoring plan for birds and a schedule as it pertains to Phase 1.	ECCC-1	Section 8.2.5 ¹
c	CZN to provide an analysis of any project modifications or mitigations needed as a result of analysis of baseline data.	ECCC-1	Refer to the Birds Baseline report (September 2021)

Conformity Table B: 2020 Environment and Climate Change Canada (ECCC)*

Item	Requirement	Review Comment Reference	Section of Plan
d	CZN to provide revised Canada Warbler Assessment Addendum that follows ECCC guidance, compares Canada Warbler predicted densities estimates and model prediction uncertainty in the study area to the regional study area. Selection of the regional study area must be acceptable to ECCC.	ECCC-2	Refer to the Birds Baseline report (September 2021)

* Conformity Table per Table 14 of Parks Canada "Comments on Management Plans and other Submissions under Water License PC2014L8-0006 and Land Use Permit PC2014F0013" dated December 14, 2020.

1. Measure 6-1 Parts 2 and 3 of the Report of Environmental Assessment specifies that "bird species at risk" baseline and monitoring be conducted and does not suggest all migratory birds.

Conformity Table C: 2020 Parks Canada*

Item	Requirement	Review Comment Reference	Section of Plan
a	The scope of WMMP does not align with the Pioneer Winter Road scope identified in other management plans. Other plans are scoped for the Pioneer Winter Road which consists of a construction phase only, no haul season (operations). CZN to ensure that the scope of Phase 1 construction is described consistently in the WMMP as for other submissions. For the WMMP, the summer season following Phase 1 winter road construction does not seem to be consistently captured in Phase 1 Plan. Phase 1 plans need to cover all seasons and activities prior to Phase 2. The Permit and License define the Phases and require updated submissions typically 90 days prior to start of activities within that Phase.	-	Entire WMMP, including Section 2.0
b	CZN to provide a revised draft report to ECCC and Parks Canada based on ECCC guidance and recommendations, prior to Phase 1 construction. The report will include a power analysis to evaluate the efficacy of the current sampling design, and in order to inform the effects monitoring schedule. Note: Effects monitoring is for all migratory birds, not just Species at Risk The analysis approach is not clear from the response, and should be discussed with ECCC / Canadian Wildlife Service	PC-36	Refer to the Birds Baseline report (September 2021) ¹
c	CZN to revise the WMMP including Figure D4 to include KPs 0-16 and KPs 40-50 as additional areas for vigilance when searching for wildlife trails, and that wildlife caution zone locations will also be reviewed annually to inform more permanent management options.	PC-1	Figure D4 and Section 8.1.6
d	CZN to revise the WMMP (section 8.2.3) to read "Should it be determined that the remote camera survey has insufficient statistical power to detect change in use, the survey methods will be modified (i.e., increase sampling) or the camera survey replaced by an appropriate alternative."	PC-2	Section 9.2.3
e	CZN to revise section 8.2.3 to include the number of collared caribou in the reported results.	PC-7	Section 8.2.3.
f	CZN to provide analysis of remote camera data for wildlife baseline as committed to by CZN (ex. Caribou activity, predator activity and other species as described in WMMP Table T3) prior to Phase 1 construction. Following that CZN to provide a revised adaptive management framework with measurable parameters for caribou. Adaptive management framework should indicate how and when monitoring data will be used to refine adaptive management triggers.	PC-8	Section 9.2.3 and the Woodland Caribou & Remote Camera Baseline report

Conformity Table C: 2020 Parks Canada*

Item	Requirement	Review Comment Reference	Section of Plan
g	CZN to update with explanation of 'aerial and ground-truth surveys' and "clearing scan in advance of clearing equipment."	PC-9	Section 8.1.1.1 and Section 5.0 of the WMMP Procedure #1.
h	CZN to revise the bear den survey methods to include a 1.5km radius around all potential avalanche control locations CZN to revise the blast monitoring program to include post-blasting bear surveys.	PC-10	Section 4.0 and Figure D1 in WMMP Procedure #1. Section 8.1.3 and WMMP Procedure #3
i	CZN to provide one or more figures that illustrate how the road alignment has been adjusted to mitigate impacts to Collared pika, and to show where snowplowing activities will be restricted, based on the pika baseline data. CZN to update environmental alignment sheets to include locations where there are restrictions on snowplowing activities.	PC-11	Appendix A Map Book Figure 3 in the pika baseline report for ASR re-alignments
j	CZN to provide revised Wildlife Incident Form to address recommendations in PC-12.	PC-12	Wildlife Incident Report Form
k	CZN to revise sentence in WMMP #5, Section 1.0, identified in comment PC-13, to include species at risk.	PC-13	WMMP #5
l	CZN to revise Acronyms section to include the Migratory Birds Convention Act.	PC-15	Acronyms
m	CZN to revise WMMP to remove references to Draft WMMP.	PC-16	Removed reference to Draft
n	CZN to revise the WMMP so that consistent project terminology is used throughout, and to reflect that it is a final document and post-issuance of authorizations.	PC-18	Throughout
o	CZN to revise section 7.1 to indicate that wildlife training will be delivered by the Qualified Environmental Professional. Site orientation will be delivered to all staff, contractors, and visitors either immediately prior to Phase 1 and/or when arriving to site.	PC-19	Section 7.1; no visitors are planned for the WR
p	CZN to include consideration of bats in pre-clearing surveys and provide revisions to the pre-clearing protocol to include details specific to detecting bats, bat residences and roosting. CZN to revise section 7.4 so descriptions of pre-clearing surveys include reference to it being a mitigation for birds and bats	PC-20, PC-23	Section 8.1.1 and WMMP #1 Procedure Section 7.4
q	CZN to include a 2km blasting setback (based on the Best Management Practices Guidelines for Bats in British Columbia (BC Ministry of the Environment, 2016)) from the Polje area/cave terrain that is protective of bats during the winter.	PC-20, PC-23	Section 8.1.3 and WMMP #3 Procedure

Conformity Table C: 2020 Parks Canada*

Item	Requirement	Review Comment Reference	Section of Plan
r	It is PC's preference to have all mitigations for wildlife detailed in the WMMP, however if this is possible, CZN to revise WMMP to reference other management plans where mitigations relating to wildlife and wildlife habitat are detailed.	PC-24	Sections 7.0 to 9.0
s	CZN to revise section 7.4.2 to include detail on the safe stopping distance for caribou.	PC-25	Section 7.4.2 and SOP#1
t	CZN to remove reference to land-farm in the WMMP.	PC-26	Reference removed from Section 7.4.1
u	CZN to revise Table 5 to include bat roosts.	PC-27	Table 5
v	CZN to correct table numbering in the WMMP.	PC-28	Numbering corrected
w	CZN to provide the results of the 2019 den and nest survey, incorporated as appropriate into the WMMP, appendix or associated report. CZN to provide a description of any project or route modifications made as a result of this analysis of baseline, and any changes to mitigations required.	PC-29	Section 8.1.1 and the 2019 Den and Nest Pre-Clearing Survey report
x	CZN to revise pre-blast procedure to include species at risk.	PC-30	Section 8.1.3 and WMMP Procedure #3
y	CZN to update section 8.1.5 to include presence of carnivores in human-use areas as an example of a reportable incident.	PC-32	Section 8.1.5 and Wildlife Incident Report Form
z	CZN to update Table 11 to include "at and near camps" for "survey area."	PC-33	Table 11
aa	CZN to revise WMMP #6 as per PC comment #38.	PC-38	WMMP #5 and Clearing Scan datasheet
ab	CZN to revise WMMP #3 (pre-blast procedure) to include reference to the Avalanche Hazard Management Plan.	PC-39	WMMP Procedure #3
ac	CZN to revise WMMP #3 (pre-blast procedure) to include a suspension of blasting when visibility within the 1 km radius is impeded.	PC-40	WMMP #3
ad	CZN to revise SOP#2 to reflect that there will be no use of physical deterrents in non-conflict situations.	PC-42	SOP #1
ae	CZN to revise SOP #1 to include a designate (i.e., Construction Manager/Operations Manager) to record wildlife sightings when the Dene Monitor is not present.	PC-43	SOP #1
af	CZN to update the Wildlife Incident Form with definitions of aggressive animal behaviours identified in comment PC-44.	PC-44	Wildlife Incident Report Form
ag	CZN to revise SOP#2 to include definitions for problem animal, wildlife incident, habituation, aggression, wildlife attractants, and food conditioning.	PC-46	SOP #1
ah	CZN to update the WMMP and SOPs to reflect their response that firearms will not be used for euthanization of wildlife and in situations with imminent risk to people. Note that use of firearms to fire non-lethal deterrents will require a permit from NNPR. Parks Canada may engage with CZN on a case by case basis for serious wildlife incidents.	PC-47	Decisions regarding firearms reverted Dec 2021 in discussions with Parks Canada

Conformity Table C: 2020 Parks Canada*

Item	Requirement	Review Comment Reference	Section of Plan
ai	CZN to cite the R package used for QPAD analysis in the Canada Warbler Assessment.	PC-48	Birds Baseline report Section 2.4 (Tetra Tech 2021)
aj	In our previous comments Parks Canada identified several issues with the Caribou Gap Analysis, including methodology and differing interpretations of the significance of the results. These concerns remain; however, they are more relevant to a Phase 2 WMMP and may be raised again during review of a Phase 2 WMMP. These include review comments PC-54, 57, 67, 68, and 71.	PC-54, 57, 67, 68, and 71	Sections 3.2.3.1 and 3.2.3.2 in the Caribou Baseline report ²
ak	CZN to remove results from caribou collar studies conducted on herds whose ranges are not known to overlap significantly with the proposed ASR.	PC-56	Caribou Baseline report ²
al	CZN to update Section 2.2 to include explanation of five caribou seasons.	PC-58	Section 2.2 of the Caribou Baseline report ²
am	CZN to update the WMMP and Caribou Data Gap Analysis to remove references to caribou density.	PC-60	Removed reference to density.
an	CZN to revise Section 2.2.2 to include season in the list of factors that influence caribou habitat use.	PC-61	Caribou Baseline report ²
ao	CZN to revise Section 2.2.2.1 and Charts 2 and 3 to remove reference to the mean ASR elevation.	PC-64	Caribou Baseline report ²
ap	CZN to revise Chart 2 with the seasons in order, present a measure of variability, number of observations, and remove mean elevation.	PC-65	Caribou Baseline report ²
aq	CZN to revise Chart 3 to depict the range of elevation used by the individual caribou and number of observations used to calculate the mean.	PC-66	Caribou Baseline report ²
ar	CZN to revise the Caribou Data Gap Analysis to specify the number of animals with functional collars in the various analyses.	PC-69	Caribou Baseline report ²
as	CZN to revise Chart 9 legend or figure caption to indicate the number of collars that were functioning each year.	PC-70	Caribou Baseline report ²
at	CZN to include predator presence along the ASR in Table 5	PC-72	Table 5

Conformity Table C: 2020 Parks Canada*

Item	Requirement	Review Comment Reference	Section of Plan
au	CZN to revise the results section to include a figure (i.e., map) that depicts the following: pika talus sites, the existing alignment, the proposed Phase 1 road alignment, and any areas of direct or indirect pika habitat loss resulting from Phase 1 operations.	PC-73	Figures 2a-2m in the pika baseline report.
av	CZN to revise Table 1 as follows: replace the 'Total Area of Pika Habitat (ha)' column from Table 1 with two columns - 'Total Area of Talus Patch (ha)' and 'Total Area of Indirect Pika Habitat (ha)'.	PC-74	Table 4 in the pika baseline report.
aw	GNWT-ENR has identified revisions and recommended changes to the WMMP (Letter dated May 5, 2020). Parks Canada supports all revisions and recommended changes that are not specific to GNWT-ENR's jurisdiction and requires them to be addressed in future submissions.	GNWT-ENR	-

* Conformity Table per Table 14 of Parks Canada "Comments on Management Plans and other Submissions under Water License PC2014L8-0006 and Land Use Permit PC2014F0013" dated December 14, 2020.

1. Measure 6-1 Parts 2 and 3 of the Report of Environmental Assessment specifies that "bird species at risk" baseline and monitoring be conducted and does not suggest all migratory birds.
2. Woodland Caribou and Remote Camera Baseline Report (Tetra Tech 2021).

Conformity Table D: 2020 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
Wildlife Hazard Mitigation Monitoring and Road Mortality Risk Monitoring			
a	Revision 1: Wildlife Hazard Mitigation Monitoring and Road Mortality Risk Monitoring must be conducted weekly during the construction and operation phases of the Phase 1 winter road project. Relevant sections of the WMMP, Appendix B - SOPs and Appendix D – Monitoring Procedures must be updated to reflect this change.	Revision 1	Updated to weekly during construction and operation ¹
b	Revision 2: NorZinc must provide an addendum to the WMMP that includes the results of the October 2019 aerial bear den survey. Given that the project has been delayed a year, and that an active den was detected in October 2019, all confirmed or suspected bear dens detected in that survey will need to be re-assessed prior to construction to determine if they are active in fall 2020. The WMMP must be revised to include more detailed adaptive management options that could be implemented in the event that an active den is detected within the specified setback distance and the road alignment cannot be adjusted beyond the setback. The WMMP must also describe monitoring that will be conducted in the event that an active bear den is detected within the specified setbacks in order to confirm that the bear is not disturbed from the den during project activities.	Revision 2	Refer to Section 8.1.1
c	Revision 3: The spatial extent of boreal caribou winter track surveys must be extended to km 170 to cover the portion of the winter road between the Nahanni Butte Access Road and the Liard River. Surveys will thus be conducted between km 110 and 170. Section 8.2.4 and Appendix D – WMMP#8 of the WMMP must be updated accordingly.	Revision 3	Survey area extended to KP 170 in Section 8.2.4 and WMMP #8 Procedure

Conformity Table D: 2020 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
d	Revision 4: NorZinc will provide ENR and other interested parties with reports, at minimum every two weeks, during Phase 1 activities which describe implementation of wildlife mitigation measures, wildlife data collected under different monitoring programs, wildlife incidents and any adaptive management measures that were triggered and implemented.	Revision 4	Refer to the Weekly Report in Section 10.0
e	ENR shares PCA's concern (PCA's comment #43 from January 2020) that there is a wide variety of monitoring and reporting tasks assigned to the Dene monitor. The WMMP did not clarify how many Dene monitors would be hired for Phase 1 and gave the impression that there would only be one. NorZinc's response to PCA comment #43 from January 16, 2020, helps to address this concern by clarifying that there will be two full-time Dene monitors hired, one working from each end of the road project, as well as additional Dene monitors hired to operate the Checkpoint. Recommendation/Required Revisions: None	General Comment	-
f	Table 10 -Wildlife Hazard Mitigation Monitoring and Table 12-Road Mortality Risk Monitoring state that monitoring will be conducted weekly during construction, and twice a month during operation of the Phase 1 winter road. Section 8.2.1.2 states that the operational period for the road will only be two weeks long. No rationale was provided as to why the frequency of these two monitoring programs would be scaled back during operations. Given the short period of operation of the road in Phase 1, there would only be one survey during operations. For consistency, the frequency of monitoring should be weekly throughout all Phase 1 activities. Recommendation/Required Revisions: See Required Revision#1	Table 10 - Wildlife Hazard Mitigation Monitoring and Table 12 – Road Mortality Risk Monitoring	See Required Revision #1
g	NorZinc should always consult with ENR and Parks Canada when pre-defined setback distances cannot be implemented and there may be a risk of contravening one of the regulatory requirements outlined in Section 5.3 of the WMMP. Recommendation/Required Revisions: In the third paragraph, last sentence, change "is recommended" to "is required".	WMMP Section 7.2	Sentence revised to read "is required" in Section 7.2
h	Re-fueling near water bodies, streams, and wetlands references industry standards, but should reference the requirements of the land use permit or water licence. Recommendation/Required Revisions: The WMMP should reference the minimum requirements for setbacks when re-fueling near water bodies set out in the land use permit and water licence.	WMMP Section 7.3	The setback required under the Water Licences updated in Section 7.3
i	This section states that carcasses may be transferred to Nahanni Butte, or incinerated upon approval from regulators, after alerting ENR and Parks Canada. Does Nahanni Butte have the appropriate facilities to temporarily store wildlife carcasses if they are to be transferred to Parks Canada or ENR, or to dispose of a carcass? NorZinc needs to ensure that removal of carcasses to Nahanni Butte does not create a wildlife attractant and risk of human-wildlife conflict in the community. Recommendation/Required Revisions: Provide greater detail on how wildlife carcasses transferred to Nahanni Butte would be handled or disposed of so as not to create a wildlife attractant and risk of human-wildlife conflict in the community.	WMMP Section 7.4.1 and SOP#2 – Removal of Wildlife Carcasses	Updated in Section 7.4.1 and in SOP #2 ² .
j	This section states that "All buildings will be designed and maintained to prevent sheltering wildlife", but no specific examples are provided of the designs that will be used. Recommendation/Required Revisions: Provide examples in the WMMP annual report of the design features implemented at project buildings to prevent sheltering wildlife.	WMMP Section 7.4.1 – Shelter Attractants	Added to the Annual Report requirement in Section 10.0

Conformity Table D: 2020 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
k	<p>In the aircraft procedure, it is stated that the BMP's #5 and 6 for Flying Low in Caribou Country and Sheep Country will be followed and the areas where wildlife have been seen in the past will be avoided.</p> <p>Recommendation/Required Revisions: Please specify how areas where wildlife have been seen in the past will be avoided since this information is not specified in the BMP's #5 and 6. Where will you get the information and how far back into wildlife sighting records will be included?</p>	WMMP Section 7.4.2	Refer to Section 7.4.1 and 8.1.5.
l	Add boreal caribou to list of key harvest species that is checked off in the "Access control and hunting/trapping" row of the table.	WMMP Table 5	Table 5
m	<p>NorZinc's consultants made ENR aware that an active bear den was detected within the 800 m setback distance from the road alignment during the October 2019 aerial bear den survey. Table 7 states that the size of the setback distance will be reduced in consultation with ENR and/or Parks Canada and that NorZinc will proceed with appropriate adaptive management to minimize disturbance to the den. Specific adaptive management options in these circumstances were not identified in the WMMP. ENR discussed some options with CZN's consultant by phone, but NorZinc did not provide a detailed written adaptive management plan to ensure that the denning bear will be protected from disturbance. It is not appropriate to wait until the annual WMMP report to report on the adaptive management actions that will be implemented, as ENR cannot assess whether they are sufficient before project activities are undertaken.</p> <p>Recommendation/Required Revisions: See Section 7 - Required Revision #2</p>	WMMP Section 8.1.1 - Den and Nest Pre-clearing Monitoring	See Required Revision #2
n	<p>There are nine talus sites between km 15 and 16 that are adjacent to the existing all-season road, which are on territorial public land (Prairie Creek Proposed Phase 1 Road - Collared Pika Habitat Loss Estimates – November 14, 2019). All but one was active in summer 2019.</p> <p>The WMMP indicates that snowplowing activities will be restricted where there is Pika presence within 10 m of the Phase 1 road, but the specific talus sites that this applies to are not identified.</p> <p>Will there be follow-up surveys to determine occupancy in summer 2020 to assess whether they might have been impacted by Phase 1 road operations?</p> <p>Recommendation/Required Revisions: Please specify the specific talus sites where snowplowing activities must avoid pika talus habitat. ENR notes that PCA made a similar request in PCA Comment #11 (January 2020).</p>	WMMP Section 8.1.2 – Collared Pika Construction Monitoring	Appendix A Map Book.

Conformity Table D: 2020 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
o	<p>The scope of the boreal caribou winter track monitoring program is currently limited to the section of the Phase 1 winter road between km 110 and the Liard River (km 155), which the WMMP states is the portion of the Phase 1 Project within the boreal caribou range. This statement is incorrect. The section of the road from the Liard River (km 155) to the Nahanni Butte access road (km 170) is also within the boreal caribou range and should be included in the survey area. The WMMP states that the track survey will occur once in March 2020, but an additional survey may be attempted in January 2020 following Phase 1 clearing. Two surveys, conducted as separate survey events, will provide additional information to account for detectability, for example if caribou were in the survey area on one survey event, but not during the other. The proposed method of repeating the survey during the same survey event along a 10 km portion of the road would only account for biases in observer detection error.</p> <p>ENR notes that some of the adaptive management triggers specified in section 8.2.4.2 would be impossible to detect with only one survey conducted during Phase 1 and are only applicable to the monitoring program longer-term as it continues into Phase 2 and 3.</p> <p>Recommendation/Required Revisions: See Required Revision #3</p>	WMMP Section 8.2.4 – Boreal Caribou Winter Track Monitoring	Survey area extended to KP 170 in Section 8.2.4 and WMMP #8 Procedure
p	<p>The WMMP specifies that there will be an annual report provided to regulators and a comprehensive report provided at the cessation of the Phase 1 road project.</p> <p>An annual or comprehensive report provided only after completion of Phase 1 activities will not allow ENR to assess whether the mitigation and monitoring programs are being implemented as planned while the project is in progress. Regular reports during Phase 1 activities that include brief descriptions of wildlife sightings, wildlife incidents, adaptive management triggered, etc. will enable ENR to monitor implementation of the WMMP as the project proceeds.</p> <p>This will provide evidence to ENR and Parks Canada that the mitigation measures and monitoring programs described in the Phase 1 WMMP are being implemented as planned.</p> <p>Recommendation/Required Revisions: See Required Revision #4 Additional recommendations:</p> <p>ENR recommends that NorZinc consult the weekly environmental reports for the Tlicho all-season road project as an example of more frequent reporting while undertaking project activities (e.g., W2016E0004 - TASR - Weekly Environmental Report - January 12 – 18, 2020 - Jan 22_20.pdf)</p> <p>ENR recommends that wildlife sighting data compiled in the annual report for the Phase 1 WMMP should be provided in a tabular format that includes precise coordinates or road kilometer posts (KP) so that it can be easily imported into ENR's Wildlife Management Information System or exported to GIS software.</p>	WMMP Section 10.0 - Reporting	Weekly Construction Report described in Section 10.0. Submission of the Wildlife Observation Logs in a tabular format with, with location data added to Section 10.0.
q	Recommendation/Required Revisions: Change contact information for ENR Dehcho Region to: Report a wildlife observation 1-867-695-7450 Eve Lamontagne: 1-867-695-7450, extension 1008	WMMP SOP#1 and SOP#2	Contact information updated in SOPs #1 and #2

* Conformity Table per ENR Comments presented in a letter (Further Revisions Required for the Wildlife Management and Monitoring Plan for Phase 1 of the Canadian Zinc's Prairie Creek All-Season Road Project) dated May 5, 2020. Includes Table 2 recommendations and required revisions for the Phase 1 WMMP.

1. Tables 10 and 12 of the Wildlife Hazard and Road Mortality Risk monitoring programs, and their associated Monitoring Procedures (Appendix D) updated to weekly monitoring during construction and operation. Frequency of monitoring is not included in the SOPs.
2. Updated to state that CZN will find a facility that accepts special waste and is able to immediately bury the carcass in a dedicated area of the landfill cell with at least 2 m of cover material.

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
Wildlife Hazard Mitigation Monitoring and Road Mortality Risk Monitoring			
a	Ensure objectives of all baseline and monitoring studies are clear, achievable, and defensible, and that the value of a given dataset is not overstated.	PC-2022-02-Summary-01, Technical meeting #2, PC-9-21-70	8.0
b	As required in Parks Canada's LUP, monitoring methodology for all taxa must be designed to have the ability to detect adverse impacts and residual effects. Supporting rationale must be laid out to demonstrate that the methods used for baseline surveys and project-concurrent monitoring will have sufficient power to detect change.	PC-2022-02-Summary-02, Technical meeting #2, 4, and 7 Conformity comments, PC-9-21-53 and -77	8.0
c	Consolidate wildlife trail information into a database with metadata to be used to inform site-specific mitigations. Continue to build wildlife trails database with all observational data of wildlife crossing, aerial identifications of trails, collar and other survey data.	PC-2022-02-Summary-03, Technical meeting #2, PC-9-21-87	Updated in Section 8.1.6
d	Commit to and report on spring bear den surveys in 2022 or in the spring before Phase 1 if the project is delayed. Conduct 3-6 surveys over 10 weeks as per previous comments. Stratify surveys based on den habitat models (Condition PC-2022-02-Summary-05).	PC-2022-02-Summary-04, Technical meeting #2, PC-9-21-14, -31, -33, -36, and -100	Spring den surveys completed
e	Conduct RSF modelling for grizzly bear denning habitat. Use data from neighboring regions and/or recalibrate existing models based on data from southern Rockies. Use this model to stratify spring bear den surveys. Use model to inform ASR mitigations. Consider also building RSF for grizzly bear habitat to inform ASR mitigations.	PC-2022-02-Summary-05, Technical meeting #2 and 6 PC-9-21-27, -31, -53, -84, and -100	Preliminary Grizzly den habitat suitability model completed with dens available. Also refer to Section 8.1.1
f	Link bear den habitat delineation and bear den sightings with appropriate mitigations including, but not limited to: - reduced speed zones - camp and/or building electrification - relocation of borrow pits - modification of the road alignment - relocating camp locations Modifying clearing dates to when bears are in "deeper hibernation" is not a mitigation tool supported by bear biology.	PC-2022-02-Summary-06, Technical meeting #2, PC-9-21-59	Refer to updates in Sections 8.1.3, 9.1.1, and 9.1.4

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
g	<p>Create a bear management plan with a decision matrix specifically for how to manage bear encounters during Phase 1 as bears can be active year round. Refer to Parks Canada's Bear Management Plan for an example. The decision matrix needs to include definitions of type of aggressive and nonaggressive behaviours (e.g. bears charging due to nearby cubs vs. predatory bears) and appropriate, targeted actions for specific situations.</p>	<p>PC-2022-02-Summary-07, Technical meeting #2, Conformity comment PC-44</p>	Refer to the Bear Management Plan
h	<p>Based on the current data, it is not possible to draw inferences on the seasonal use and distribution of the road corridor by wolverine, wolves or bears due to extremely small sample size and low detection probability. Remove overstatement of value of camera data for carnivores.</p> <p>Include wording that identifies the sensitivity of wolverines to industrial development and a commitment to undertake wolverine monitoring and or modelling work if there are more than 3 incidental detections during any ASR Phase.</p> <p>Include wording that identifies the sensitivity of grizzlies to industrial development and a commitment to undertake additional grizzly monitoring and/or habitat modelling work if there are more than 5 incidental detections during any ASR Phase.</p>	<p>PC-2022-02-Summary-08, Technical meeting #6, PC-9-21-86, LUP Conformity comment 2, PC-9-21-63 and 84</p>	Table C, WMMP 1, Sections 8.1.1 and 9.1.5, and Bear Management Plan
i	<p>Develop a protocol with a decision matrix which guides actions that may be taken in response to wildlife interacting or interfering with project activities. This could be done separately or in conjunction with the bear decision matrix.</p> <p>In instances where there is no threat to life or property, active deterrence (hazing) needs to be directly authorized by PCA on a case-by-case basis. PCA will provide 24 hour/7 days per week point of contact with delegated authority to authorize hazing or active deterrence. Wildlife shall be given 2 hours to move beyond the designated setback area unless otherwise authorized.</p> <p>In instances where there is potential for threat to life or property, the protocol shall take into account wildlife behaviour and knowledge of aversive conditioning. Escalation of interaction in such scenarios should be well defined and performed by those with appropriate training.</p> <p>In the case of bear interactions, the protocol should refer to the bear encounter matrix (Condition PC-2022-02-Summary-07).</p> <p>Currently CZN does not include the use of lethal deterrents as a tool for managing human wildlife conflict. As a result, it is strongly recommended CZN reconsider the use of lethal deterrents or that the protocol used acknowledges potential delayed response times by Parks Canada given distance, weather conditions, etc. The protocol should include provisions for this sort of situation for example: hardened muster point like vented Sea Cans, etc.</p> <p>Adaptive management approaches should be outlined for wildlife in avalanche management zones depending on the reason for their being in the avalanche zone, i.e. hitherto undiscovered mineral lick, caribou foraging on a slope such that they won't have moved on within 2 hours, etc.</p>	<p>PC-2022-02-Summary-09, Technical meeting #6, PC-9-21-16 and 17</p>	Refer to updates in SOP 1, the Bear Management Plan, and Section 8.1.3

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
j	<p>Provide a protocol for overflights to ensure compliance with mitigation measures. In particular, the protocol must ensure harassment of wildlife is avoided. Examples include:</p> <p>a. Transfer of all flightlog data to PCA as part of annual reporting to verify flight procedures are being followed, i.e. animals are not being harassed, that flight altitudes are sufficiently high, and that flight crews are not flightseeing within the park. This information is critical to ensure compliance to BMPs 4, 5, and 6.</p> <p>b. Clear transfer of knowledge to pilots from CZN of local areas of animal concentration or use (e.g.. areas where caribou and sheep have been seen in the past). This transfer is critical for BMPs 5 and 6 for Flying in Caribou Country and Flying in Sheep Country.</p>	<p>PC-2022-02-Summary-10, Technical meetings #2 and 7 PC-9-21-20 and 21</p>	Refer to SOP 1
k	Address previous comments to ensure best outcomes in human-wildlife interactions/conflict/mitigations- see Review Comment Reference column.	<p>PC-2022-02-Summary-11, Technical meeting #2, PC-9-21-9, -15, -58, -63-64, -69, -76, -90-91, -97, 103 -104, and 111</p>	Refer to the Bear Management Plan and SOP 1
l	Include details of how snow plow operators will action mitigations regarding plowing around pika habitat. Indicate the use of GPS, road markers, maps etc.	<p>PC-2022-02-Summary-12, Technical meeting #4, PC-11</p>	WMMP Procedure #4
m	Provide workplan/workflow for QEP's and DM's which includes training and supports provided. Indicate the staffing level for these positions. Explicitly state what training or on the job briefing will be provided.	<p>PC-2022-02-Summary-13 Technical meeting #1, 2, and 4, PC-9-21-5 and 41</p>	Providing separate document
n	For wildlife incidents or animal-vehicle collisions, CZN has indicated that the environmental monitor will "investigate the cause and re-evaluate the applicable mitigation to determine why and how preventing the wildlife incident failed in order to inform the appropriate adaptive management" for either wildlife incidents or animal-vehicle collisions.	<p>PC-2022-02-Summary-14 PC-9-21-65 and -114</p>	Updated in Sections 9.1.1 to 9.1.6

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
o	<p>Provide details/clarify blasting and avalanche control procedures related to wildlife, including:</p> <p>a) Describe how the Dene Monitor will delineate the perimeter of the 1 km setback and determine whether a big game species/species at risk is within or outside the 1 km setback (e.g., by using a high-quality range finder). On the Wildlife Pre-Blast Form, include fields that would allow for estimation of the area covered by the Pre-blast Procedure (e.g., for each vantage point, provide the latitude/longitude and distance until view is obstructed when facing N, S, E, and W). Provide viewshed analyses for height of land where DMs will be during pre blast scans.</p> <p>b) Describe survey methods for detecting wildlife disturbances post blasting in avalanche control areas. How will wildlife disturbance from the time of the blast up until 30 minutes after the blast be monitored when it is unsafe for the Dene Monitor to be present (i.e., within an avalanche control area)</p> <p>c) Describe survey details of the helicopter flyover (e.g., transect spacing, flight height and speed, duration of search time) that will be completed by the Blaster of Record to confirm that no wildlife are present within 1km of the avalanche control zone.</p>	<p>PC-2022-02-Summary-15, Technical meeting #4, PC-9-21-37 to -40</p>	Refer to Section 8.1.3 and the viewshed in WMMP Procedure #3
p	<p>Ensure that highly-valuable migratory bird habitat (e.g. SAR) is delineated. Use this delineation to inform mitigations including, but not limited to:</p> <ul style="list-style-type: none"> - road realignment - movement of camp locations - minimizing footprint - location of borrow pits - provision of resources for offsets (e.g. for restoration of legacy impacts from other developments) 	<p>PC-2022-02-Summary-16 Technical meeting #3, ECCC-9-21-1, ECCC-1</p>	Refer to the Bird Baseline Report (dated May 25, 2022)
q	<p>Update/expand the power analysis for migratory birds:</p> <p>a. Complete the power analysis for all 38 species to determine the proportion of species for which a change could be detected under different scenarios</p> <p>b. Extend the power analysis to the use of diversity indices which may be more useful to understand community changes</p> <p>c. limit effect size to -20% change in populations over time</p> <p>d. Explore scenarios with the given baseline data if the ARU survey were to be expanded past 80 stations, e.g. 100, 150, 200 etc. ARUs to understand what if any amount of stations would be necessary to detect -20% change, principally to Canada warbler (a species at risk)</p>	<p>PC-2022-02-Summary-17 Technical meeting #3, ECCC-9-21-2 and 3, ECCC-1, PC-36</p>	Refer to the Bird Baseline Report (dated May 25, 2022)
r	<p>Use the updated power analysis (Condition PC-2022-02-Summary-17) to inform effects monitoring that should be designed and employed for Phases 1 and 2. The power analysis may indicate that there is no feasible sampling design to generate significant statistical power to detect change, in which case either a precautionary approach where the difference in means is used to indicate effects or a different survey method should be employed. Further data collected as baseline (see below) or during monitoring of Phase 1 should be used to update and improve monitoring survey design.</p> <p>The updated power analysis will also allow for the exploration of monitoring focus. Note that effects monitoring should be for all birds, not just species at risk. However, if the power is not obtainable to detect declines in all bird species, umbrella species or species representing guilds could potentially be selected if solid rationale for their focus is there.</p>	<p>PC-2022-02-Summary-18 Technical meeting #3, ECCC-1, PC-36, ECCC-9-21-2 and 3</p>	8.2.5 and refer to the Bird Baseline Report (dated May 25, 2022)

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
s	Deploy an equal or greater number of ARUs to collect more baseline data prior to Phase 2. This redeployment should be informed by the findings of the updated power analysis (Condition PC-2022-02-Summary-18). If the power analyses indicates the study design will not allow for reasonable inferences, then effect size and or umbrella species/SAR focused studies should be explored.	PC-2022-02-Summary-19 Technical meeting #3, ECCC-1, PC-36	8.2.5 and refer to the Bird Baseline Report (dated May 25, 2022)
t	Address all other recommendations/ concerns raised regarding migratory birds.	PC-2022-02-Summary-20 ECCC-9-21-4 to 6	Refer to the Bird Baseline Report (dated May 25, 2022)
u	Areas of known sheep activity/concentration shall be delineated to inform mitigations outlined in "Flying in Sheep Country". Sheep space use data should be mapped with associated metadata. The sheep database should be updated with incidental data and augmented with focused sheep surveys if important sheep areas are discovered with 2km of the ASR right of way. Add content to the adaptive management section describing triggers and courses of action if sheep or mineral licks are encountered during Phase 1. These should be informed by baseline desktop analysis of sheep concentration areas that should be updated as sightings continue.	PC-2022-02-Summary-21 Technical meeting #2 and 5 PC-9-21-75	SOP 1 and Section 8.1.5
v	The current remote camera study design will not provide sufficient data to infer "caribou seasonal and temporal use and distribution along and within 4 km of the PWR, mortality risk from predator access, and caribou-vehicle collision risk" (WMMP Oct, 2021). Camera trap studies are unlikely to produce an adequate metric (biologically representative and/or statistically robust) for caribou along the ASR route due to low detection probability and high seasonal/internal variability, i.e. hundreds or perhaps thousand of cameras may still not yield useful data to infer project level effects and adaptively manage. As soon as possible, prior to Phase 2, utilize proven methods for baseline and monitoring surveys or demonstrate the viability of the camera work for mountain caribou. The response variable(s) for redesigned baseline and monitoring surveys (see PC-2022-02-Summary-23) should be changed such that they are biologically relevant to project effects on caribou. These metrics, as suggested in the technical meetings, include: occupancy, density, abundance, composition, seasonal use, movement and intensity of space use. Update the WMMP to reflect commitment to utilize proven methods as part of a caribou baseline and monitoring program.	PC-2022-02-Summary-22 Technical meeting #2 and 7 PC-9-21-51, -53, -67, -72, and -81	Remote camera replaced in Section 8.2.3
w	As soon as possible, prior to Phase 2, develop and implement a mountain caribou monitoring program using accepted techniques such as aerial surveys and/or satellite collars for occupancy, density, abundance, composition, seasonal use, movement and/or intensity of space use. All surveys and/or collar deployment needs to be done at a meaningful scale for these migratory animals. Based on previous zone of influence work a 20km buffer would be a good starting point for any survey work. Any collar deployment and/or survey work should target the road alignment. Work should target caribou "seasons" and acknowledge that inference from a survey completed in one season to another is limited. Update the WMMP to reflect commitment to utilize proven methods as part of a caribou baseline and monitoring program.	PC-2022-02-Summary-23 Technical meeting #7, PC-9-21-52, -67, and -81	Remote camera replaced in Section 8.2.3

Conformity Table E: 2021/2022 Parks Canada and Environment and Climate Change Canada*

Item	Requirement	Review Comment Reference	Section of Plan
x	<p>Develop an adaptive management framework for mountain caribou, which uses triggers from relevant and accepted baseline and monitoring data (e.g. collar and/or survey data). For example, mitigation strategies that adaptive management could encompass could include:</p> <ol style="list-style-type: none"> 1. Spatially explicit and/or seasonal speed reductions linked to caribou movement 2. Micro rerouting of the ASR based on important crossing areas 3. Seasonal closures based on data showing seasonal use areas and sensitive habitats 	<p>PC-2022-02-Summary-24 Technical meeting #7 PC-9-21-67</p>	Remote camera replaced in Section 9.2.3
y	<p>Remove assertion that all mountain caribou within the project area belong to the Redstone herd. Adequate baseline and monitoring work will enable confidence in herd affiliation (see Conditions PC-2022-02-Summary-22 and PC-2022-02-Summary-23). Remove assumptions of risks regarding harms to caribou based on the assumption caribou around the Project area belong to the Redstone herd.</p>	<p>PC-2022-02-Summary-25 Technical meeting #7 PC-9-21-49 and -80</p>	Updated in Section 8.2.3
z	<p>Address all other recommendations/ concerns raised regarding mammals.</p>	<p>PC-2022-02-Summary-26 PC-9-21-32, -43 to 44, -50, -54 to 57, 82, -98, -101, -109, and -119</p>	-
aa	<p>Traffic volumes shall be quantified as transits (one way trips) per day and indicate whether this indicates an increase based on the proposed expanded mine project.</p>	<p>PC-2022-02-Summary-27 Technical meeting #4, PC-9-21-1, PC-9-21-45</p>	No change for Phase 1
bb	<p>Confirm that harvest reporting is voluntary and clarify if harvest level will be verified or validated. If there is to be no correcting for unreported harvest, harvests should be reported as minimum known harvest level. Do not overstate the value of this metric.</p>	<p>PC-2022-02-Summary-28 Technical meeting #4, PC-9-21-19 and 47</p>	Updated to minimum known harvest in Section 8.2.2

* Conformity Table per PCA and ECCC comments provided through 1) PCA e-mail (November 5th, 2021), 2) Table of comments (November 22nd, 2021), 3) 7 recorded technical meetings from December 2nd to December 16th 2021, and 4) three technical meetings in March 2022.

Conformity Table F: 2021 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
a	<p>Table 16, Section 9.1 mentions applicable setback distances for lodges/dams, but no setback distances for beaver lodges or dams are specified in Table 4, Section 7.2. Muskrat push-ups are also protected under s.s.51(2) of the Wildlife Act.</p> <p>Add a setback distance for beaver lodges/dens, and muskrat push-ups to Table 4. ENR recommends that the general setback of 250 m stipulated in the Northern Land Use Guidelines - Seismic Operations be used for these features.</p>	ENR-12Dec2021-01	Added to Table 4, Sections 8.1.1 and 9.1.1, and WMMP #1 Procedure
b	Providing locations of moveable wildlife caution zone signs to non-project related drivers may lead to targeted hunting in those areas. Edit this section to stipulate that "Sign locations will also be provided to project-related drivers before traveling on the PWR."	ENR-12Dec2021-02	Updated in Section 8.1.6
c	WMMP mentions "Signs will be posted advising road users that the land is the traditional land of the Nah?a Dehé Dene Band, and a request that the road not be used and that no hunting should occur." This type of sign may be perceived as being illegal under sub-section 147(2) of the Wildlife Act which states that "No person shall, without lawful authority, post a sign or notice purporting to prohibit or regulate activities in relation to wildlife or habitat." Depending on where the sign is posted, it may occur within the traditional land of other First Nations than just the Nah?a Dehé Dene Band. The wording of the signage should not include any reference to "no hunting" and should instead focus on encouraging non-project related traffic to stop at the checkpoint. The sign should acknowledge all First Nations whose traditional lands overlap with the PWR and all-season road corridor.	ENR-12Dec2021-03	Removed from Section 7.4.2. Refer to the Traffic Control Mitigation and Road Operations and Maintenance Plan as well as the Design and Construction Plan
d	WMMP mentioned "If wildlife is present on or near the airstrip prior to aircraft take off or landing, staff trained in deterrence procedures will encourage the animal away from the airstrip." No distance specified for what constitutes "near" the airstrip. SOP#3 - section 3.2 suggests that "near" is within 100 m. Change to "wildlife is present on or within 100 m of the airstrip".	ENR-12Dec2021-04	Airstrip procedures removed from the WR Project, but will be detailed in the Mine WMMP
e	WMMP mentioned "Undertake a wildlife reconnaissance (to be completed by the Dene Monitor) by scanning adjacent slopes, ponds, and surrounding areas with binoculars prior to blasting, if blasting should occur. Blasting is prohibited if big game species are observed within 1 km of the blast site until the animal moves out of the area (refer to Section 8.1.3)." A survey with binoculars won't be effective at covering a 1 km radius within forested terrain. This issue may be more pertinent to Phase 2 issue, given that the WMMP says blasting will be limited during Phase 1 to the more northern portions (km 0 to 35) of the road where the terrain is more open, and hillsides may be searchable with binoculars. Where blasting will occur within or adjacent to forested terrain, monitors should either survey the 1 km buffer zone on foot or CZN should consider the use of a drone where weather conditions permit.	ENR-12Dec2021-05	Refer to Section 8.1.3 and Section 7.5

Conformity Table F: 2021 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
f	As previously discussed and agreed to by CZN on October 14, 2021, reduce transect spacing for aerial bear den surveys to 250 m.	ENR-12Dec2021-06	Updated in Section 8.1.1 and WMMP Procedure #1
g	Table 15 states that there will be "Two track surveys (approximately Dec 2021 to Mar 2022) depending on a safe crossing at the Liard River.;" however, the text in Section 8.24 and Appendix D - WMMP #8 suggest that only one winter track survey may be conducted. ENR would like to see two winter track surveys conducted to increase the likelihood of detection of boreal caribou should they occur in the study area. Conduct two winter track surveys, one following the clearing of the trail by the mini-mulcher but before operation of the winter road, and a second one either during a period that traffic on the winter road is temporarily suspended or after road operations have ceased in March.	ENR-12Dec2021-07	Confirmed 2 track surveys in Section 8.2.4 and WMMP #8 procedure
h	The WMMP mentioned "A den, lodge/dam, raptor nest, or bat hibernacula is detected on the PWR footprint, but clearing is still outside the applicable setback distances." It is not clear how it would be possible for one of these features to be detected on the PWR footprint yet clearing could still occur outside the applicable setback distance. Add additional text to clarify how this adaptive management circumstance could occur.	ENR-12Dec2021-08	Refer to Section 9.1.1
i	It is possible that a bear, wolverine, or other wildlife species, could be disturbed from its den before the den is detected by project staff. What adaptive management response would occur if project staff observed an active bear, wolverine or other wildlife species during the period in which it would normally be denning? Add "High Action Level: A bear, wolverine or other normally denning mammal is observed by project staff, suggesting it may have been disturbed from its den by project activities." Add adaptive management options for this circumstance.	ENR-12Dec2021-09	Refer to Section 9.1.1
j	The WMMP mentioned Define a distance threshold for "near" "A nest, den, hibernacula, or roost observed in or near a camp or worksite."	ENR-12Dec2021-10	Refer to Section 9.1.5
k	The WMMP mentioned "A single non-Project vehicle accessing the WR outside the checkpoint station hours, as determined from the daily review of the remote camera at the checkpoint station". If there is a way that people could bypass the checkpoint and still gain access to the WR (e.g. traveling up the Liard River to where the WR connects on the western shore) then the check station and the remote camera at the checkpoint station will miss this traffic. Recommend a second remote camera be placed on the WR on the north side of the Liard River to capture non-project related traffic that might circumvent the checkpoint.	ENR-12Dec2021-11	A second remote camera added to Section 9.2.2

Conformity Table F: 2021 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
I	<p>The WMMP mentioned "If wildlife is reported on or near the road, traffic will stop for all wildlife seen crossing or attempting to cross the WR." Also "Traffic may resume, at 20 km/hr, once the animal is at a safe distance across and or five minutes after last visual. The safe distance is dependent upon the species and distance from which the vehicle stopped from the animal (assuming various distances based on when the animal first observed) but refers to the distance beyond which an animal could not return to the roadway by the time the vehicle resumes driving and passes the point at which contact with the animal could be made. A safe distance for a caribou is considered to be 50 m from the road;" These mitigation measures are not consistent with Commitment 165 in Table A. "Near" is not defined, the speed limit is higher, and the "safe distance" is smaller. Commitment 165 says that if caribou are reported within 500 m of the road, speed will be reduced to half of 30 km/hr (which is 15 km/hr), and that traffic can resume once caribou are at least 100 aw Make SOP#1 and other sections of the WMMP where this mitigation may be mentioned consistent with Commitment 165/166.</p>	ENR-12Dec2021-12	Refer to Section 7.4.2 and SOP 1
m	<p>The follow-up report from the fall 2021 pika survey has not yet been submitted. In ENR's review of the 2019 version of the Phase 1 WMMP we asked whether there would be follow-up surveys conducted after the Phase 1 WR operations to determine whether occupied talus sites adjacent to the WR might have been impacted. Please submit the fall 2021 pre-clearing pika survey report. Please indicate whether follow-up surveys of talus sites adjacent to the WR will be conducted in summer 2022 to assess whether the WR may have impacted pika occupancy of those sites.</p>	ENR-12Dec2021-13	<p>A follow-up report that presents the results of the fall 2021 and 2022 pre-clearing pika survey will be submitted prior to WR clearing.</p> <p>A follow-up survey will be completed in August 2023 to assess whether the WR affected pika occupancy at four talus sites</p>

* Conformity Table per ENR Comments presented in an email (subject ENR comments on the CZN Phase 1 PWR WMMP) sent December 19, 2021.

Conformity Table G: 2022 GNWT ENR*

Item	Requirement	Review Comment Reference	Section of Plan
a	NorZinc shall update Section 8.1.2.1 to reflect the addition of a follow-up survey in August 2023.	Approval Condition #1	Updated in Sections 8.1.2, 9.1.2, App D WMMP#2
b	NorZinc shall amend Section 7.4 and SOP #2 of the WMMP to clarify that reporting of wildlife-vehicle collisions within 24 hrs extends to any project-related vehicle either traveling on the PWR or an NWT highway. Wildlife-vehicle collisions involving project-related vehicles on NWT highways should also be summarized in annual WMMP reports.	Approval Condition #2	Updated in mitigation 7.4-2, SOP#1, and Section 10.0
c	NorZinc shall amend SOP #1 REPORTING, RESPONDING TO, AND DETERRING WILDLIFE to remove euthanization as a response when wildlife are encountered from Table 1 and Section 5.1.1 on territorial lands.	Approval Condition #3	Updated in SOP#1 Table 1 and Section 5.1.1

* Conformity Table per ENR Comments presented in a letter dated August 10, 2022 (attached to letter titled Conditional Approval of the Wildlife Management and Monitoring Plan for Phase 1 of NorZinc's Prairie Creek All-Season Road Project).

Revision History

Revision	Description	Revised By (Initials)	Revision Date
0	Draft Mine and Winter Road	Golder Associates	2010
0	Draft All-Season Road (submitted with DAR)	Tetra Tech (KL)	2016-08-31
0	Updated Mine and Access Road based on reviewer comments received during EA process	Tetra Tech (KL)	2018-12-21
1	Revised to Phase 1 Winter Road	Tetra Tech (KL)	2019-07-31
2	Phase 1 Permit Revisions	Tetra Tech (KL)	2019-09-30
2	Pioneer Winter Road Revisions	Tetra Tech (KL)	2021-09-30
3	Winter Road Revisions	Tetra Tech (KL)	2022-07-15
4	Winter Road Revisions based on reviewer comments	Tetra Tech (KL)	2022-10-05

Review and Approval

The following signatures indicate that the undersigned have read and agreed to the contents of this document, and that they approve and accept its distribution and use.

Description	Authority	Signature	Date
Document Owner	David Harpley VP Environment & Permitting Affairs		
Prepared by: Karla Langlois, B.Sc., P.Biol. Biologist Environment & Water Practice			October 5, 2022
Prepared by: Jeff Matheson, M.Sc., R.P.Bio., P.Biol. Senior Biologist Environment & Water Practice			October 5, 2022

Distribution List

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PLAIN LANGUAGE SUMMARY

This Wildlife Management and Monitoring Plan (WMMP, or the Plan) serves to describe wildlife and wildlife habitat mitigation, monitoring, and adaptive management to be employed during Phase 1 construction of the Prairie Creek Winter Road (WR; the Project) leading to the Prairie Creek Mine (Mine), Northwest Territories. It is Canadian Zinc Corporation's (CZN's) intent to ensure that proper procedures are implemented and followed to avoid effects to wildlife and wildlife habitat, and where unavoidable, to reduce the severity or likelihood of effects. The WMMP will be in effect for Phase 1 construction and until road closure and deactivation at the end of season.

The WR is located in the southern Mackenzie Mountains and crosses through the Nahanni National Park Reserve (NNPR) from KP 17 – 102 (85 km). Much of the WR follows the alignment of an existing road that was built in the 1980s which is now under various stages of revegetation. Traditional knowledge studies conducted by the Species at Risk Committee (2012) and the Dehcho Land Use Planning Committee (ND) report that wildlife habitat is relatively intact near the Project. Habitats along the road are occupied by big game (including key harvest species such as moose) and Species at Risk (e.g., caribou, grizzly bear). CZN recognizes the importance of wildlife and wildlife habitat values at and near the WR, including harvest species important to Indigenous groups.

Baseline wildlife studies form the basis of the WMMP. CZN continued to collect baseline data since the Environmental Assessment, including an aerial Northern Mountain and Boreal Caribou survey in March 2019, remote camera program from June 2019 to September 2020, Grizzly Bear den surveys and habitat model in spring 2022, Collared Pika surveys in 2016, 2017, 2019, and 2021, breeding bird surveys in 2017, and analyses of Parks Canada's remote collared caribou data. Methods employed during the baseline surveys were developed in consultation with regulators. Baseline information collected during these earlier field surveys, as well as Dene Knowledge provided to CZN during construction, will be used to evaluate the effects predictions and better inform WR mitigation.

The WMMP summarizes potential effects of the WR on wildlife habitat loss and alteration, wildlife mortality and harm, and disturbances to wildlife and lists CZN's protective measures to avoid such effects. When effects cannot be avoided, the WMMP also lists mitigation that is designed to limit the effects and/or reduce the likelihood of effects, to the extent possible and in accordance with adaptive management strategies. CZN's Standard Operating Procedures (SOP's) and Project-specific mitigation help to achieve these objectives.

CZN has had the opportunity to hear from territorial and federal regulators and local Indigenous groups during the environmental assessment and permitting phases and tracks commitments and comments to address their concerns regarding the WR. Key features of CZN's approach to mitigating wildlife effects is a employee and contractor training program, the use of Dene Monitors and a Qualified Environmental Professional to implement mitigation and adaptive management responses, and the establishment of a Road Oversight Committee (ROC) to review and address Indigenous concerns that may arise from the WR. The Dene Monitors and the Qualified Environmental Professional are responsible for implementing the WMMP project commitments, regulatory requirements and permit conditions, mitigation measures, and monitoring programs.

Despite adherence to mitigation, some effects on wildlife and wildlife habitat may still occur. CZN's monitoring programs will be used to test mitigation effectiveness and effects predictions made during the environmental assessment process, and to better inform adaptive management to manage wildlife effects. The WMMP describes two types of monitoring programs:

1. Mitigation Monitoring: monitoring programs designed to verify that mitigation is carried out and/or working as intended. Mitigation monitoring focuses on areas where mitigation is needed and where failed mitigation has a higher risk to wildlife and wildlife habitat. WR mitigation monitoring focuses on:

- Den and raptor stick nest surveys prior to clearing;

- Collared pika surveys prior to, and after, construction;
- Big game/species at risk blast surveys;
- Wildlife hazards at the temporary WR camps and worksites;
- Wildlife observation logs and wildlife incidents reporting; and
- Road mortality risk.

2. **Effects Monitoring:** monitoring programs designed to detect changes as a result of the WR and associated activities. This monitoring goes beyond the Project activity or footprint and looks for potential effects that can not be fully mitigated, or addresses concerns identified by regulators and/or local Indigenous groups. Effects monitoring focuses on:

- Effects due to traffic levels;
- Effects from/on wildlife harvesting;
- Effects on Northern Mountain Caribou distribution and caribou-vehicle collision risk along the WR;
- Effects on Boreal Caribou distribution, and caribou-vehicle collision risk); and
- Effects on birds.

CZN is developing additional monitoring programs specific to Phase 2 activities, which includes clearing to the full road width, the construction of an all-season access road, as well as the construction and operation of a winter road.

Adaptive management is also an important part of the WMMP as a process to continually learn and improve based on monitoring. CZN regularly evaluates the monitoring procedures and on-site mitigation measures and reviews these with Parks Canada, Environment and Natural Resources (ENR), Environment and Climate Change Canada (ECCC), and local Indigenous groups, as appropriate. Recommendations for improvement based on science, Dene Knowledge, newly listed Species at Risk, and lessons learned from the WR and others will be incorporated into subsequent editions of the WMMP.

This WMMP is a living management plan that will be updated for subsequent phases of the Project to include any lessons learned (in terms of the Project, Dene Knowledge, and recent technologies) that will be gained in the coming years.

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ACRONYMS & ABBREVIATIONS

Acronyms / Abbreviations	Definition
ADKFN	Acho Dene Koe First Nation
agl	Above ground level
ASR	All-season Road
BMP	Best Management Practice
cm	Centimetre
CM	Construction Manager
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CZN	Canadian Zinc Corporation
DAR	Developers Assessment Report
DFN	Dehcho First Nations
DCP	Design and Construction Plan
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
ENR	Government of Northwest Territories Environment and Natural Resources
GPS	Global Positioning System
km	Kilometre
km/hr.	Kilometres per Hour
KP	WR Kilometre Post
LKFN	Łíídlíj Kúé First Nation
m	Metre
MBCA	Migratory Birds Convention Act
MVLWB	Mackenzie Valley Land and Water Board
MVRB	Mackenzie Valley Review Board
Nddb	Nah?a Dehé Dene Band
NNPR	Nahanni National Park Reserve
NWT SARA	Species at Risk (NWT) Act
OM	Operations Manager
Parks Canada	Parks Canada Agency
QEP	Qualified Environmental Professional
REA	Report of Environmental Assessment (MVRB 2017)
ROC	Road Oversight Committee
SARA	Species at Risk Act
SOP	Standard Operating Procedure
TAC	Technical Advisory Committee
WHMIS	Workplace Hazardous Materials Information System
WMMP	Wildlife Management and Monitoring Plan
WR	Winter Road

GLOSSARY OF TERMS

Acronyms/Abbreviations	Definition
Adaptive Management	A structured process of continual learning and improving management policies and practices based on mitigation, monitoring, Dene Knowledge, similar northern land use projects, and feedback from regulatory agencies and local Indigenous groups.
Big Game	Any big game species listed in Schedule A of the Wildlife General Regulations of the NWT Wildlife Act with the potential to occur in the Project area. These include bison, wolf, coyote, wolverine, Dall's sheep, mountain goat, moose, caribou, and bear.
Dene Knowledge	The cumulative, collective body of knowledge, experience, and values built up by the Dene peoples through generations of living in close contact with nature. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual, and political change.
Disturbance	Any activity that interrupts the regular behaviour and routine of wildlife (Yukon Environment 2010).
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 Wildlife Act).
Harassment	To unnecessarily chase, fatigue, disturb, or torment.
Mitigation	Measures taken to avoid or reduce a potential Project effect.
Monitoring	The process of observing, recording, and analyzing Project activities and potential Project effects.
Species at Risk	Any species legally listed under the federal and territorial Species at Risk Acts or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the NWT Species at Risk Committee as Extinct, Extirpated, Endangered, Threatened, or Special Concern.
Talus	Rock debris that accumulates at the bottom of a slope or cliff.
Winter Road (WR) Project	The winter construction of the winter trail used to support geotechnical and geophysical investigation work.

1.0 INTRODUCTION

This Wildlife Management and Monitoring Plan (WMMP, the Plan) was prepared for Canadian Zinc Corporation (CZN) by Tetra Tech Canada Inc. (Tetra Tech). This management plan outlines the mitigation, monitoring, and adaptive management responses to be employed during Phase 1 construction of the Prairie Creek Winter Road (WR; the Project). Phase 1 is a precursor to the Phase 2 construction of an All-Season Road (ASR) linking the Prairie Creek Mine (Mine) to the Nahanni Butte Access Road, Northwest Territories (NT). The WR will support geotechnical and geophysical investigation work.

Under the NWT *Wildlife Act* and the *Canadian National Parks Act* (CNPA), this Plan is binding and enforceable, once approved by the Minister of Environment and Natural Resources (ENR) and Parks Canada Agency (Parks Canada), respectively.

Currently, this management plan only applies to the WR as Phase 2 (the ASR) is presently in the design phase. This Plan will be updated for Phase 2 ASR and will be adapted to incorporate modifications and/or additions to management and monitoring programs, methods, corporate Standard Operating Procedures (SOPs), and industry Best Management Practices (BMPs), as necessary.

1.1 Company Name, Location and Mailing Address

Company Name:

Canadian Zinc Corporation

Head Office:

Address: Suite 1710 – 650 West Georgia Street, Vancouver, BC, V6B 4N9
Phone: +1-604-688-2001
Fax: +1-604-688-2043
Email: David.Harpley@norzinc.com

Prairie Creek Mine Site:

Iridium 9555 Satellite Phone 1 (yellow) 011-8816-315-30998
Iridium 9505A Satellite Phone 2 (black) 011-8816-315-30997
Iridium 9505A Satellite Phone 3 (orange) 011-8816-315-30996
Ground-To-Air Radio Handheld FREQ 122.800

1.2 Purpose

It is Canadian Zinc Corporation's (CZN's) intent to ensure that proper procedures are implemented and followed at all times to avoid effects to wildlife and wildlife habitat, and where unavoidable, to reduce the severity or likelihood of effects. The WMMP is a guidance document for on-site personnel (employees and contractors) regarding the appropriate conduct and management of wildlife and wildlife habitat that may be affected by WR activities. Mitigation, monitoring protocols, and triggers for adaptive management action are described to prevent and limit potential effects, initiate further action, and evaluate predicted effects. The WMMP is valid for the WR and remains valid until the Phase 2 WMMP is administered. A copy of the approved WMMP will be available at all active camps during the Project.

The key objectives of the WMMP are to:

- Consolidate CZN's commitments and strategies to mitigate potential effects to wildlife and wildlife habitat;

- Provide Project personnel with SOPs and BMPs to protect people and wildlife and to guide responses to given human-wildlife situations using steps and/or decision-making trees;
- Describe pre-construction inspections to be conducted as part of the mitigation monitoring program;
- Outline CZN's approach to monitoring the effectiveness of implemented mitigations;
- Outline CZN's approach to monitoring wildlife and wildlife habitat effects; and
- Summarize CZN's reporting and community engagement approaches to transmit and share results with local Indigenous groups.

This plan is designed to be dynamic to allow further evaluation through engagement with regulators and Indigenous groups, incorporation of Dene Knowledge, and adjustments based on the principles of adaptive management.

1.3 Related Management Plans

Other CZN WR management plans, developed as part of the Project's overall environmental management system, are also relevant to the protection of wildlife and wildlife habitat (Table 1). These should also be reviewed in conjunction with the WMMP.

Table 1: Related Management Plans

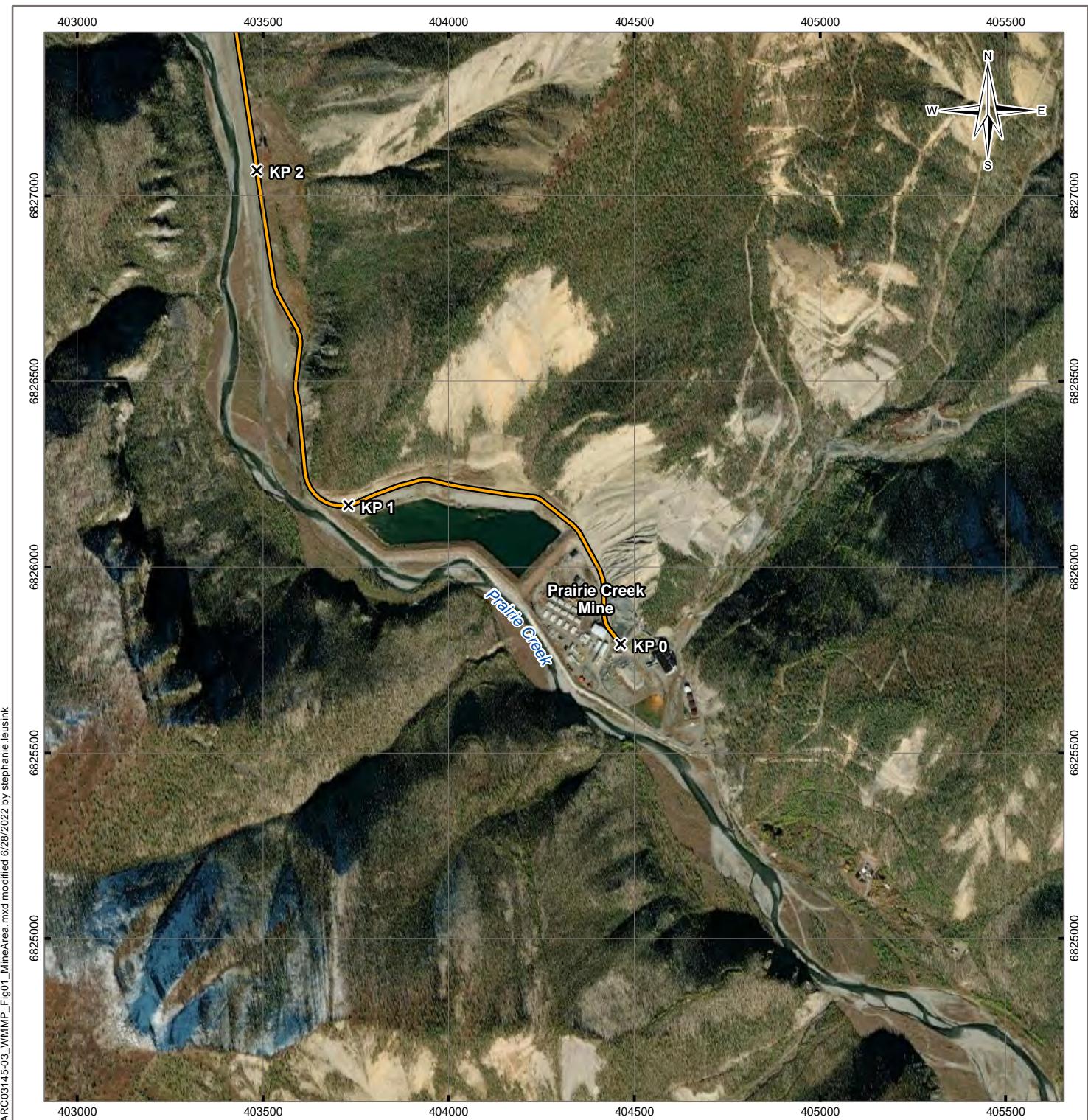
Management Plans	Management Plans
Avalanche Hazard Management Plan	Invasive Species Management Plan
Closure and Reclamation Plan	Sediment and Erosion Control Plan
Design and Construction Plan	Spill Contingency and Emergency Response Plan
Engagement Plan	Traffic Control Mitigation and Road Operations and Maintenance Plan
Explosives Management Plan	Waste Management Plan

Copies of all these plans will be kept at the Prairie Creek Mine (the Mine). Details of the WR Project, together with the schedule of WR activities, are provided in the CZN Traffic Control Mitigation and Road Operations and Maintenance Plan as well as the Design and Construction Plan.

2.0 PROJECT DESCRIPTION

CZN is planning to operate the Prairie Creek Mine, which is located at approximately 61° 33' north latitude and 124° 48' west longitude adjacent to Prairie Creek, a tributary of the South Nahanni River, in the southwest corner of the Northwest Territories, as shown on Figure 1. The WR is in the traditional territory of the Nah'a Dehé Dene Band. The Acho Dene Koe First Nation also assert that the eastern-most 6/7 km of the WR is in their outlying traditional territory.

Phase 1 construction of the WR is intended to provide seasonal access, for one winter, to complete geotechnical and geophysical investigations along the ASR alignment. The WR will be approximately 170 km long and will primarily utilize the proposed ASR alignment, as shown on Figure 2 (attached). Areas where the WR alignment deviates from the ASR alignment can be viewed in detail in the Traffic Control Mitigation and Road Operations and Maintenance Plan's Map Book (CZN 2019) prepared by Allnorth. Approximately half of the WR construction (85 km from Kilometre Post (KP) 17 to KP 102) is located within the Nahanni National Park Reserve (NNPR). The WR will support geotechnical and geophysical investigation work only using tracked and light vehicles.

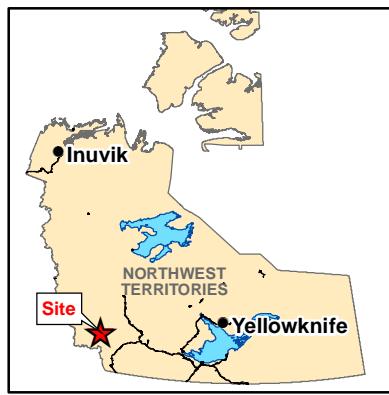


LEGEND

- ✗ Kilometre Marker
- Existing Mine Access Road to be used for Winter Road

NOTES

Base data source:
2019 Kilometre Marker and 2021 Winter Road alignment from AllNorth.
Imagery from ESRI; Maxar (2018).



STATUS
ISSUED FOR USE

WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Prairie Creek Mine Area Overview

PROJECTION		DATUM	CLIENT	
UTM Zone 10		NAD83	 CANADIAN ZINC CORPORATION	
Scale: 1:15,000		200 100 0 200	 TETRA TECH	
Metres				
FILE NO.				
EARC03145-03_WWMP_Fig01_MineArea.mxd				
OFFICE	DWN SL	CKD YL	APVD RH	REV 0
Tl-VANC				
DATE	PROJECT NO.			
June 28, 2022	ENG.EARC03145-03			

Figure 1



An important goal of the WR construction program is to limit mineral soil disturbance and to confine the alignment to the middle of the proposed ASR footprint as much as possible. Combining the WR and proposed ASR alignment footprints as much as possible will significantly reduce the total project footprint which will in turn limit ground and watercourse disturbances. Where side slopes exist, the construction of the WR is intended to largely occur along the downslope side of the proposed ASR alignment.

3.0 ENVIRONMENTAL SETTING

The Prairie Creek Mine site is located within the southern Mackenzie Mountains in an area characterized by stunted spruce with limited undergrowth and open areas dominated by lichen. The WR connects the Mine to the Liard Highway. The WR leaves the Mine site heading north along the Prairie Creek valley for about 7 km before turning east to cross the Mackenzie Mountains (Figure 2). As the WR climbs out of the Prairie Creek valley it enters sub-alpine shrub and alpine tundra from an elevation of approximately 1,000 metres (m) above mean sea level at KP 10. The WR continues to climb through the alpine to the summit of 1,530 m at KP 17, then drops down and enters the sub-alpine again at the 1,000 m elevation mark around KP 25. As the road decreases in elevation to approximately 900 m, it passes through a spruce-lichen alpine forest zone similar to that found at the Mine site and then into riparian alluvial habitat in the Sundog tributary valley bottom.

As the road crosses the Ram Plateau, it passes through an open forest black spruce/pine parkland setting between 830 m and 930 m elevation, before dropping down into the Tetcela River valley. This valley consists of mixed coniferous/deciduous closed forest. The road then passes through a short distance of muskeg and open shrub/sedge wetland at the headwaters of Fishtrap Creek, and climbs up and over the Silent Hills, again characterized by closed mixed coniferous/deciduous forest. The road then crosses an area of black spruce muskeg and wetlands near the Grainger River headwaters before passing through mixed coniferous-deciduous parkland at Grainger Gap (Second Gap).

Once through the Grainger Gap, the road heads south edging along the foothills of the Nahanni Range (Front Range) through mixed deciduous coniferous forest towards the community of Nahanni Butte. The WR crosses the Liard River approximately 6 km north of the community of Nahanni Butte and continues through forest to the Nahanni Butte access road and Liard Highway.

Climate data collected from the Prairie Creek Mine weather station suggests the Mine site climate is slightly more temperate when compared to data collected from Fort Simpson, NWT; the Mine tends to be cooler in the summer but warmer in the winter (CZN 2015). Since 1982, there have been at least three documented forest fires in the vicinity of the WR. The first was located near KP 66, the second in 1994 covered an area immediately east of the Nahanni Range, and a third and smaller burn occurred just east of Mosquito Lake in 2008. Several additional smaller burns are also known to have occurred since.

The WR traverses wildlife habitats occupied by big game (including key harvest species) and those with special conservation status. Traditional knowledge studies conducted by the Species at Risk Committee (2012) and the Dehcho Land Use Planning Committee's (ND) report relatively intact wildlife habitat in the vicinity of the Project.

4.0 ROLES AND RESPONSIBILITIES

Key individuals responsible for the successful management and implementation of Project commitments, regulatory requirements, mitigation, and wildlife monitoring programs outlined in the WMMP are identified below. Each of their specific roles and responsibilities are also described in applicable SOPs and monitoring procedures.

Additional contracted staff, including professional biologists and Dene Monitors, will be retained to carry out specified wildlife surveys and report on an as needed basis. Responsibilities pertaining to contracted staff are outlined in applicable monitoring plans.

Road Project Director (RPD): oversees all aspects of WR activities. Manages the designated Qualified Environmental Professional (QEP) and Construction Managers and ensures all procedures, reporting, schedules, budget, personnel, and environmental safety plans are followed. The roles, responsibilities, and training requirements for the RPD are defined in Section 5.1 of the Design and Construction Plan (DCP).

Construction Managers (CM): are responsible for implementing, monitoring, and overseeing all construction activities, including, along with the QEP, verifying wildlife mitigation and commitments, including SOP's and BMP's, and ensuring applicable regulations are followed, and applicable employees and contractors are appropriately trained on the WMMP. They will also support Dene Monitors when wildlife deterrent action may be required and will be trained to safely use wildlife deterrents. The roles, responsibilities, and training requirements for the CM are defined in Section 5.1 of the DCP.

Qualified Environmental Professional (QEP): The full-time, on-site QEP is responsible for implementing, monitoring, and overseeing all environmental and regulatory compliance activities during WR activities. The QEP will be a professional reporting to the RPD, and will act as a verifier of compliance, with the authority to enact temporary construction shutdowns if unacceptable conditions are observed. The QEP's roles of coordinating DM activities include providing appropriate training and supervision to allow the DMs to carry out environmental monitoring tasks. The roles, responsibilities, and training requirements for the QEP are defined in Section 5.1 of the DCP.

Dene Monitors (DM): are responsible for carrying out daily inspections of the WR and will work under direct supervision of the QEP. Monitors will help identify issues related to road maintenance, signage, non-Project vehicle use of the WR, as well as wildlife, and will report all issues and observations to the QEP. They will consider whether Project activities are being conducted in accordance with the mitigation measures and Dene Knowledge to limit effects to wildlife. The Dene Monitors will have training prior to construction, including how to respond to a wildlife incident and other applicable SOPs, and duties outlined in the monitoring procedures.

Dene Monitors will have the following training:

- Avalanche safety training (mandatory for all personnel before working in avalanche terrain)
- Wildlife identification, track identification, and deterrent training
- Radio operator training

General duties and responsibilities of the Dene Monitor include:

- Monitor and observe WR activities and confirm they are carried out in accordance with the WMMP.
- Record observations while carrying out the WMMP.
- Incorporate Dene Knowledge to further the understanding and management of wildlife and wildlife habitat.
- Support the QEP when informing staff and contractors during both regularly (e.g., daily tailgates) and irregularly scheduled meetings on the activities with a higher potential for wildlife/wildlife habitat effects, areas requiring higher awareness (i.e., wildlife caution zones), and wildlife sighting trends.
- Record wildlife sightings in the Wildlife Observation Logs and collect the Wildlife Observation Logs from camps and other work sites.
- Follow the monitoring procedures in this Plan and together with the QEP manage existing mitigations and carryout adaptive management actions.

- Respond to all wildlife incidents and seek advice from the QEP, when required.
- Operate access control checkpoints, as per a commitment made by CZN (see Checkpoint Monitors below).
- Together with the QEP, seek advice, through CZN, from appropriate regulatory agency (e.g., ENR, ECCC, Parks Canada) regarding issues that arise.
- Together with the QEP and CM, immediately notify ENR, ECCC, and/or Parks Canada of any wildlife mortalities that have, or may have, occurred as a result of the Project (local Indigenous harvesting not included).
- Provide support to local Indigenous groups independent monitoring program(s) to the greatest extent practicable.

Checkpoint Monitors: will operate the access control checkpoint that will be established near the WR's junction with the Nahanni Butte Access Road (see Section 4.0 of the Traffic Control Mitigation and Road Operations and Maintenance Plan). The checkpoint will be staffed by monitors from the Nah?a Deh?e Dene Band (NDDB), per a commitment made by CZN.

Health and Safety Coordinator (HSC): will be responsible for reviewing, approving, monitoring, and overseeing all health and safety related activities during WR activities. The HSC will ensure construction activities are compliant with WSCC regulations and will oversee delivery of the WR's health and safety program. The HSC has acting authority and responsibility, alongside the RPD, CM, and QEP, to ensure safe work practices are being followed, as described in Section 5.1 of the DCP.

CZN Employees and Contractors: all are expected to respect and follow, where applicable to them, the mitigations outlined in this WMMP, including the SOPs. Onsite employees and contractors (including pilots) must attend the daily tailgate meetings.

Technical Advisory Committee (TAC) and Road Oversight Committee (ROC): The Technical Advisory Committee (TAC) acts as an overall Project advisory group, which will include reviewing and implementing the WMMP (and associated WMMP revisions) and assessment of mitigation effectiveness and associated adaptive management needs, including the consideration of traditional values. The Road Oversight Committee (ROC) will feed information to the TAC and is intended to address the concerns of Indigenous groups and the work of independent Dene Monitors on the WR. Issues and considerations regarding wildlife and effects are to be discussed during the annual TAC meetings.

5.0 COMMITMENTS AND/OR REGULATORY REQUIREMENTS

5.1 Report of Environmental Assessment (REA MVRB 2017; EA1415-01)

5.1.1 Measure 6-1

Part 1: Wildlife baseline information collection, monitoring, mitigation, and adaptive management program.

In order to reduce adverse impacts on wildlife and wildlife habitat so they are no longer significant, CZN will collect additional wildlife baseline information to be integrated with mitigation, focused monitoring, and a systematic approach to adaptive management.

To accomplish this, CZN will:

- i. collect baseline data as described in Part 2 of this measure
- ii. monitor wildlife and wildlife habitat during construction and operations as described in Part 3
- iii. incorporate Traditional Knowledge in developing and implementing a monitoring program
- iv. develop and implement an adaptive management framework to manage impacts on wildlife

Part 2: Collection of baseline wildlife information for caribou, collared pika and bird species at risk that occur in the area.

The purpose of this baseline information collection is to confirm the presence or absence of listed wildlife species in the Project area, their population size, seasons of use and important habitat for species described below in the all-season road corridor.

To support Part 1, the developer will:

- a) submit a baseline survey plan for review and approval to Parks Canada within the NNPR and to GNWT on territorial lands
- b) conduct baseline surveys for northern mountain caribou, boreal caribou, collared pika, and bird species at risk
- c) use recognized methods and standards approved by Parks Canada within NNPR, by GNWT on territorial lands, and by ECCC for species at risk
- d) conduct surveys at the direction and approval of Parks Canada within NNPR and of the GNWT on territorial lands
- e) complete surveys prior to road construction
- f) share its baseline wildlife information with local indigenous groups, including Nah?a Deh?e Dene Band (NDDB), L?íídl?j K?é First Nation (LKFN), and Dehcho First Nations (DFN)
- g) present the results of its baseline information collection with local Indigenous groups, including NDDB, LKFN and DFN, in a culturally-appropriate way

Part 3: Wildlife monitoring programs

In order to reduce adverse impacts on wildlife so they are no longer significant, the developer will prepare and implement a systematic monitoring program(s) for wildlife that may be affected by the Project.

The developer will:

- a) submit monitoring program(s) for review and approval to Parks Canada within the NNPR and GNWT on territorial lands
- b) focus on monitoring of northern mountain caribou, boreal caribou, collared pika, and bird species at risk
- c) use recognized methods and standards approved by Parks Canada within NNPR, by GNWT on territorial lands, and by ECCC for species at risk

- d) conduct monitoring through all phases of the Project
- e) formalize monitoring programs within the Wildlife Management and Mitigation Plan (Measure 6-2)
- f) provide annual monitoring reports to Parks Canada, GNWT, ECCC, NDDB, LKFN and DFN
- g) share its wildlife monitoring data with local Indigenous groups including NDDB, LKFN and DFN
- h) present the results of its wildlife monitoring programs to local Indigenous groups, including NDDB, LKFN and DFN, in a culturally appropriate way

5.1.2 Measure 6-2

Measure 6-2 builds on CZN's commitment to update the draft WMMP with mitigation described in the commitments table and throughout this report in order to reduce impacts on wildlife and wildlife habitat so that they are no longer significant. The measure requires a systematic adaptive management framework as part of the WMMP.

Part 1: GNWT to require a WMMP

In order to reduce adverse impacts on wildlife and wildlife habitat so they are no longer significant, GNWT will require the developer to prepare and implement a Wildlife Management and Monitoring Plan.

The GNWT will:

- a) require that the developer prepare a WMMP under the legal authority of Section 95(1) of the Wildlife Act for portions of the Project in its jurisdiction
- b) include opportunity for public review of and comment on the final WMMP prior to construction and on updates to the WMMP throughout the life of the Project

Part 2: Parks Canada to require a WMMP

In order to reduce adverse impacts on wildlife and wildlife habitat so they are no longer significant, Parks Canada will require the developer to prepare and implement a Wildlife Management and Monitoring Plan.

Parks Canada will:

- a) require that the developer prepare a WMMP as a condition of an authorization for the portions of the road in its jurisdiction
- b) include opportunity for public review of and comment on the final WMMP prior to construction and on updates to the WMMP throughout the life of the Project

Part 3: Developer to prepare and implement a WMMP.

The developer will:

- a) update its draft WMMP to include all commitments and mitigations agreed to or recommended by its consultants throughout the EA
- b) develop an adaptive management framework that links the results of monitoring with adjustments to mitigations as part of the WMMP that satisfies the requirements set out in Appendix B of the report of EA

- c) describe how the monitoring data is linked with adaptive management in the Traffic Control and Management Plan
- d) submit its updated WMMP to the wildlife regulators described in Parts 1 and 2 for review and approval prior to construction
- e) prepare and submit an annual report to wildlife regulators on the effectiveness of the WMMP that includes a description of how the adaptive management framework was used to address Project impacts

5.1.3 Measure 6-3

The following measure is required to mitigate significant adverse effects resulting from direct mortality to wildlife from vehicle collisions by both mine and non-mine traffic along the all-season road. This measure is linked to the Traffic Control Mitigation and Management Plan.

Part 1: Reducing the risk of vehicle collisions with wildlife

In order to reduce the likelihood of significant impacts on wildlife from collisions with vehicles along the road, CZN will identify and communicate wildlife caution zones to road users. The details of this approach will be incorporated into the developer's WMMP (referred to in Measure 6-2) and will include:

- a) a description of how wildlife information from drivers will be collected and recorded to inform the selection of wildlife crossing areas
- b) a detailed system for identifying wildlife (specifically big game as defined in the Wildlife Act) caution zones and marking them along the road (such as where sightings or collisions have occurred or where Traditional Knowledge identifies trails)
- c) use of a remote camera trap system to identify wildlife road crossing areas and identify non-mine related traffic
- d) annual reporting of wildlife sightings by drivers that includes vehicle collisions with wildlife, locations of signage for wildlife caution zones, and whether they were modified based on operational experience
- e) annual reporting to regulators of remote camera log results, locations of primary wildlife crossings and how wildlife caution zones were modified based on monitoring results (if applicable)
- f) annual reporting to regulators on road use by non-mine vehicles using data from remote camera logs

The GNWT will regulate this measure on territorial lands and Parks Canada will regulate this measure within the NNPR. Reporting will be included in the WMMP annual report.

5.2 Project Commitments

CZN is committed to mitigating potential WR-related effects on wildlife and wildlife habitat by implementing mitigation and effects monitoring programs using CZN's own SOP's (Appendix B) and performing tasks in a consistent and safe manner outlined in industry BMP's (Appendix C).

CZN commits to managing and monitoring wildlife and wildlife habitat affected by the WR. A list of CZN's wildlife and wildlife habitat commitments relating to the WR is provided in Table A (see Tables section) along with the applicable section(s) within the WMMP that address each. Additional comments from the regulators are included in Table B (see Tables section) along with the applicable section(s) within the WMMP that address each.

These tables include comments regarding both Phase 1 and Phase 2 of the project for tracking purposes. Only the Phase 1 comments that relate to the WR have been addressed in this version of the WMMP. The remaining comments will be addressed in WMMPs for subsequent phases.

5.3 Regulatory Requirements

CZN must follow several federal and territorial Acts and Regulations throughout the WR. Applicable Acts and Regulations prohibit disturbing, injuring, or killing wildlife and destroying their nests, dens, lodges/dams, and designated critical habitat. Federal and territorial legislation provide guidance for wildlife and wildlife habitat protection and are briefly described below. 2. Annual updates to Table 2 are required as part of the Annual Report (refer to Section 10.0) to capture any adjustments to the species listed (e.g., species added or removed).

Table 2: Wildlife Species Conservation Status and Applicable Legislation

Species	SARA ¹ Legal Listing	COSEWIC ¹ Assessment	NWT SARA Legal Listing ²	NWT SARC ² Assessment
Wood Bison (<i>Bos bison athabascae</i>)	Threatened	Special Concern	Threatened	Threatened
Boreal Woodland Caribou (<i>Rangifer tarandus caribou</i>)	Threatened	Threatened	Threatened	Threatened
Northern Mountain Caribou (<i>Rangifer tarandus caribou</i>)	Special Concern	Special Concern	Special Concern	Special Concern
Wolverine (<i>Gulo gulo</i>)	Special Concern	Special Concern	No Status	Not At Risk
Grizzly Bear (<i>Ursus arctos</i>)	Special Concern	Special Concern	Under Consideration	Special Concern
Little Brown Myotis (<i>Myotis lucifugus</i>) and Northern Myotis (<i>M. septentrionalis</i>)	Endangered	Endangered	Special Concern	Special Concern
Collared Pika (<i>Ochotona collaris</i>)	Special Concern	Special Concern	No Status	Not Assessed
Horned Grebe* (<i>Podiceps auritus</i>)	Special Concern	Special Concern	Not Applicable	Not Applicable
Common Nighthawk* (<i>Chordeiles minor</i>)	Threatened**	Special Concern	Not Applicable	Not Applicable
Yellow Rail* (<i>Coturnicops noveboracensis</i>)	Special Concern	Special Concern	Not Applicable	Not Applicable
Lesser Yellowlegs* (<i>Tringa flavipes</i>)	Under Consideration	Threatened	Not Applicable	Not Applicable
Red-necked Phalarope* (<i>Phalaropus lobatus</i>)	Special Concern	Special Concern	Not Applicable	Not Applicable/Sensitive
Short-eared Owl (<i>Asio flammeus</i>)	Special Concern	Threatened	No Status	Not Assessed
Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Special Concern***	Not At Risk	No Status	Not Assessed
Olive-sided Flycatcher* (<i>Contopus cooperi</i>)	Threatened**	Special Concern	Not Applicable	Not Applicable

Table 2: Wildlife Species Conservation Status and Applicable Legislation

Species	SARA ¹ Legal Listing	COSEWIC ¹ Assessment	NWT SARA Legal Listing ²	NWT SARC ² Assessment
Bank Swallow* (<i>Riparia riparia</i>)	Threatened**	Threatened	Not Applicable	Not Applicable
Barn Swallow* (<i>Hirundo rustica</i>)	Threatened	Special Concern	Not Applicable	Not Applicable
Evening Grosbeak* (<i>Coccothraustes vespertinus</i>)	Special Concern	Special Concern	Not Applicable	Not Applicable
Harris's Sparrow* (<i>Zonotrichia querula</i>)	Under Consideration	Special Concern	Sensitive	Not Applicable
Rusty Blackbird (<i>Euphagus carolinus</i>)	Special Concern	Special Concern	No Status	Not Assessed
Canada Warbler* (<i>Cardellina canadensis</i>)	Threatened	Special Concern	Not Applicable	Not Applicable
Western Toad (<i>Anaxyrus boreas</i>)	Special Concern	Special Concern	Threatened	Threatened
Gypsy Cuckoo Bumble Bee (<i>Bombus bohemicus</i>)	Endangered	Endangered	At Risk	Data Deficient
Suckley's Cuckoo Bumble Bee (<i>Bombus suckleyi</i>)	Under Consideration	Threatened	No Status	Not Applicable
Western Bumble Bee mckayi ssp. (<i>Bombus occidentalis mckayi</i>)	Under Consideration	Special Concern	Sensitive	Data Deficient
Western Bumble Bee occidentalis ssp. (<i>Bombus occidentalis occidentalis</i>)	Under Consideration	Threatened	No Status	Not Assessed
Yellow-banded Bumble Bee (<i>Bombus terricola</i>)	Special Concern	Special Concern	Sensitive	Not at Risk
Transverse Lady Beetle (<i>Coccinella transversoguttata</i>)	Special Concern	Special Concern	Secure	Not Assessed

SARA = Species at Risk Act

COSEWIC = Committee on the Status of Endangered Wildlife in Canada

NWT SARA = Species at Risk (NWT) Act

NWT SARC = NWT Species at Risk Committee

1. Government of Canada 2022.

2. Government of the Northwest Territories 2021.

* = Species (and their nests) also protected under the *Migratory Birds Convention Act*.

** = Species under consideration for down-listing status under Schedule 1.

*** = Species proposed to be removed from Schedule 1.

5.3.1 Canada National Parks Act

Inquiries on the *Canada National Parks Act* are to be directed to Parks Canada.

The *Canada National Parks Act* (CNPA; Government of Canada 2000) enables Parks Canada to establish, manage (i.e., enforce), and maintain national parks and national park reserves. Prohibitions against hunting (except traditional subsistence harvesting) and possession of listed wildlife (or their parts, including eggs) are included. The Act gives power to the Minister for the issuance, amendment, renewal, suspension, and or cancellation of Land Use Permits and Water Licenses. General prohibitions make it an offence to:

- Hunt (except traditional subsistence harvesting), disturb, hold in captivity, or destroy any animal within, or remove wildlife from, a park;
- Possess any wildlife killed or procured from a park;
- Disturb or destroy a nest, lair, den, or beaver house or dam in a park;
- Touch, feed, or entice wildlife in a park to approach by holding out or setting out foodstuffs or bait of any kind;
- Release any exotic wildlife within a park;
- Fish within a park without a permit (additional prohibitions and general provisions apply for those with permits);
- Shine a moveable light having a voltage greater than 4.5 volts in any area frequented by wildlife between sunset and sunrise;
- Possess a firearm in a park unless the firearm is unloaded and is transported in a secure manner where no part of the firearm is exposed;
- Discharge a firearm in a park;
- Erect a sign without a permit (sign restrictions apply);
- Install a septic tank or dry privy in a park without permission from the superintendent;
- Store garbage in a park unless in an approved enclosure (approved by superintendent) or steel refuse containers that meet the following specifications: well-fitting and easily operated covers, painted outside, proper brackets for disposal vehicle attachment, free from cracks or major dents, proper base stands or wheels, of a size approved by the Superintendent;
- Litter or allow garbage to escape from vehicles;
- Remove, deface, damage, or destroy any flora or natural objects in a park, without a permit;
- Pollute any watercourse;
- Obstruct or divert any watercourse without a permit;
- Take water from the park for domestic or business water supply purposes without a permit; and
- Possess, store, and use explosives in a park without a permit.

Special authorization from a Superintendent is required to carry a firearm or trap where the firearm or trap is to be carried through the park for use outside the park.

Additional prohibitions may apply; refer to the *Canada National Parks Act* and its Regulations.

5.3.2 Migratory Birds Convention Act

Inquiries on migratory birds and the *Migratory Birds Convention Act* are to be directed to Environment and Climate Change Canada (ECCC).

Most bird species in Canada are protected under the federal *Migratory Birds Convention Act, 1994* (MBCA; Government of Canada 1994). Subsection 12 (1h) “prohibits the killing, capturing, injuring, taking, or disturbing of migratory birds or the damaging, destroying, removing, or disturbing of nests” whenever these species are found (i.e., federal and non-federal lands). To minimize disturbance to migratory birds on and near the Project (Bird Conservation Region B7), clearing activities should be avoided between May 1 to August 31. Although ECCC (2016) provides these timing restrictions as general industry guidelines to protect most birds, the onus remains with CZN to comply with the legislation even when working outside of the suggested timing restrictions.

The Act also prohibits the deposit of a substance harmful to migratory birds in waters, or in a place from which the substance may enter waters, frequented by birds.

5.3.3 Species at Risk Act

Inquiries on Species at Risk and the *Species at Risk Act* (SARA) are to be directed to Parks Canada (all Species at Risk in the NNPR) and ECCC (migratory birds and Species at Risk anywhere they occur (federal and non-federal lands).

The federal *Species at Risk Act* (SARA) protects plant and wildlife species from becoming extinct or lost from the wild, provides for the recovery of species that are at risk (Extirpated, Endangered, Threatened), and promotes the management of Special Concern species to prevent further loss (Government of Canada 2016). The SARA prohibitions apply to all wildlife species, and their critical habitat, that are listed on Schedule 1 as Extirpated, Endangered, or Threatened (i.e., listed species). General prohibitions under the Act do not apply to species listed on Schedule 1 as Special Concern. Table 2 provides the conservation status of species known to occur near the WR.

The SARA contains general prohibitions, that apply wherever these species are found, that make it an offence to:

- Kill, harm, capture, or take an individual of a species listed in Schedule 1 of SARA as endangered, threatened, or extirpated.
- Possess, collect, buy, sell, or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened, or extirpated.
- Damage or destroy the residence (e.g., nest or den) or any part of the critical habitat of one or more individuals of a species listed in Schedule 1 of SARA as Extirpated, Endangered, or Threatened (if a recovery strategy has recommended the reintroduction of that Extirpated species into the wild in Canada).

These prohibitions apply to:

- All Extirpated, Endangered, and Threatened species listed in Schedule 1 of SARA when found on lands under the authority of Parks Canada.
- All Extirpated, Endangered, and Threatened migratory birds listed in Schedule 1 of SARA and protected by the MBCA, anywhere they occur (federal and non-federal lands).

There are additional provisions (Section 34[2]) that allow the federal government to apply SARA regulations (e.g., via an Emergency Order) to Schedule 1 species located on private or territorial lands should they determine that the territorial government is not fulfilling their commitments (e.g., under the national Accord for the Protection of Species at Risk) to protect federally listed species.

Under certain circumstances, SARA (Section 73) allows for permits to be issued or agreements to authorize activities that would be in contravention of the Act (i.e., activity affecting a listed species, any part of its critical habitat, or an individual's residence). The Competent Minister (Parks Canada within NNPR) has authority to issue permits when each of the conditions are met:

1. All reasonable alternatives to the activity that would reduce the impact on the species have been considered, and the best solution has been adopted;
2. 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
3. The activity will not jeopardize the survival or recovery of the species.

Subsection 79(2) specifies that the responsible authority is required to take measures to monitor the adverse effects of the project on listed wildlife species and their critical habitat. Measures taken to monitor the adverse effects must be consistent with any applicable recovery strategy or action plan. In addition, it is best practice to confirm that measures taken to monitor adverse effects on species of Special Concern be consistent with relevant management plans for those species.

5.3.4 Northwest Territories Wildlife Act

Inquiries on all species including big game species on territorial land and the NWT *Wildlife Act* are to be directed to the Department of Environment and Natural Resources (ENR).

The NWT *Wildlife Act* states that operators of industrial projects requiring a WMMP will need it approved by the Minister of ENR and the WMMP will be binding and enforceable.

The *Wildlife Act* and applicable regulations provide protection to all wild animals in the NWT, including bird species not protected under the *Migratory Birds Convention Act* (e.g., raptors), mammals, amphibians, and all other vertebrates and invertebrates in the NWT. The *NWT Wildlife Act* states in Sections 51 and 52 that no person shall, without a permit, 1) damage, destroy, or take a bird egg, an occupied nest, or the nest of a raptor that is either occupied or unoccupied, 2) damage or destroy a den, beaver dam or lodge, muskrat pushup, or bat summer maternity roost, or 3) disturb or harass big game (big game includes coyote, wolf, wolverine, grizzly and black bears, caribou, moose, bison, and Dall's sheep) and raptors.

However, a person may chase a bear away from a camp or its immediate area, if necessary, for the protection of human life or property (use of a vehicle permitted). Similarly, a person may injure or kill wildlife if necessary, for the protection of life or property. In the event of wildlife injury or death for this purpose, it must be reported without delay to a wildlife officer including the location of the wildlife. However, Section 56(4) indicates that killing wildlife for the defense of life or property isn't defensible if it results from human-related mismanagement.

In the rare instance of accidental injury or mortality of a big game species or Species at Risk (refer to Table 2) on territorial lands, CZN shall without delay, report the incident to an ENR wildlife officer (and Parks Canada) including the location of the incident, within 24 hours.

No person will feed or place/leave/deposit food, food waste or other substances that could attract wildlife. The Act also outlines provisions including the protection of habitat and inspections of waste management practices and attractants to dangerous wildlife.

5.3.5 Species at Risk (NWT) Act

Inquiries on all species at risk on territorial land and the *Species at Risk (NWT) Act* are to be directed to ENR.

The *Species at Risk (NWT) Act* prevents the extirpation and extinction of species in the NWT by establishing the roles and responsibilities of the Government of NWT and its citizens to assess, protect, and recover Species at Risk (Government of NWT 2010). The Act applies to any wild animal, plant, or other species managed by the Government of the Northwest Territories on both public and private lands. The Act recognizes Indigenous and treaty rights, and land claim agreements in respect to Species at Risk.

The Act applies to all species assessed by the Species at Risk Committee to be of Special Concern, Threatened, Endangered, Extirpated, and/or Extinct (Table 2). Destruction of any part of the species designated habitat is prohibited. It should be recognized that the commissioner on the recommendation of the Minister may impose legislation regarding species and species habitat:

- Requiring the doing of things that may conserve the species;
- Prohibiting activities that may adversely affect the species;
- Respecting the harvest of the species, including the establishment of a system of quotas, authorizations or permits;
- Prohibiting killing, harming, harassing, capturing or taking an individual of a species;
- Prohibiting the buying or otherwise acquiring, selling, leasing, trading, bartering, or offering for sale or lease an individual of a species or any part or derivative of such an individual;
- Prohibition of possessing an individual of a species or any part or derivative of such an individual;
- Prohibiting importing or exporting an individual of a species or any part or derivative of such an individual;
- Requiring the doing of things that may conserve the habitat or area;
- Prohibiting activities that may adversely affect the habitat or area;
- Imposing prohibitions against damaging or destroying the habitat or area;
- Controlling, restricting or prohibiting any use of, access to, or activity in the habitat or area; and
- Controlling, restricting or prohibiting the release of any substances in or into the habitat or area.

6.0 POTENTIAL PROJECT EFFECTS

Wildlife and wildlife habitat have the potential to be adversely affected by the WR in the absence of (or improper implementation of) mitigation measures, including SOPs and adherence to BMPs.

Direct and indirect potential effects, such as habitat loss and alteration, wildlife mortality and harm, and sensory disturbances that could result in changes to local wildlife distribution, behaviour, and/or abundance, have the potential to occur throughout the WR. Effects on wildlife and wildlife habitat were predicted in the DAR as within a local geographic extent, of low significance when mitigation is applied, and generally reversible upon road closure.

Table 3 outlines possible adverse effects that could occur because of WR activities and references the related mitigations within this Plan to avoid and or limit potential effects (Section 7). Detailed descriptions of effects and mechanisms of effects on wildlife are presented in the Developers Assessment Reports (Golder 2010 and Tetra Tech EBA 2015) and summarized in Table C (see Tables section) specific to key harvest species and Species at Risk.

Table 3: Summary of Potential Winter Road Effects on Wildlife and the Plan Sections that Describe the Applicable Mitigation

Effect	Mechanism of Effect	Mitigation (detailed in Section 7.0)				
		On-Site Education and Awareness Training (Section 7.1)	Restricted Activity Periods & Setback Distances (Section 7.2)	Habitat Loss & Alteration Management (Section 7.3)	Wildlife Hazard Management (Section 7.4)	Sensory Disturbance Management (Section 7.5)
Habitat Loss and Alteration	All WR activities	✓		✓		
	Release of deleterious substances	✓		✓		
	Changes to local hydrology			✓		
Wildlife Mortality and Harm	All WR activities		✓		✓	
	Human-wildlife conflicts	✓	✓	✓	✓	✓
	Attracting and or habituating wildlife	✓		✓	✓	
	Wildlife-equipment/vehicle collisions	✓	✓	✓	✓	✓
	Access control and hunting/trapping				✓	
	Improved predator access and travel				✓	
	Obstructing or reducing movement/distribution			✓	✓	✓
Sensory Disturbance	All WR activities, including the WR itself	✓	✓	✓	✓	✓

7.0 MITIGATION

CZN is committed to avoiding and limiting effects to wildlife and wildlife habitat from the WR by applying appropriate mitigations, monitoring the mitigation's effectiveness once implemented, and improving mitigations following the principles of adaptive management and incorporation of Dene Knowledge.

Mitigation is used to avoid and/or reduce potential effects to wildlife and wildlife habitat, to the extent possible and in accordance with adaptive management strategies. Mitigations follow commitments made by CZN and reflect applicable territorial and federal regulations and land use requirements. CZN will maintain SOP's, BMP's, and Project-specific mitigation approaches to achieve these overall objectives:

1. Standard Operating Procedures (SOPs): Consist of CZN's standardized instructions to perform routine tasks in a consistent and safe manner (Appendix B). These will be updated to incorporate newly acquired information including Dene Knowledge.
2. Best Management Practices (BMPs): Practices usually developed by regulators and/or developers, provided to the public as guidelines for the desired activities and/or outcomes on public lands (Appendix C). These are to be used as guidance and where there is any discrepancy between the BMPs and the project-specific mitigations, the project-specific mitigations apply.
3. Project-Specific Mitigations: Mitigations specific to the WR and/or potentially affected species to avoid and/or limit potential effects (described in the sections below). These may also be updated to incorporate newly acquired information based on monitoring and Dene Knowledge.

Project-specific mitigations are intended to first avoid effects to wildlife and wildlife habitat, and when unavoidable, to limit effects to the extent possible. Effects will be avoided by adapting, rescheduling, and/or relocating Project-related activities. As an example, during pre-development planning, the Access Road alignment was relocated away from sensitive wildlife habitats in the Polje by-pass, Silent Hills, Wolverine-Grainger Gap, and Nahanni Front Range to address concerns raised by the NDDB and Parks Canada.

Common and effective means of mitigation also include seasonal avoidance (i.e., restricted activity periods) when wildlife is most sensitive to disturbance (e.g., denning), and establishing setback distances from Project-related activities.

When avoidance cannot be achieved, mitigation to limit effects or the likelihood of effects to the extent possible will be implemented. These mitigation measures are drawn from the Prairie Creek Mine and All-Season Road environmental assessments, and other EA-related documents including those of other mines and access roads. Many of these other Projects have developed practical and effective mitigation and have been integrated within this Plan. Applicable mitigations were reviewed from the following other recent NWT resource development projects and access roads:

- Tlicho All-Season Road
- Inuvik to Tuktoyaktuk Highway
- Gahcho Kue Mine
- Avalon Nechalacho Project

7.1 On-Site Education and Awareness Training

Effective employee and contractor training is an important mitigation strategy to avoid adverse effects to wildlife and wildlife habitat. Regular training of, and reminders to, employees and contractors will be carried out throughout the Project that are appropriate to their tasks and responsibilities. All onsite personnel (employees and contractors, including pilots) will participate in a detailed site orientation either immediately prior to and/or when arriving to site that will include general wildlife education and a more specific discussion regarding the WMMP and wildlife-related SOPs and BMPs, how to avoid or limit human-wildlife conflict.

Employees and contractors will be made aware of big game (including key harvest species) and the conservation status of all Species at Risk that could be encountered within the Project area and known areas of occurrence. Staff and contractors will also be made aware of the potential for these species to use anthropogenic structures and habitats, the reporting protocol if the species are found, and possible mitigation responses.

Training specific to wildlife will be delivered by the QEP. Detailed on-site training records will be maintained by the QEP and the Construction Manager.

On-site education and awareness training will be delivered to all employees and contractors either immediately prior to the Project and/or when arriving to site and will include:

7.1-1	General	Responsibilities of all site personnel and contractors for environmental protection.
7.1-2	Acts & Regulations	SARA, CNPA, MBCA, and the <i>Wildlife Act (NWT)</i> prohibitions, species to which the prohibitions apply, and the species' habitat and their residence (e.g., nests, dens).

7.1-3	Attractants	Procedures regarding proper storage, transfer, and disposal of waste, wildlife attractant management, and the possible implications of food conditioning and unsecured wildlife attractants.
7.1-4	Deterrent Procedures	Several on-site employees will have training to deter wildlife and respond to wildlife incidents. There will be two trained employees, minimum, on site at all times.
7.1-5	Deterrent Procedures	Instruction to Dene Monitors, QEP, and Mine management (in communication with ENR and or Parks Canada, where necessary) on the proper use and safe application of deterrents to protect worker safety and respond appropriately with deterrents.
7.1-6	Harassment	Project-related employees and contractors are prohibited from harassing wildlife.
7.1-7	Spill & Emergency Response	Accidental spill and emergency response, including rapid deployment and containment approaches, as outlined in the Spill Contingency and Emergency Response Plan.
7.1-8	Species Identification	Identification of Species at Risk potentially in the area (using camp posters), potential use of anthropogenic structures and habitats, and reporting procedures.
7.1-9	Species Occurrence	Areas of known occurrence, including nests and dens.
7.1-10	WMMP	Responsibilities of all site personnel and contractors to follow CZN's wildlife-related mitigation and SOPs outlined in the WMMP and other management plans (e.g., Traffic Control Mitigation and Road Operations and Maintenance Plan). Applicable SOPs, BMPs, and mitigations and monitoring programs including reporting procedures of wildlife observations, wildlife incidents reporting, and instructions to avoid disturbing wildlife and wildlife residences will be discussed.

7.2 Restricted Activity Periods and Setback Distances

Wildlife and their nests, dens, staging, overwintering, and feeding areas should be avoided during sensitive time periods. WR activities are scheduled to occur during the winter. This schedule avoids the sensitive bird nesting (May 1 to August 31), caribou calving and post-calving (May 1 to July 15), Dall's Sheep lambing (May 1 to June 15), Collared Pika breeding (early May to early July), and fox and wolf denning (May 1 to July 15, and May 1 to Sept 15, respectively) periods.

Despite avoiding the sensitive periods of the above species, certain WR activities will occur during sensitive overwintering periods for others. When Project activities occur during sensitive wildlife periods, setbacks will be established and will be considered the minimum distance from which Project activities should occur. Restricted activity periods and setback distances applicable to the WR are provided in Table 4.

If Project activities cannot be scheduled to avoid sensitive periods and/or relocated outside the setback distances and/or there is a risk of contravening one of the regulatory requirements outlined in Section 5.3, additional mitigation to limit potential effects will be implemented, as outlined in the WMMP, and/or recommended by the QEP, ENR, ECCC, and Parks Canada. Consultation with, and possibly permits from, Parks Canada, ECCC, and or ENR is required in order for Project activities to occur during the timing restrictions and within setback distances.

Table 4: Timing Restrictions and Setback Distances for the WR

Wildlife or Wildlife Habitat	Sensitive Period	Sensitive Feature	Specific Conditions	Minimum Setback Distance
General				
All	Year round	N/A	Helicopter overflights	Territorial lands: 300 m above ground level (agl) NNPR: 600 m agl
Mammals				
Bats	Sept. 15 – Jun. 1 ¹	Hibernacula	Winter blasting when near the poljes approx. KP 52 to 62 (an area of potential hibernacula; Appendix A Map Book)	2 km
Bear dens (Grizzly, Black bear)	Sept. 30 – May 31	Den	Winter Project activities when den occupied (or suspected)	800 m
		Den	Winter blasting when den occupied (or suspected)	1.5 km
Bison	Mar. 1 – Jul. 15	N/A	General Project activities when bison present	500 m
Caribou ²	Dec. 1 – Apr. 30	Entire range	Blasting in boreal caribou range	Activity to be minimized to extent possible
	Year round	N/A	Blasting when caribou present	1.0 km
	Year round	N/A	General Project shut-down distance when caribou present	500 m
	Dec. 1 – Apr. 30	N/A	Helicopter overflights	600 m agl
Collared Pika	Snow period	Suitable Talus	General Project activities	Do not disturb/destroy talus and the nearby (10 m) meadow
	Snow period	Suitable Talus	Snow storage and snow banks	10 m
Dall's Sheep	Year round	N/A	Blasting when Dall's Sheep present	1.0 km
			Helicopter overflights	Fly below the sheep and place a ridge between helicopter and sheep
Moose	Year round	N/A	Blasting when Moose present	1.0 km
			Helicopter overflights	300 m agl, to extent possible
Wolverine	Year round	N/A	Blasting when Wolverine present	1.0 km
	Feb. 15 – May 31	Den	General Project activities when den occupied (or suspected)	2.0 km
Beaver	Year round	Lodge	General Project activities	250 m
Muskrat	Year round	Pushup	General Project activities	250 m
Mineral Lick	Apr 1 – Jul 15	Mineral Lick	General Project activities	250 m
			Helicopter overflights	1.0 km
Birds				
General Birds	May 1 – Aug 31	Nest	General Project activities	Various
General Raptors	Mar 1 – Sept. 1	Nest	General Project activities	1.5 km
	Sept. 2 – Feb. 28	Nest (unoccupied)		500 m
Trees supporting stick and/or cavity nests	Year round	Nest	General Project activities when nests are found	Do not cut down

Adapted from AANDC (2011) and Environment Canada (2009).

Notes: Seasonal timing is a general guideline; the exact timing and duration of wildlife sensitive periods depends on the species and may vary annually.

1. Although specific periods of hibernation are unknown in the NWT, it is predicted that hibernation extends from late September to early June, in association with insect availability.
2. A restricted activity period (May 1 to July 15) for blasting that occurs from KP 5 – 10 and KP 40 – 50 and a 2 km blasting setback to caribou calves will be incorporated in the subsequent phases of the Project since the WR occurs outside calving season.

7.3 Habitat Loss and Alteration Management

Habitat loss and alteration can occur through the destruction, degradation, or fragmentation of wildlife habitat from WR activities including accidental spills and changes to natural drainage patterns. The following mitigation strategies will be implemented within the Project area to avoid or limit habitat loss and habitat alteration:

7.3-1	Construction Methods	Construct the WR in accordance with best standard industry practices in relation to ground disturbance, hydrology maintenance, and construction in permafrost areas.
7.3-2	Footprint	Maximize the use of the 1980s winter road disturbance to limit the size of the Project footprint.
7.3-3	Footprint	The WR avoids known wildlife, landscape, and cultural areas (e.g., Caribou and Moose lowland areas east of Nahanni Range, karst features and the poljes) identified by Indigenous groups.
7.3-4	Footprint	Collect the footprint spatial data, post-construction of the WR, and provide the digital footprint to the Dehcho Land Use Planning Committee and ENR (and others as requested) to incorporate into ongoing cumulative effects monitoring across the Dehcho.
7.3-5	Off-road Travel	Restrict all vehicles to the designated road and work areas within the designated footprint.
7.3-6	Spills	Follow the WR Spill Contingency and Emergency Response Plan procedures and train staff to quickly respond to an accidental spill. These Plans includes provisions for rapid deployment of cleanup crews and for containment and clean-up of spilled material and contaminated surfaces. Spill response actions for the Phase 1 WR is outlined in Section 6.4 of the Spill Contingency Plan (Tetra Tech 2021d).
7.3-7	Spills	Fuel storage and handling will follow the Spill Contingency Plan (Tetra Tech 2021d) and the Land Use permit (MV2014F0013 and PC2014F0013) requirement for fuel storage.
7.3-8	Timber Collection	CZN will notify the community of Nahanni Butte of opportunities to undertake timber recovery.

7.4 Wildlife Hazard Management

The WR includes the following general mitigation to reduce the likelihood of wildlife mortality and harm during Project activities:

7.4-1	Harm/Mortality	Suspend all applicable Project activities if wildlife are in imminent risk of harm. Follow procedures outlined in <i>SOP #1 Reporting, Responding to, and Deterring Wildlife</i> in the event of wildlife mortality or injury.
7.4-2	Harm/Mortality	Employees and contractors to report all Project-related wildlife mortalities/injuries immediately to a Dene Monitor, the QEP, or CM. When responding to any injured or killed animals, the procedures outlined in SOP #1 are to be followed.

All big game species and Species at Risk harmed as a result of the Project will be reported to Parks Canada and or ENR within 24 hours, including any project-related collisions with wildlife when traveling on the WR or an NWT highway. Reporting will be done in accordance with the procedures outlined in SOP #1.

7.4-3	Line of Sight	Use windrows, lumber, or other brush clearing material to reduce line of sight (where required) along intersecting linear features. The height of the windrow is dependent upon the terrain; however, the BC Ministry of Forests, Lands, and Natural Resource Operations and BC Ministry of Environment (2015) suggest an adequate visual screen is comprised of vegetative cover capable of hiding 90% of a standing adult caribou from view at a distance of 60 metres.
7.4-4	Wildlife Residences	Avoid the destruction of nests, dens, beaver lodges and dams, muskrat push-ups, and bat hibernacula, when encountered (NWT <i>Wildlife Act</i> , CNPA, SARA, MBCA). Suspend all applicable Project activities if wildlife residences may be destroyed or disturbed.
7.4-5	Wildlife Residences	Complete the aerial Fall Survey described in the Den and Nest Pre-Clearing Monitoring procedure, on and near the proposed Project footprint, prior to clearing activities (refer to Section 8.1.1).
7.4-6	Wildlife Residences	Scan for nest and dens while clearing as described in the Den and Nest Pre-Clearing Monitoring procedure (refer to Section 8.1.1).
7.4-7	Wildlife Residences	Suspend all applicable Project activities if wildlife dens, dams, push-ups, raptor nests, and/or hibernacula may be destroyed by the WR activities. Follow protocols outlined in Section 8.1.1 and SOP #1, including consultation with ENR and or Parks Canada.

7.4.1 Human-Wildlife Conflicts and Wildlife Attractant Procedures

The WR includes the following mitigations to prevent wildlife mortality by reducing the risk of human-wildlife conflicts and properly managing Project attractants. Proper waste management by deterring wildlife attraction to the Project is a key element of effectively managing human-wildlife conflicts. CZN's Waste Management Plan provides a framework for the handling and disposal of attractants such as garbage, food wastes, and other edible and aromatic substances. The Waste Management Plan must be reviewed in association with the WMMP, and the steps provided in SOP #2 *Reducing Wildlife Attractants* will be followed by all individuals on-site.

7.4-8	Aggressive/ Dangerous Animal	Warnings over two-way radio will be given if there is an aggressive or potentially dangerous animal within the Project area.
7.4-9	Aggressive/ Dangerous Animal	Incidents of wildlife exhibiting aggressive behaviour will be reported immediately to a Dene Monitor and QEP to respond. Employees will be instructed to immediately leave areas and/or seek shelter where wildlife are exhibiting such behaviours or when they feel there may be danger.
7.4-10	Aggressive/ Dangerous Animal	CZN's response to conflicts with potentially dangerous wildlife is included in SOP #1. A Dene Monitor and the QEP act to avoid/minimize risk of human-wildlife conflicts, respond to incidents, and consult with and report to ENR and or Parks Canada.
7.4-11	Deterrents, Specific to NNPR	Unless there is imminent danger to people or property, no deterrents shall be used in NNPR without Parks Canada authorization. Parks Canada's 24 hour Emergency Line shall be called to approve wildlife deterrence during non-threatening encounters.

7.4-12	Deterrents	Use the least intrusive deterrent method first (SOP #1). A Dene Monitor, with support from the CM or the QEP are responsible for gradually increasing the deterrent level, as the situation requires, for the safety of wildlife and people. Once the animal has left the Project area, the deterrent will be stopped.
7.4-13	Food Attractants	Feeding wildlife is prohibited.
7.4-14	Food Attractants	No pets allowed.
7.4-15	Food Attractants	Littering is strictly prohibited.
7.4-16	Food Attractants	All employees and contractors will follow the procedures outlined in SOP #2 to reduce wildlife attractants through proper waste management.
7.4-17	Food Attractants	Salt will not be used for road maintenance to avoid potential wildlife attraction to the road.
7.4-18	Food Attractants	Collect and store food and food wastes, petroleum products, and other putrescible matter in bear-proof containers and/or in a manner inaccessible to wildlife, as applicable. Transport the waste off-site for disposal and or treatment.
7.4-19	Food Attractants (carcasses)	Wildlife carcasses encountered in the Project area will be recorded with GPS location in the Wildlife Observation Log following SOP #1. The QEP will notify ENR and or Parks Canada within 24 hours. A Dene Monitor, with support from the QEP, will dispose of carcasses upon receipt of approval from regulators. Carcasses suspected of disease must be disposed following guidance from ENR and or Parks Canada. Large carcasses and or gut-piles found along the WR must be removed with haste to avoid attracting other wildlife and increasing the risk of human-wildlife conflict and animal-vehicle collisions. Carcasses will first be offered to the Nah?a Deh?e Dene Band for traditional use if in suitable condition and when disease is not suspected. If NDDB declines, Environment and Climate Change Canada (2017) recommend that disposal occur at facilities licenced to accept special waste, and the carcass/gut pile should be buried immediately in a dedicated area of a landfill cell with at least 2 m of cover material. CZN will identify a solid waste disposal facility that is licenced to accept an animal carcass/gut pile.
7.4-20	Food/Shelter Attractants	A Dene Monitor, supported by the QEP, to audit and manage, where necessary, Project-related attractants throughout the Project life (refer to Section 8.1.4 Wildlife Hazard Mitigation) to inform determination of adaptive management, if required.
7.4-21	Shelter Attractants	The WR camp facilities (e.g., skid-camps) will be monitored for sheltering wildlife. If an animal gains access to a camp, it will be immediately removed by way of non-lethal deterrent action. Capture and handling is not permitted without prior consultation and direction from ENR, Parks Canada, and or ECCC as special permits may be required. No nests or dens are to be disturbed. Measures will be taken to secure the site from future access by wildlife. Refer to Section 8.1.4 <i>Wildlife Hazard Mitigation</i> .
7.4-22	Wildlife Incident Reports	Report all instances of wildlife deterrent use and or harm of big game species/Species at Risk. The QEP will prepare a Wildlife Incident Report and will forward the information to ENR and Parks Canada within 24 hours.

7.4-23	Wildlife Sightings	All employees and contractors will follow the procedures outlined in SOP #1 to report wildlife sightings in the Wildlife Observation Log or to notify a Dene Monitor, QEP, or CM to enter the sighting for them. The Wildlife Observation Log will be monitored by the QEP and a Dene Monitor to inform determination of adaptive management. If big game species or Species at Risk are repeatedly observed on/near the same location along the WR, corrective action will be taken, if required (e.g., mobile signs; refer to Sections 8.1.5 and 8.1.6).
7.4-24	Wildlife Sightings	If big game or Species at Risk are encountered or affected by the Project, the primary mitigation measure will be avoidance.
7.4-25	Wildlife Sightings	Employees and contractors to report human-wildlife conflicts (including with Wood Bison) and resulting incidents to a Dene Monitor and the QEP to respond.

7.4.2 Road, Access, and Traffic Procedures

The WR includes mitigation to prevent wildlife mortality by following safe procedures along the road, restricting access along the WR, and implementing traffic procedures:

7.4-26	Access Control	Access control includes the operation of a checkpoint to deter and record non-Project vehicle access when the Liard River Ice Bridge is open. The checkpoint will be staffed by representatives of the NDDB and will be located at the WR-Nahanni Butte road junction.
7.4-27	Access Control	Access road and mine management staff will be notified of any non-Project vehicle use of the WR or evidence of land use, such as hunting, fishing, camping, or firewood harvesting. This information will be recorded by the observer or a Dene Monitor in the Wildlife Harvest Datasheet (refer to Section 8.2.2).
7.4-28	Access Control	Monitor vehicle access along the WR at the checkpoint (refer to Sections 8.2.2).
7.4-29	Access Control	In NNPR, aircraft are to maintain a minimum flying altitude of 600 m above ground level (agl) or greater (except for approaches and take offs) set under Transport Canada's Aeronautical Information Manual for flying over national parks. When flying outside of national parks, ENR's <i>Flying Low?</i> guidelines (BMP #4) recommend maintaining a minimum flying altitude of 300 m agl or greater (except for approaches and take offs).
7.4-30	Access Control	When appropriate, BMP's #5 and 6 for <i>Flying in Caribou County</i> and <i>Flying in Sheep Country</i> , respectively including maintaining a minimum flying altitude of 600 m during sensitive times of the year, avoid flying directly towards the animals, and avoid flying over areas where wildlife have been seen in the past. These BMPs are intended particularly for Project helicopters that may be working/landing beyond the designated airstrip; not for fixed-wing aircraft landing/taking off from the airstrip. Onsite helicopter pilots working/landing, as part of PWR activities, will attend daily tailgate meetings where wildlife have been seen recently (i.e., past 3 days of Wildlife Observation Logs) and in the past will be discussed (refer to Section 8.1.5).
7.4-31	ATVs	Non-Project use of all-terrain vehicles (ATVs) and snowmobiles will be deterred as much as possible (Commitment from PR#55).
7.4-32	Harvesting	Project employees and contractors are prohibited from hunting, fishing, trapping, and harvesting wildlife while working within Project areas (i.e., within the WR corridor and at the Prairie Creek Mine).

7.4-33	Harvesting	Monitor vehicle access and wildlife harvesting along the WR at the checkpoint (refer to Sections 8.2.1 and 8.2.2, respectively).
7.4-34	Harvesting	CZN to provide support to NDDB to develop a harvest monitoring program to track and report on patterns and levels of harvest associated with the WR. A checkpoint station attendant, supported by the QEP, will monitor access and wildlife harvesting along the WR (refer to Sections 8.2.1 and 8.2.2, respectively).
7.4-35	Harvesting	Participate, as required, in discussions with the proprietors of the Nahanni Butte D/OT/02 outfitting zone (if an outfitting permit remains current), NDDB, and ENR regarding non-Indigenous access to the Nahanni Range portion of the outfitting zone and hunting agreements along and near the WR. This includes total harvests reported from this portion of their outfitting zone.
7.4-36	Signs	Posted signage is described in the Traffic Control Mitigation and Road Operations and Maintenance Plan.
7.4-37	Signs	Highly visible signage will be installed along the WR indicating the NNPR boundaries.
7.4-38	Signs	A movable signage system will be employed along the WR to inform drivers of "caution zones", (areas requiring extra vigilance), based on recent and frequent wildlife activity and possible vehicle-conflict zones (refer to Sections 8.1.5 and 8.1.6). A Dene Monitor, under direction of the QEP, will maintain the signage (current based on animal activity reported on the roadway; i.e., Wildlife Observation Log and Road Survey monitoring). Wildlife caution sign locations will also be provided only to Project-related vehicles at the checkpoint (refer to SOP #1 <i>Reporting, Responding to, and Deterring Wildlife</i>). Non-project drivers will not be alerted to the location of wildlife caution signs to minimize the likelihood of over-harvesting in the identified zones.
7.4-39	Snow Removal	Maintain appropriate snow removal practices by creating 10 m wide wildlife breaks, at least every 300 m when brush/organic and snow piles exceed 1 m in height so that wildlife can readily move off the road and through breaks as vehicles approach (AANDC 2011).
7.4-40	Snow Removal	Prohibit the storage or deposition of snow, rock, or road bed debris on pika talus sites and their available meadow, as determined by construction monitoring (i.e., meadow that is within 10 m of the talus site; refer to the Appendix A Mapbook for snow/construction debris exclusion zones or Figure D2 construction survey areas where this mitigation is required to avoid four particular talus sites and nearby meadows). Brightly painted rebar are installed at each end of the talus sites to warn equipment operators of the pika exclusion zones. Refer to the pika baseline report (Tetra Tech 2021b) for a description of these four talus sites.
7.4-41	Travel Procedure	Authorized road users along the WR will follow the steps outlined in SOP #1 <i>Reporting, Responding to, and Deterring Wildlife</i> to prevent risk of wildlife mortality and injury.
7.4-42	Travel Procedure	Vehicle speed will be limited to 30 km/hr on the WR.
7.4-43	Travel Procedure	Vehicle speeds will continue to be 30 km/hr when in the wildlife caution zone, as depicted by the caution zone signs; however, drivers must remain extra vigilant for wildlife in the caution zone.
7.4-44	Travel Procedure, Specific to Caribou	If caribou are reported on the WR or within 500 m of it, traffic or activity will cease at least 500 m from (or at first observation of) the animal(s) and all headlights turned off until the animal is at least 100 m away or 5 minutes after last visual. Once traffic resumes, speed will continue to be 30 km/hr.

7.4-45	Travel Procedure, Specific to Caribou	If caribou are reported beyond 500 m of the WR, vehicle/equipment operators will remain vigilant for caribou within 1 km on either side of the sighting.
7.4-46	Travel Procedure	Traffic will stop for all wildlife seen crossing or attempting to cross the WR. Headlights are to be turned off once the vehicle is stopped to allow the animal to cross. All employees/contractors are to remain in the vehicle. In NNPR, big game/Species at Risk are given 2 hrs to move away on their own, without the use of deterrent action. Otherwise, an authorization from Parks Canada to proceed with deterrents may be requested. Contact the Dene Monitor/QEP/CM to request authorization and instruction from Parks Canada to proceed. On territorial land, traffic may resume, at 30 km/hr, once the big game/Species at Risk is at a safe distance (50 m) across and or five minutes after last visual. The exception is a 100 m safe distance for caribou from the road before traffic may resume (SOP #1).
7.4-47	Wildlife Sightings	All employees and contractors will follow the procedures outlined in SOP #1 to report wildlife sightings in the Wildlife Observation Log.
7.4-48	Wildlife Sightings	The QEP, with support from the CM and/or a Dene Monitor will only notify project-related road users the location of wildlife caution zones to curtail hunting potential.

7.4.3 Toxic Substance Procedures

Management measures that are or will be in place with respect to potential contaminated substances include:

7.4-49	Equipment Maintenance	Regular and appropriate equipment and truck maintenance.
7.4-50	Equipment Maintenance	Equipment and trucks equipped with industry-standard emission control systems.
7.4-51	Storage	Only approved containers at designated locations will be used for storing hazardous materials. All materials that may be an attractant to wildlife must be stored in bear-proof containers and/or stored in a manner inaccessible to wildlife. Fuel containment requirements are detailed in Table 3 of the Spill Contingency Plan (Tetra Tech 2021d).
7.4-52	Storage	Use proper fuel containment and explosive storage (if required) and handling techniques. The existing fuel storage safety at the mine site (on site since 1981) will be continued. The system uses double-walled diesel fuel tanks within a bermed area to contain any potential spill and standard supplier-provided sealed drums of other potentially hazardous materials, including oils, grease, and antifreeze (ethylene glycol).

7.5 Sensory Disturbance Management

Conducting Project-activities beyond the recommended setback distances during sensitive wildlife periods (Table 4) will help to avoid disturbing wildlife and comply with legislation (e.g., NWT *Wildlife Act*, CNPA). Additional mitigation that are or will be in place to limit sensory disturbances include:

7.5-1	Aircrafts	If big game species or Species at Risk are observed during helicopter flights, they will not be approached, followed, hovered above, or circled around. If they are within 2 km to Project-related footprints, their location will be noted for recording in the Wildlife Observation Log by the observers or reported to a Dene Monitor for recording.
7.5-3	Aircrafts	When appropriate, BMP's #5 and 6 for <i>Flying in Caribou County</i> and <i>Flying in Sheep Country</i> , respectively including maintaining a minimum flying altitude of 600 m during sensitive times of the year, avoid flying directly towards the animals, and avoid flying over areas where wildlife have been seen in the past. These BMPs are intended particularly for Project helicopters that may be working/landing beyond the designated airstrip; not for fixed-wing aircraft landing/taking off from the airstrip. Onsite helicopter pilots working/landing, as part of WR activities, will attend daily tailgate meetings where wildlife have been seen recently (i.e., past 3 days of Wildlife Observation Logs) and in the past will be discussed (refer to Section 8.1.5).
7.5-4	Blasting	Prohibit blasting when big game species and Species at Risk are within 1 km.
7.5-5	Blasting	Undertake a wildlife reconnaissance (aerial and or ground-based) by scanning adjacent slopes and surrounding areas prior to blasting if blasting should occur. Blasting is prohibited if big game species/Species at Risk are observed within 1 km of the blast site (refer to Section 8.1.3).
7.5-6	Blasting	Blasting in Boreal Caribou range (located roughly between the Silent Hills area and the Liard Highway) should be limited from December to April, should it be deemed necessary for construction.
7.5-7	Blasting	If blasting is required for road construction, dust control and blast mats will be implemented, as required.
7.5-8	Construction	Stage construction activities temporally and spatially by adopting a sequential development strategy.
7.5-9	Equipment Maintenance	Industry standard muffler systems will be installed on all power equipment.
7.5-10	Equipment/Traffic Management	All vehicle and equipment operators will follow the travel procedures outlined in SOP #1.
7.5-11	Lighting Sources	Construction sites will have lighting sources directed to limit the illumination of adjacent wildlife habitat.
7.5-12	Travel Procedure	Drivers will be discouraged from the use of engine retarder brakes, as much as is safe, to reduce noise.
7.5-13	Wildlife Residences	All on-site staff will avoid disturbing known bird and wildlife nests/dens, within the restricted activity periods and setbacks. If not able to achieve setbacks during a restricted activity period other options will be discussed with, and approved by, the regulator
7.5-14	Wildlife Residences	A biologist, a Dene Monitor, and/or the QEP will complete a Grizzly and Black Bear den survey, prior to clearing activities (refer to Section 8.1.1) to inform adaptive management and limit disturbances to occupied, or suspected occupied, dens.

8.0 MONITORING

Monitoring is required to understand WR-related effects on wildlife, test mitigation effectiveness and effects predictions made during the EA process and inform the adaptive management process to best manage potential wildlife effects.

The WMMP describes two types of monitoring programs:

1. **Mitigation Monitoring:** the active collection of data necessary to carry out mitigation, verify mitigations are implemented and maintained to avoid and limit wildlife and wildlife habitat effects, and act to improve the mitigation implemented (Table 5). The focus is on areas where mitigation is needed and where failed mitigation has a higher risk to wildlife and wildlife habitat (Table 5).
2. **Effects Monitoring:** the active or passive collection of data for analysis to detect changes potentially linked to the WR and associated activities. In general, effects monitoring is conducted within and beyond the WR footprint and is specifically related to potential Project effects that cannot be fully mitigated (as described in the EA process) or concerns identified by regulators and/or local Indigenous groups (Table B see Tables section). Effects monitoring focuses on big game (including key harvest species), Species at Risk, and other species identified by regulatory and/or local Indigenous groups for which the potential effects may not be fully mitigated. Table C (see Tables section) details the potential effects, mitigation, and monitoring for key harvest species and Species at Risk, including those species not directly interacting with the WR (e.g., bird species absent during the WR) and where effects are suitably mitigated.

Both types of monitoring programs are to be implemented before and or during Project activities, as appropriate. The primary intent of the pre-construction programs is to actively search for key wildlife with the overall objective of avoiding harm (especially to big game and Species at Risk) during construction.

The QEP and Dene Monitors are responsible for identifying Project options to avoid/limit effects on wildlife by avoiding, rescheduling, and/or relocating activities, as appropriate. The QEP will seek advice from GNWT, Parks Canada, and/or ECCC as required. The QEP and Dene Monitors have the authority to stop construction activities that pose an immediate risk to wildlife and wildlife habitat.

Table 5: Overview of Winter Road Monitoring

Effect	Mechanism of Effect	Den and Nest Pre-Clearing	Collared Pika Construction	Blast	Wildlife Hazard	Wildlife Obs. Logs & Incidents Reporting	Road Mortality Risk	Traffic	Wildlife Harvest	Northern Mountain Caribou	Boreal Caribou	Birds
Target Species:		Bears, Raptors & Bats	Pika	Big Game/Species at Risk	All Wildlife			Big Game	Species at Risk	Selected Species		
Habitat Loss and Alteration	All WR activities				✓							✓
	Spills, erosion, and release of deleterious substances				✓							✓
	Changes to local hydrology				✓							✓
Wildlife Mortality and Harm	All WR activities	✓	✓	✓	✓	✓						
	Human-wildlife conflicts				✓	✓		✓				
	Attracting and or habituating wildlife				✓	✓						
	Wildlife-equipment/vehicle collisions			✓		✓	✓	✓		✓	✓	
	Access control and hunting/ trapping							✓	✓	✓	✓	
	Improved predator access and travel					✓				✓	✓	
	Obstructing or reducing movement					✓	✓			✓	✓	
Sensory Disturbance	All WR activities, including the WR itself	✓	✓	✓	✓	✓		✓		✓	✓	

8.1 Mitigation Monitoring

8.1.1 Den and Nest Pre-Clearing

The objective of this pre-clearing monitoring program is to detect dens/nest before clearing in the restricted activity periods, and if found, to avoid disturbing/destroying dens and nests. Project activities are scheduled to occur in the winter when bird nests and most mammal dens are unoccupied. The potential to damage or disturb bear dens, unoccupied raptor nests, wolverine natal dens, beaver dams and lodges, and muskrat push-ups that are protected under legislation does, however, remain, and as such, pre-clearing surveys will be conducted. Parks Canada is also concerned that winter clearing has the potential to damage bat roosts and hibernacula (winter dens) and requested that bats be considered during WR pre-clearing monitoring.

For the purposes of the pre-clearing survey, dens, lodges/dams, push-ups, raptor nests, and bat roosts/hibernacula are collectively referred to as dens and raptor nests.

In 2017, 2018, and 2019, survey crews, together with local environmental monitors, walked the entirety of the WR alignment that requires clearing; while doing so, they specifically searched for dens as part of their required tasks. Survey crews walked the majority of the WR alignment again in 2021 and searched for dens, nests, and lodges. No dens have been located by the survey crews and local environmental monitors during any of the ground-based field surveys on the WR alignment.

Black Bears den from approximately early October to May. Black Bears may excavate dens or use hollow logs/trees, rock caves, and piles of human-made debris (Kolenosky and Strathearn ND; Clarkson 1993; Larivière 2001). Excavations are commonly under the base of standing trees or stumps, under fallen logs, or directly into the soil (Kolenosky and Strathearn ND). Baseline models predict Black Bear denning habitat is common in the vicinity of the WR (Tetra Tech EBA 2016)(Figure D1, see Appendix D).

Grizzly bears are sensitive to human disturbances, particularly during the denning period. Grizzly Bears den from approximately late October to June, depending on the age and sex class. Grizzly Bears excavate dens and use natural caves and rock crevices. A total of 12 dens or suspected bear dens were detected in 2019 during the Project's den pre-clearing survey and the 2022 baseline spring den surveys (Figure D1, see Appendix D). A preliminary grizzly den habitat suitability model along the portion of the Project within the NNPR will be updated annually based on the habitat characteristics at newly detected dens detected during pre-clearing monitoring as well as from the wildlife observation logs/incident reports. As the model develops with new den locations, it can be used to intensify den survey effort during pre-clearing and blast monitoring as well as inform mitigations in next Project phases.

During a meeting with Indigenous representatives on Aug 15, 2019 to discuss integration of Traditional Knowledge into draft management plans, CZN was advised that it is unlikely that bear dens will be observed during the pre-clearing survey since denning bears tend to avoid previously disturbed areas such as the 1980s winter road.

Beaver lodges and muskrat push-ups are occupied during WR activities and have the potential to be destroyed or disturbed. These dens occur along the Tetcela River, in the Wolverine Pass, and at various lakes, ponds, wetlands, and slow-moving streams throughout the area (Figure D1, see Appendix D). Previous observations of beaver lodges and dams, shown in Figure D1 likely include repeat sightings of the same lodge/dam.

Raptors can be expected to nest throughout the Project area in a variety of habitat types. Since raptors often return to the same nest site each year, their nests are protected from destruction and should be avoided to the extent possible. Raptors may be nesting along the entire Project alignment; however, the WR footprint that directly overlaps with the 1980s winter road has low stick-nesting potential, due to a lack of suitable nesting habitat. The 1980s winter road has yet to sufficiently regenerate with most sections dominated by shrubs and young trees which provide low raptor nesting potential. Refer to Figure D1 for the known raptor nest locations.

Based on wolverine surveys in Alberta, natal denning begins in late February and extends to May (Scrafford and Boyce 2015; Jokinen et al. 2019). Natal dens are generally associated with large boulders in talus slopes, downed logs, beaver lodges, old bear dens, and/or persistent snow banks that remain into late spring (e.g., ravines and leeward slopes, COSEWIC 2014). Wolverines are sensitive to human disturbances and may abandon dens and or avoid habitat as a result.

Bats will be occupying hibernacula (or winter dens) when WR activities occur. Parks Canada has advised that bat hibernacula are known to be present in caves along the South Nahanni River. In the area of the WR, caves and deep rock crevices have the highest potential as hibernacula, possibly occurring in the poljes south of the WR KP 57 and 58. Bats across Canada begin their state of hibernation (more specifically torpor) in late September to October and arouse in late April to early June (COSEWIC 2013). Although specific periods of hibernation are unknown in the NWT, it is anticipated that hibernation extends from late September to early June, in association with insect availability. Maternity roosts are in rock crevices and mature trees (i.e., tree cavities, underneath exfoliating bark) that are occupied in the summer, which is outside the activity period of the WR. Trees do not provide suitable over-wintering habitat for bats in the NWT due to exposure to freezing winter temperatures.

CZN intends to use a mini-mulcher to clear a narrow 3 m wide (approx.) wildlife monitoring trail along the WR from the Liard River (KP 156) to approximately KP 80. This mulcher section of the WR is dominated by patches of dense and open forests and shrublands. The trail would be cleared in early winter (October). Surveyor(s) will be able to safely monitor on snowshoes for dens and nests within the narrow right-of-way ahead of the mulcher. In dense forests, a QEP may support a Dene Monitor in the search for dens/nests. The main clearance of the full width of the WR (approximately 8 m either side of centerline) along this mulcher trail, will follow. A Dene Monitor will use a snowmobile along the mulcher trail to progress ahead of clearing equipment to search for dens/nests across the planned clearing width.

The section of the WR from approximately KP 80 to the mine site (KP 0) is considered to be sufficiently open for the surveyor(s) to gain access to monitor the full width of the WR a safe distance ahead of the equipment using a snowmobile without a mulching trail.

8.1.1.1 Overall Monitoring Approach

The Den and Nest Pre-clearing Monitoring Plan is summarized in Table 6, outlined below, and detailed in Appendix D *Den and Nest Pre-Clearing Procedure*.

Den and nest pre-clearing surveys are completed in two timeframes:

1. Late fall (between mid-October to early November): to search for dens and nests within the setback distances to the Project, potential avalanche control sites, and known den/nest areas; and
2. While clearing (Clearing Scan): to search for dens and nests within the WR footprint.

Table 6: Den and Nest Pre-Clearing Monitoring Summary

Purpose: Prevent Destruction of and Minimize Disturbance to Dens and Raptor Nests				
Monitoring Timeframe	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Late Fall	Location of dens/nests in relation to the WR Current occupancy status of dens	Mid-October/early November (dependent on snowfall)	Areas within the setback distances to the Project and potential avalanche control sites	Risk of destroying dens, harming the overwintering animal, and disturbing big game/Species at Risk during Project activities which are offences under federal and territorial legislation.

Table 6: Den and Nest Pre-Clearing Monitoring Summary

Purpose: Prevent Destruction of and Minimize Disturbance to Dens and Raptor Nests				
Monitoring Timeframe	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
While Clearing (Clearing Scan)	Location of dens and raptor nests (includes bat hibernacula)	Days before clearing	WR footprint	<p>Risk of raptor nest destruction (occupied and unoccupied) which is an offence under the NWT <i>Wildlife Act</i> and <i>CNPA</i>.</p> <p>Provides data on the location of individual dens and raptor nests within the setback distances to the WR to inform adaptive management and avoid destruction of and disturbance to dens and nests.</p>
Related Programs				
Wildlife Observation Logs and Incident Reporting: repeat sightings of wildlife and wildlife sign that may suggest a den/nest in area				

The objectives of monitoring is to locate dens and raptor nests, and if any are found, to avoid damaging or disturbing them when clearing during the restricted activity periods.

The late fall survey is completed by a Professional Biologist with support from Dene Monitors after the first snowfall which improves the detection of bear sign at and near the den. Local Parks Canada and/or ENR staff will be consulted to plan the field survey when local snow conditions are favourable. It is completed within 800 m of proposed winter clearing and within 1.5 km of potential avalanche control sites (refer to Figure D1 in Appendix D *Den and Nest Pre-Clearing Procedure*), which follows the setback distances for bear and raptor nests defined in Section 7.2. Areas on the other side of the mountain are excluded from the survey as they are unlikely to be affected by PWR activity, but intersecting valleys are included in the survey near potential avalanche control sites. Survey intensity is increased in areas of known bear dens. A professional biologist will lead this aerial survey and will be supported by two Dene Monitors. The location of dens and nests detected in relation to the WR will be identified and the occupancy status (occupied, unoccupied) of dens will be determined (ground-survey to confirm occupancy status, as required, and if safe access is available for the surveyors).

Den and nest searches continue during clearing (Clearing Scan). During this survey period, a Dene Monitor or a Dene Monitor and QEP together, will complete the survey depending on the progress of the clearing equipment. This is a ground-based survey of the WR footprint.

Adaptive management strategies described in Section 9.1 are to be employed when dens or nests are found to avoid the destruction and limit the disturbance. Bear and wolverine den locations are to be kept confidential between CZN and ENR and Parks Canada until the dens are naturally vacated.

Results from the Den and Nest Pre-Clearing monitoring also inform future den and nest pre-clearing surveys (if clearing continues) as well as other monitoring programs shown in Figure 3.

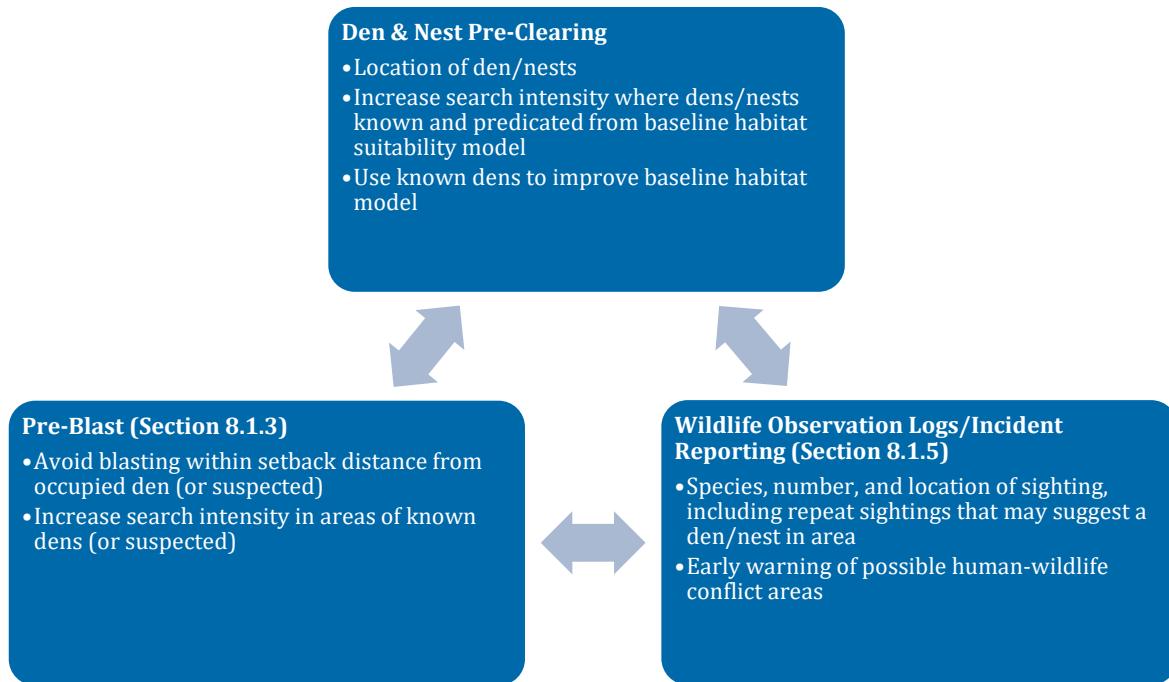


Figure 3: Relationship between Den and Nest Pre-Clearing and Other Wildlife Monitoring

8.1.2 Collared Pika Construction

The objectives of this monitoring program are to determine if pika talus sites and meadow exist within the WR footprint prior to, and after, construction, and if so, to inform adaptive management action to avoid destroying habitat and harming overwintering pika.

Collared Pikas are listed as Special Concern (Schedule 1; SARA) and are ranked as Sensitive in the NWT. Collared Pikas require talus (i.e., boulder fields) that naturally occurs in small, isolated patches and foraging meadows within a maximum of 10 m of the talus (security cover).

The WR exactly follows the 1980s winter road while in pika range. This portion of the existing 1980s winter road remains in all-season condition and does not require additional borrow material, cuts, or fills for purposes of the WR.

Suitable pika habitat in the form of talus and adjacent available meadow occur from KP 15.0 to 38.1. During the conduct of baseline surveys, 45 talus sites within 500 m of the WR were found to meet, or likely meet, pika habitat criteria. Of these 45 sites, 38 are, or have once been, occupied by pika. Pika may be expected to colonize talus sites that provide suitable habitat. CZN is designing the ASR alignment to avoid talus sites and adjacent meadow to the extent possible. Since 2016, the ASR has undergone various re-alignments to avoid 15 talus sites.

Setback distances and restricted activity periods are common best management practices used by developers to reduce disturbances when wildlife are most sensitive. However, no setback distance and/or restricted activity periods are known for Collared Pika (Julie Thomas, pers. comm., Yukon Government). Therefore, a pika expert

(opinion from Beever, pers. comm., US Geological Survey) was used to set a conservative setback for the summer pika breeding period (early May to early July) when pika are most sensitive.

WR activities avoids the most sensitive period for pika (early May to early July), which is consistent with expert opinion (Julie Thomas, pers. comm. Yukon Government).

Yukon Government also suggests that winter construction should avoid destroying talus occupied by overwintering pika. Collared Pika are most at risk of habitat loss and direct mortality when WR activities occur on occupied talus sites during the winter (approximately early October – mid-April). Additional habitat loss could occur if activities damage the meadow habitat within 10 m of talus sites.

Baseline pika and previous pre-construction surveys delineated pika talus sites. Based on the results of these surveys, the WR avoids direct loss to talus sites (0 ha direct loss). However, the current WR design results in a temporary loss to available meadow (0.02 ha) at CZN-32-PK-4 (near KP 32) which was occupied by pika in 2021, 2019, and 2017. This is because the existing 1980s road, that the WR follows, is revegetating to meadow habitat. Although the WR does not damage the underlying vegetation, it does delay the snowmelt and spring availability of this portion of meadow to pika.

A road survey crew was deployed to site in the fall of 2021 to adjust the WR to avoid the meadow at this one talus site (CZN-32-PK-4; refer to Section 3.3.1.1 Adaptive Management in the pika baseline report). The proximity to Sundog Creek restricts the realignment of the WR to completely avoid this meadow; however, another follow-up site visit will occur in the fall of 2022 to confirm. A follow-up report that presents the results of the fall 2021 and 2022 pre-clearing pika survey will be submitted prior to WR clearing.

8.1.2.1 Overall Monitoring Approach

The Collared Pika construction monitoring program is summarized in Table 7 and detailed in Appendix D.

Table 7: Collared Pika Construction Monitoring Summary

Purpose: Avoid Destruction of Talus Sites and Meadow and Pika Mortality during Winter Construction				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Ground-based walking transects	Presence of active haypiles, vocalizations, and sightings	August 2022 prior to Project August 2023 after the Project	Talus sites 25 m from the WR	Collared Pikas are listed under the SARA as Special Concern. Risk of pika mortality if damage to talus sites that are occupied by overwintering pika. Informs adaptive management to avoid the destruction of talus sites and meadow during winter activities. Identifies where pika currently occur immediately prior to winter activities to inform adaptive management actions.

A crew of two people (led by a professional biologist and supported by a Dene Monitor) complete the ground-based survey before and after planned WR activities, in August when pika haypiles are most conspicuous. Talus sites occurring within 25 m of the WR are surveyed (Figure D2; refer to Appendix D) before and after WR construction.

Adaptive management is required if winter activities results, or has the potential to result, in a direct loss of talus sites and/or its surrounding meadow (portion of the meadow within 10 m from the talus edge), as determined by the construction survey. Additional adaptive management is required if winter activities affected pika occupancy at these talus sites.

Results from the Collared Pika Construction monitoring may inform other pika construction surveys.

8.1.3 Blast

Blasting is not required for the construction of the WR (see Phase 1 Pioneer Winter Road Design and Construction Plan, November 24, 2021), but may be required for avalanche control from approximately KP 0 to 35 (Figure D3, see Appendix D). The objectives of this program are to detect big game and Species at Risk (e.g., wolf, coyote, wolverine, Dall's sheep, moose, caribou) within the restricted setback to blast sites, and if detected, carry out adaptive management to limit disturbance.

Wildlife monitoring is required prior to and after avalanche control blasting; if wildlife are present, blasting may be temporarily delayed until wildlife move out of the area. All blasting, if required, will be conducted in conformance with the Explosives Management Plan and Avalanche Hazard Management Plan, following this monitoring program, and in accordance with Dene Knowledge.

Blasting may disturb wildlife overwintering in the local area, may result in individual animals fleeing, and may have energetic consequences for local wildlife if blasting is persistent. To reduce effects associated with blasting, blast monitoring will be completed by the Blaster of Record, and blasting will be temporarily postponed if big game/Species at Risk are observed within a 1 km setback (Figure D3, see Appendix D). Refer to Table 4 in Section 7.2 for the minimum distance from which blasts should occur from species.

Blasting also disturbs denning bears. Results from baseline surveys confirm that grizzly bears have previously denned in potential avalanche control areas and in neighbouring valleys, and the preliminary grizzly den habitat suitability model predicts denning habitat within 1.5 km of the potential avalanche control areas (Figure D3; Appendix A Map Book). To reduce potential effects on any denning bears, the Blaster of Record and the QEP will determine if bear dens (occupied, unoccupied, and suspected) are known to occur within 1.5 km of the planned avalanche control blast and will take appropriate adaptive management.

8.1.3.1 Overall Monitoring Approach

Blast monitoring is required to limit disturbances to overwintering wildlife, to the extent possible. Key tasks of the monitoring program are to 1) detect big game/Species at Risk within the setback distance, and if wildlife is detected 2) temporarily delay the blast until the animal is outside the applicable setback. The Blast Monitoring Plan is summarized in Table 8, outlined further below, and detailed in Appendix D.

Actions to minimize harm to wildlife, including the period to allow wildlife to move off on their own accord will be the responsibility of the Blaster of Record during avalanche control blasts or the Dene Monitor and QEP during road construction blasts, and will follow SOP #1 Reporting, *Responding to, and Deterring*.

Table 8: Blast Monitoring Summary

Purpose: Minimize Disturbances to Big Game/Species at Risk while Blasting				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Helicopter reconnaissance	Target species sighted within the setback before and after blasting Known bear dens (occupied, unoccupied, suspected) within the setback to the blast site Number of Wildlife Incidents Reports	Immediately prior to and within a half hour after blasting	Within the 1 km setback distance for animal sightings Within the 1.5 km setback distance for bear dens	Blasting is disturbing to nearby overwintering wildlife. Monitoring limits disturbance to nearby wildlife. Informs adaptive management to improve the monitoring approach.
Ground-based reconnaissance (only if blasting is required for road construction)	Target species sighted within the setback before, during, and after blasting Known bear dens (occupied, unoccupied, suspected) within the setback to the blast site Number of Wildlife Incidents	Prior to, during, and an hour after blasting		

Table 8: Blast Monitoring Summary

Purpose: Minimize Disturbances to Big Game/Species at Risk while Blasting				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Related Programs				
Wildlife Observation Logs and Incident Reporting: repeat sightings of wildlife and wildlife sign that may suggest a den/nest in area Den and Nest Pre-Clearing: locates denning areas where pre-blast searches are completed				

When no bear dens are known or suspected within 1.5 km of the planned blast (refer to the results of the Den and Nest Pre-Clearing, Wildlife Observation Logs, and baseline surveys), the Blaster of Record/Dene Monitor will search for wildlife within a 1 km radius of the planned blast (refer to Appendix D *Blast Procedure* and Figure D3). The Blaster of Record/Dene Monitor will temporarily suspend the blast when big game/Species at Risk are observed in the avalanche pathway and within the 1 km setback.

When bear den(s) are known or suspected within 1.5 km, the Blaster of Record/Dene Monitor will intensify the reconnaissance survey at/near each den following the advice of the QEP and regulator (refer to Appendix D *Blast Procedure*).

In NNPR, when there is no threat to life or property, active deterrence of big game/Species at Risk needs to be directly authorized by Parks Canada (refer to Appendix D *Blast Procedure*).

On territorial land, wildlife within the setback distance will be given 30 minutes before the least invasive deterrent action necessary to encourage the animal out of the setback radius will be performed following SOP #1 Reporting, *Responding to, and Deterring*. Any action taken to encourage wildlife to move out of the 1 km setback will be recorded as an incident in the Wildlife Incident Report (refer to Section 8.1.5 and SOP #1). In addition, any detection of big game/Species at Risk within the 1 km setback within a half hour after the blast will be recorded as a wildlife incident.

Results from other monitoring programs inform the Blast monitoring program as shown in Figure 3 (see Section 8.1.1). Likewise, results from Blast monitoring inform wildlife Incident Reporting and serves as a basis for corrective action and ongoing adaptive management.

8.1.4 Wildlife Hazard

Project mitigations are in place to prevent harm to wildlife and wildlife habitat. The Wildlife Hazard program is u.

The Wildlife Hazard monitoring program focuses on where failed mitigation has a higher risk of:

- Nest/den destruction and/or disturbance
- Human-wildlife conflicts
- Habitat alterations including spills

This involves two monitoring approaches within camps and worksites:

1. Worksite Check
2. Waste Management Audit

Using a standard checklist of mitigations, this monitoring procedure serves as a tool to track compliance relating to these areas of focus.

The QEP, with support from a Dene Monitor, is responsible for verifying that Project activities are being completed in accordance with Project commitments and mitigations.

The Worksite Check is used to proactively scan for wildlife and wildlife residences (nests, dens, roosts) at active worksites/ camps, habitat alterations, attractants and improperly stored materials, and spills so that identified issues can be managed in a timely manner and mitigations are working effectively throughout the WR.

The Waste Management Plan requires that all attractant wastes in the Project area be stored in designated and approved wildlife proof containers (e.g., Sea Cans), wastes will be collected daily, and all non-combustible wastes will be regularly recycled and/or transported off-site, consistent with current industry management practices. Compliance with the Waste Management Plan is important to minimize risk of problem wildlife. Wildlife that have been rewarded (food) by visiting camp and waste facilities may continue to return, thus increasing the risk of human-wildlife conflicts and wildlife mortality. The proper storage, handling, and disposal of waste is an essential mitigation to reduce the risk of wildlife attraction, and it has been shown to reduce incidents at existing northern mines.

The WR is expected to produce a small volume of waste. Road construction crews and self-contained skid-camps are anticipated to generate and accumulate modest volumes of domestic waste and sewage. These wastes will be temporarily stored in the self-contained skid camps for regular collection and transport off site for treatment and disposal. The following wastes identified in the Waste Management Plan have the potential to attract wildlife:

- Combustible Non-Hazardous Waste: kitchen and food waste, corrugated cardboard, and domestic refuse
- Hazardous Waste: petroleum products
- Recyclable Waste: beverage containers
- Domestic Sewage: black water and grey water

A Worksite Check and Waste Management Audit will be completed to manage wastes produced in accordance with the WMMP and the WR Waste Management Plan, applicable legislation, regulations, authorizations, permits, and licenses.

For consistency, the Dene Monitors and QEP must be familiar with the Waste Management Plan and Spill Contingency Plan and the policies and procedures in SOP #2 *Reducing Wildlife Attractants* when conducting the Worksite Check and Waste Management Audit.

8.1.4.1 Overall Monitoring Approach

A Dene Monitor will perform the Worksite Check and Waste Management Audit to verify 1) Project commitments and mitigations relating to human-wildlife conflicts and habitat alterations at worksites are in place for as long as they are required, 2) the mitigations implemented are in working order, and 3) these wildlife effects are prevented by modifying and/or improving the Project policies and practices for the life of the Project, to the extent possible.

The Wildlife Hazard Mitigation monitoring program is summarized in Table 9, outlined further below, and detailed in Appendix D.

Table 9: Wildlife Hazard Mitigation Monitoring Summary

Purpose: Manage Compliance to Project Commitments and Mitigations to Minimize Human-Wildlife Conflicts and Habitat Alteration at Camps and Worksites				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Worksite Checks Waste Management Audits	The mitigation and the number of mitigations perceived to be or shown to be noncompliant Number, location, and species sighted (including nests/dens) and repeat sightings at camps/worksites	Worksite Check and Waste Management Audits at least once weekly during Project activities	Camps and other worksites	<p>Potential for increased human-wildlife interactions and habitat alteration.</p> <p>These Project policies and practices are in place to prevent human-wildlife conflict and minimize harm to wildlife habitat.</p> <p>Provides data on which mitigation is not in compliance, frequency of issue, and where mitigation has failed (animal gained access to food reward).</p> <p>The number of conflicts is indicative of the potential for wildlife mortality.</p> <p>Provides an early warning to consider adaptive management action.</p>
Related Programs				
Wildlife Observation Logs and Incident Reporting: Together with the Worksite Check and Waste Management Audits identifies areas of repeat wildlife sightings that may be an indication of an attractant or potential area for human-wildlife conflict				

A Dene Monitor will be on site to monitor and manage potential risks to wildlife and wildlife habitat during Project activities. A Dene Monitor and the QEP are responsible for touring applicable camps and other worksites, performing the Worksite Check and Waste Management Audit, verifying mitigations are implemented and working effectively, advancing the adaptive management process (if required), and making improvements based on adaptive management.

The Dene Monitor will be present on site throughout Project activities. Monitoring will be performed at active construction camps, all waste storage/transfer facilities, and other active Project sites at least once weekly to verify mitigation is implemented and working effectively, including camp waste procedures.

Results from the Wildlife Observation Logs and Incident Reporting program inform the Wildlife Hazard adaptive management including the frequency of wildlife hazard monitoring, as shown in Figure 4.

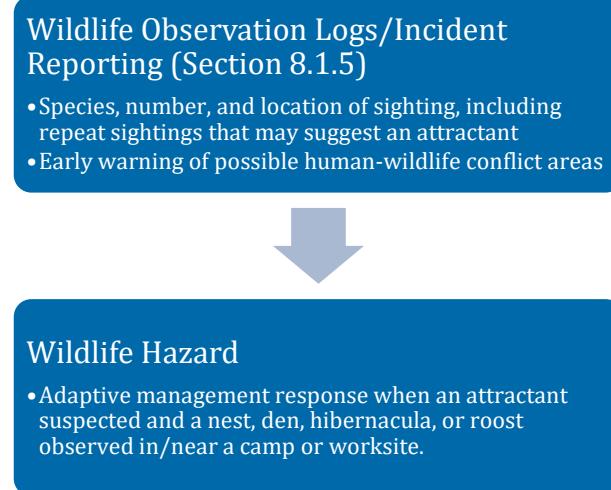


Figure 4: Relationship between Wildlife Hazard and Other Wildlife Monitoring

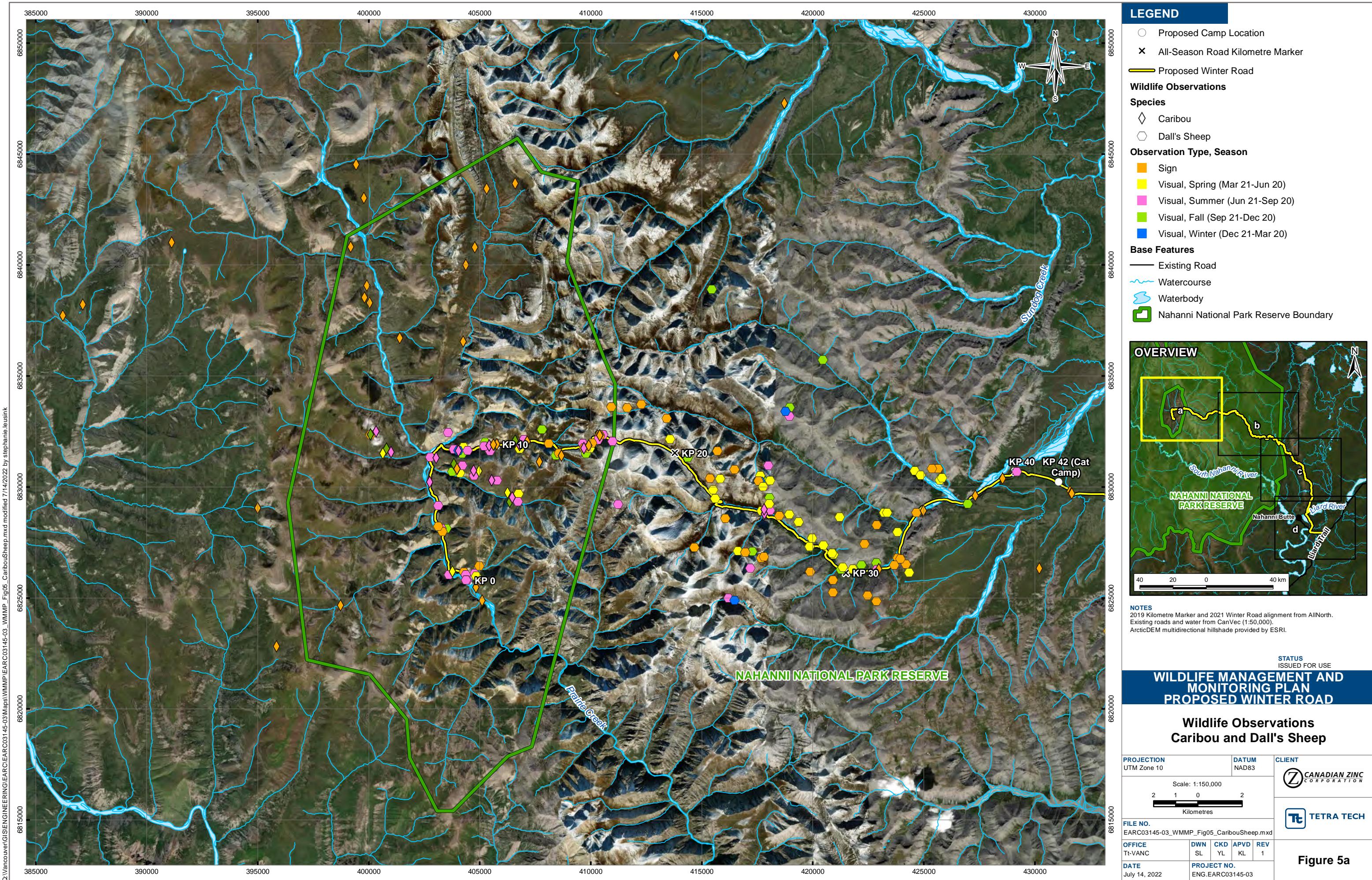
8.1.5 Wildlife Observation Logs and Incident Reporting

CZN has an “observe, record, and report” policy for wildlife observed and incidents involving wildlife on and near the WR. The purpose of the Wildlife Observation Logs (and associated sighting database) are to report and track wildlife sightings to keep onsite employees and contractors informed of wildlife activity in an area and serve as an early warning of possible human-wildlife conflict areas that can be proactively avoided or mitigated through adaptive management. During baseline and previous monitoring programs, caribou and Dall’s Sheep sightings and sign were recorded (Figure 5), as well as bears, wolverine, and wolf (Figure 6), and moose and bison (Figure 7). These previous sightings can be used to inform employees and contractors of possible human-wildlife conflict areas at the beginning of the Project and will be updated by subsequent sightings in the Wildlife Observation Logs. Wildlife sightings presented in Figures 5-7 represent general wildlife distribution in areas that were surveyed and may include repeat sightings of the same individual and/or sign on neighbouring transects and/or different survey events.

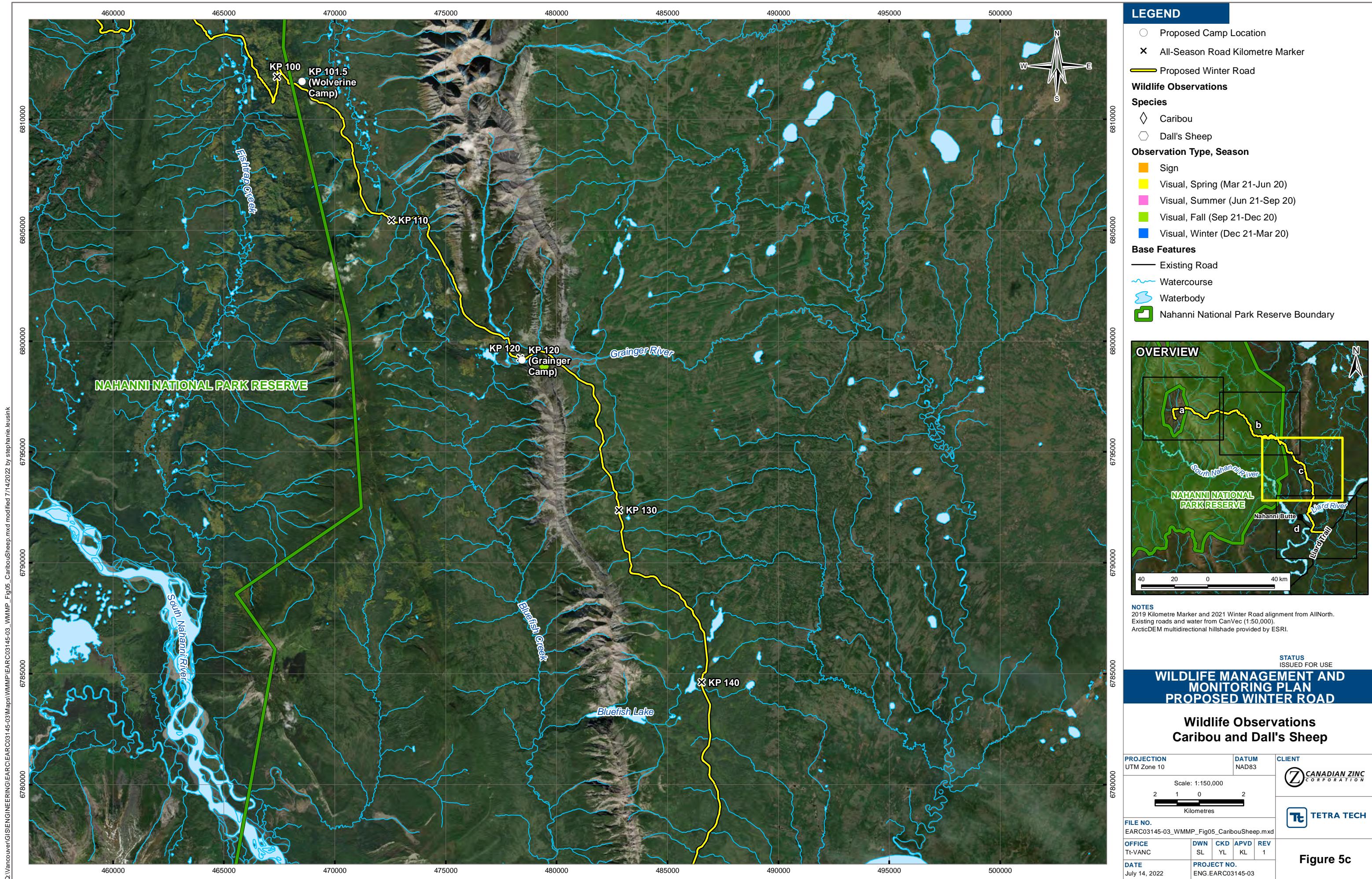
Wildlife Incident Reporting indicates that a wildlife conflict has occurred or could have occurred. Monitoring and reporting of incidents serves as a basis for corrective action and ongoing adaptive management.

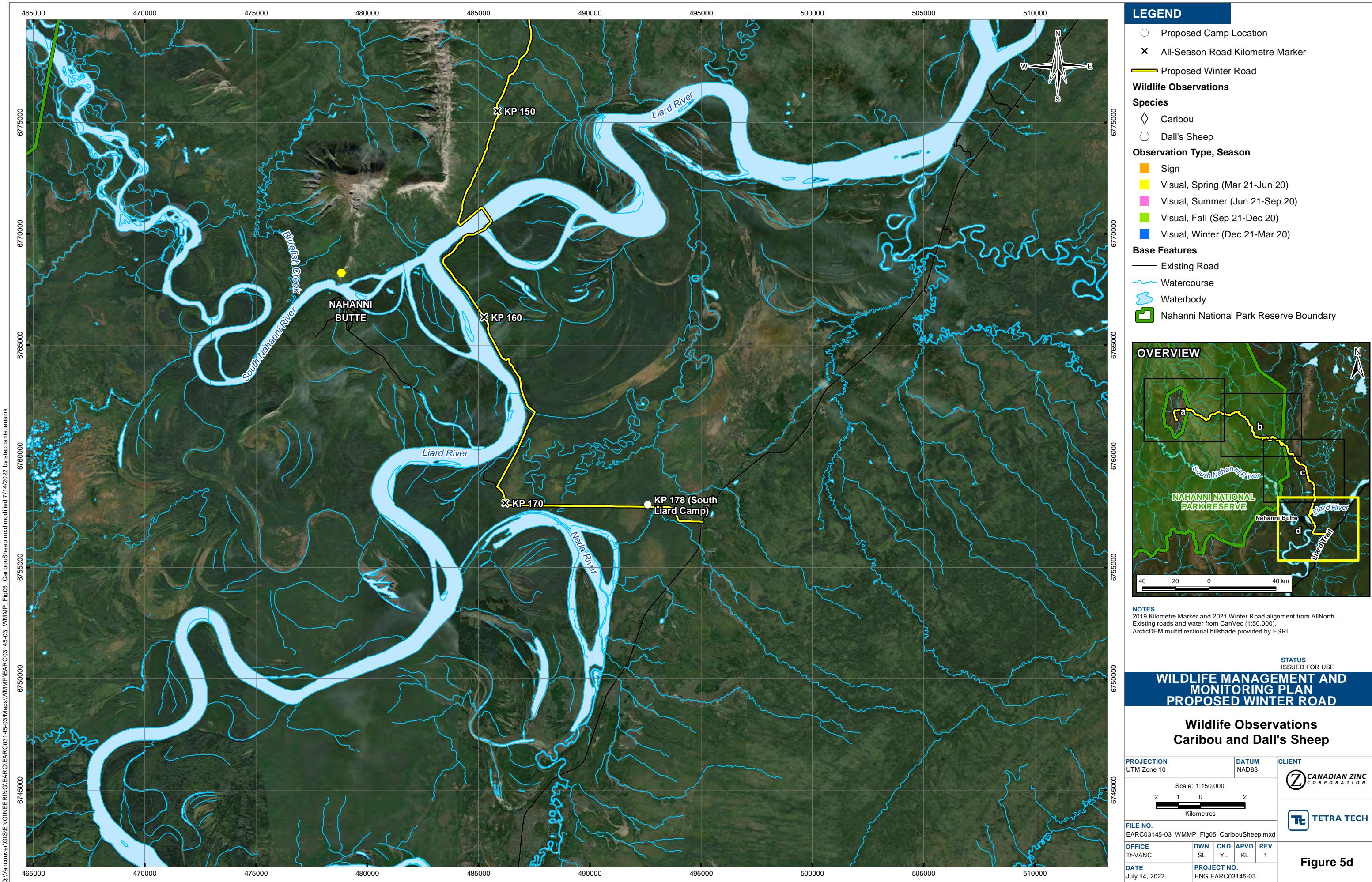
A reportable incident includes:

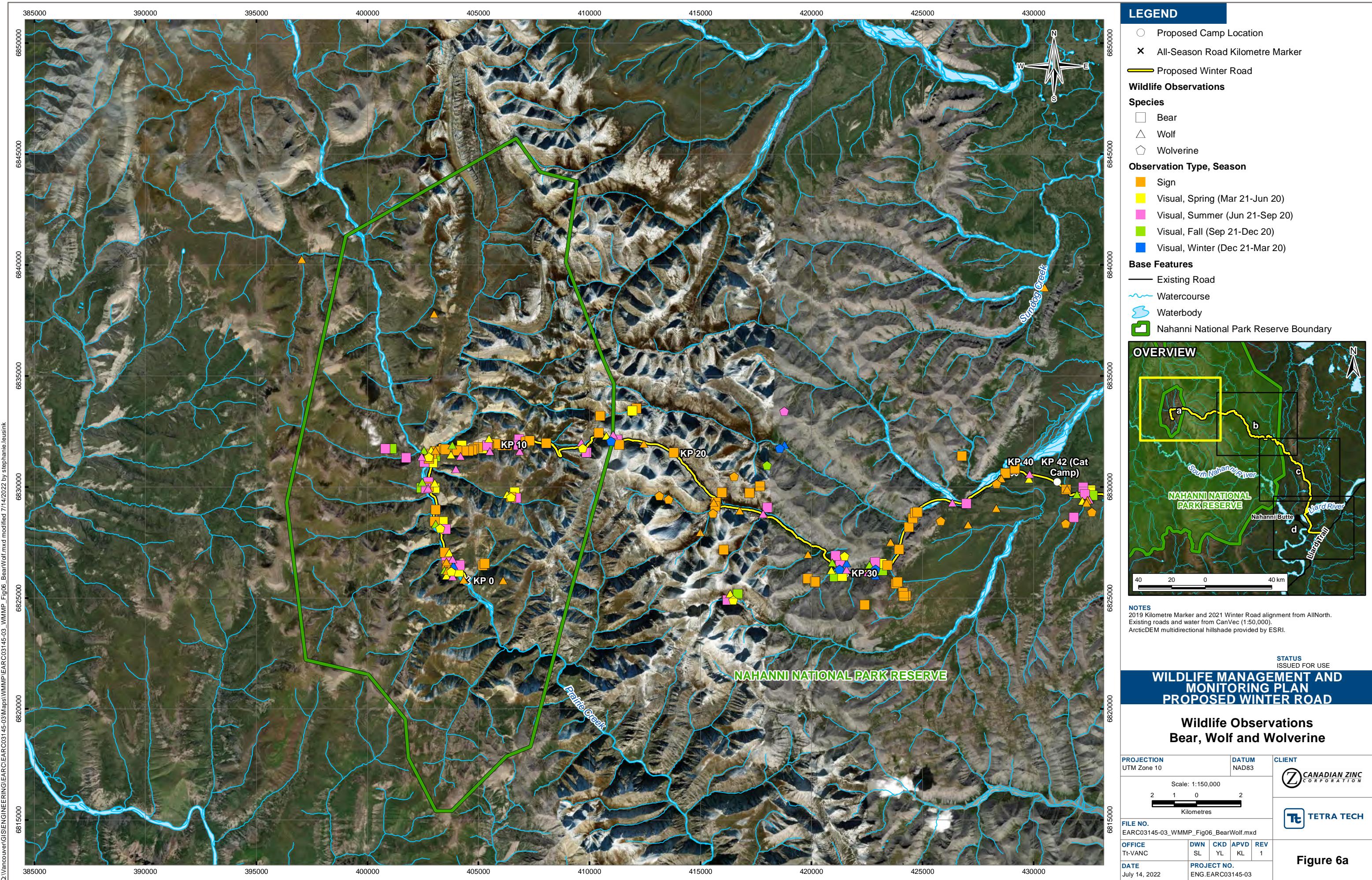
- Big game species/Species at Risk mortality and/or injury due to, or suspected from, Project activities;
- Accidental destruction of a wildlife residence (den, nest) and/or finding a residence while clearing;
- Human-wildlife encounters that present a risk to either people or animals, including incidents of wildlife exhibiting aggressive behaviour (e.g., animal does not flee when deterrents are used, flattened ears, charge or bluff-charge, attack) or a large carnivore in camp;
- Big game/Species at Risk sighted within 1 km of a blast site during and/or within a half hour after blasting;
- Wildlife-caused property damage;
- Big game/Species at Risk has, or potentially has, gained access to an attractant (food/shelter) as a result of Project activities; and
- Anytime deterrent action is taken.

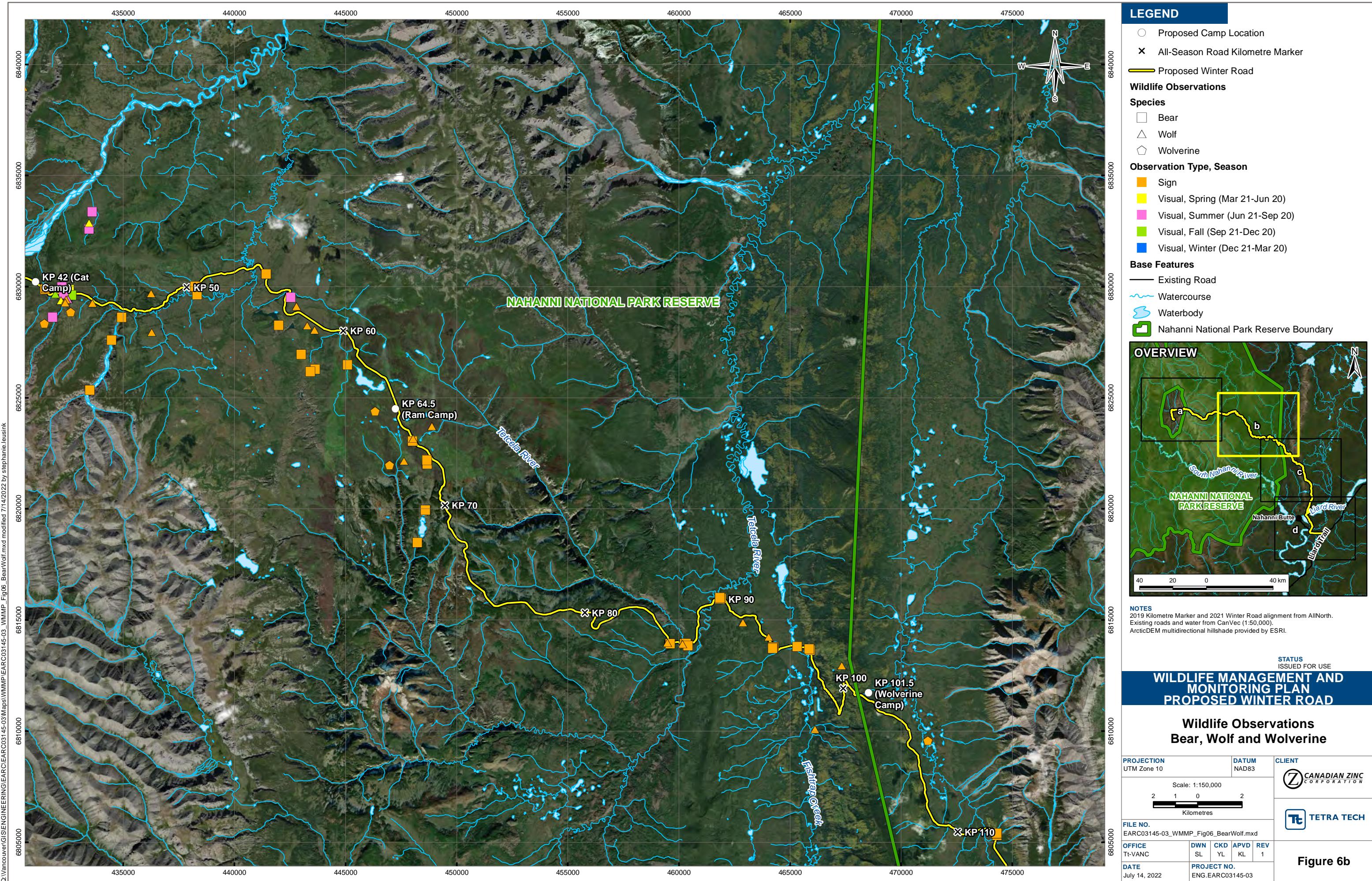


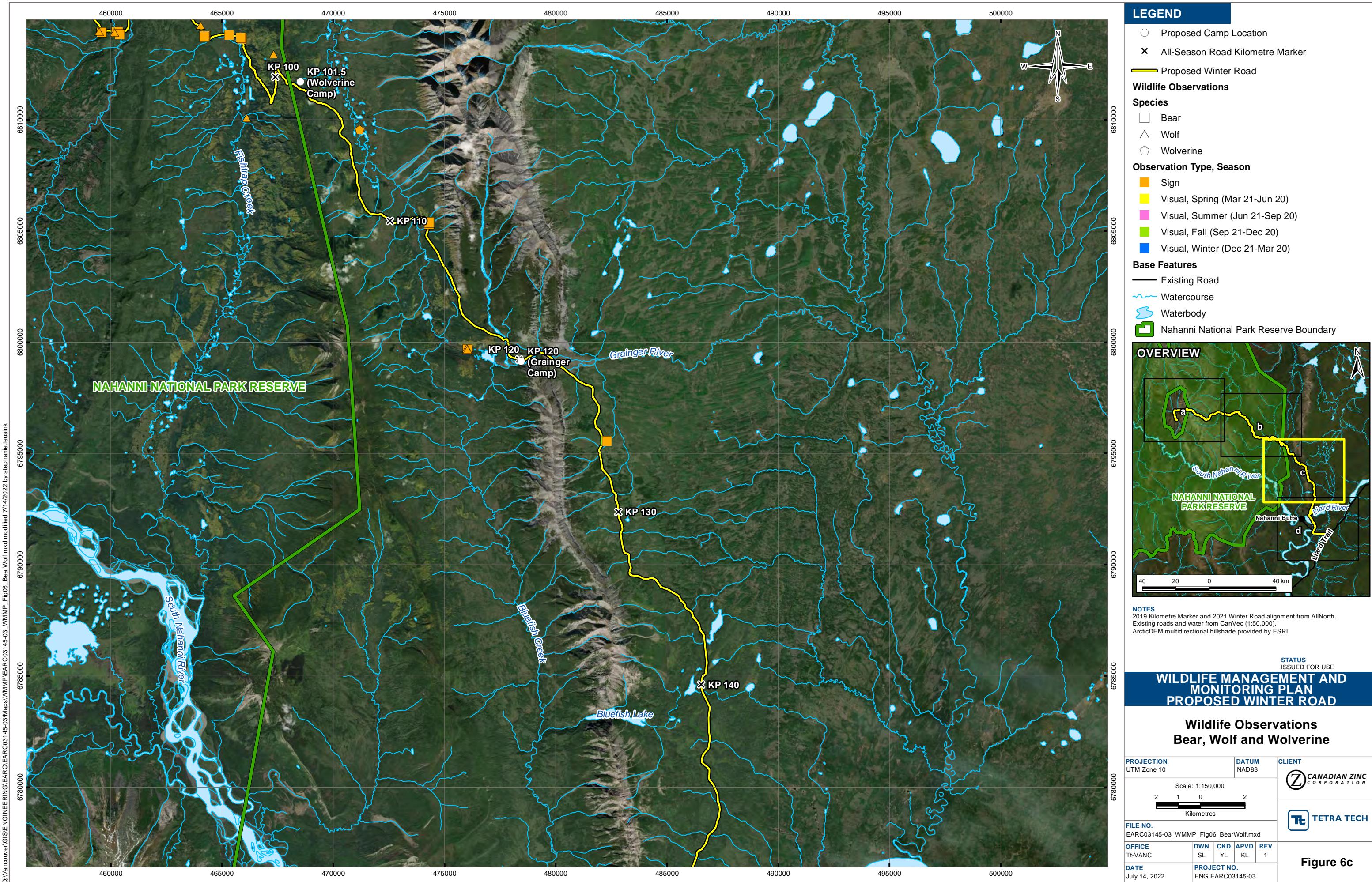


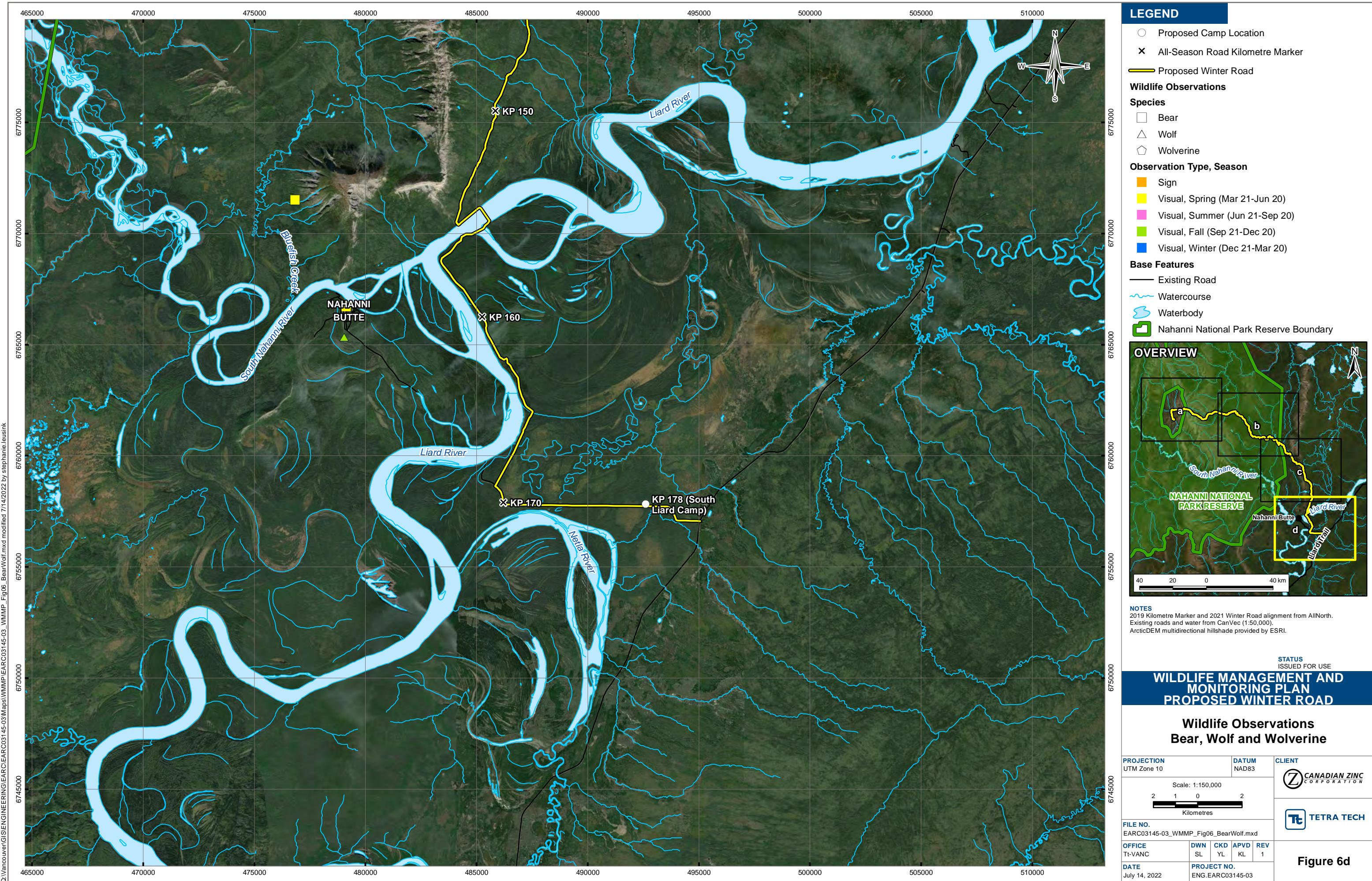


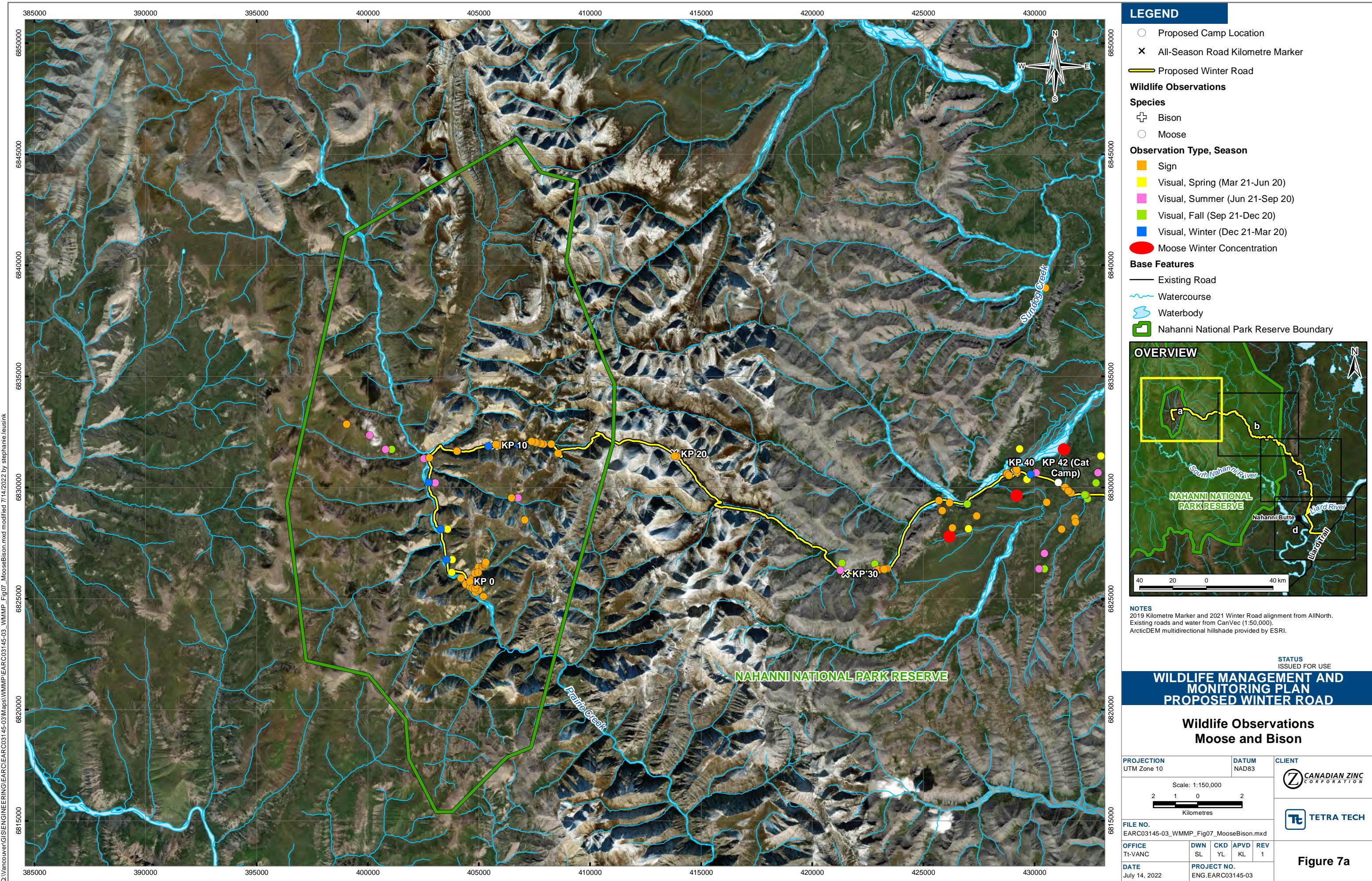


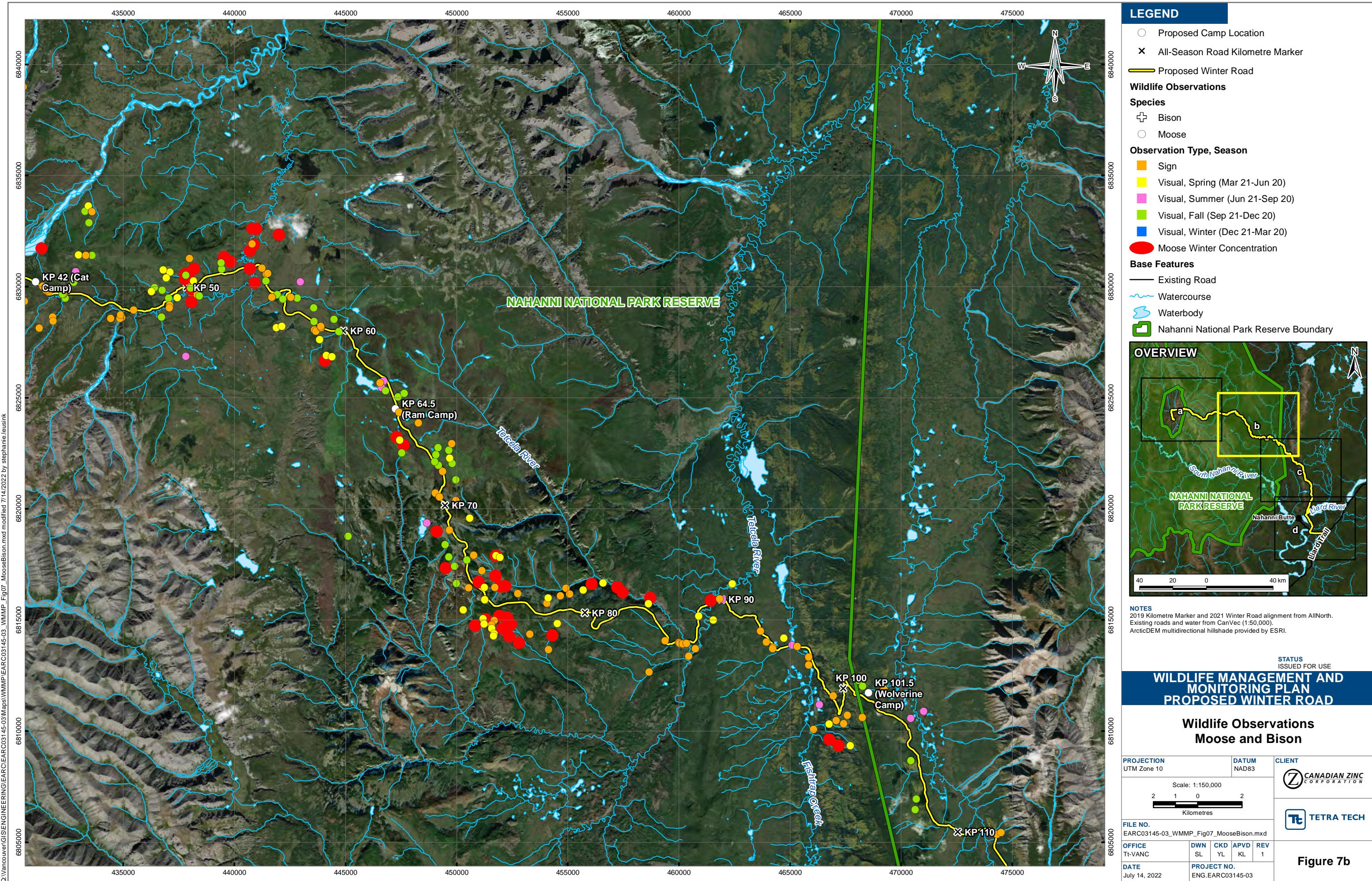


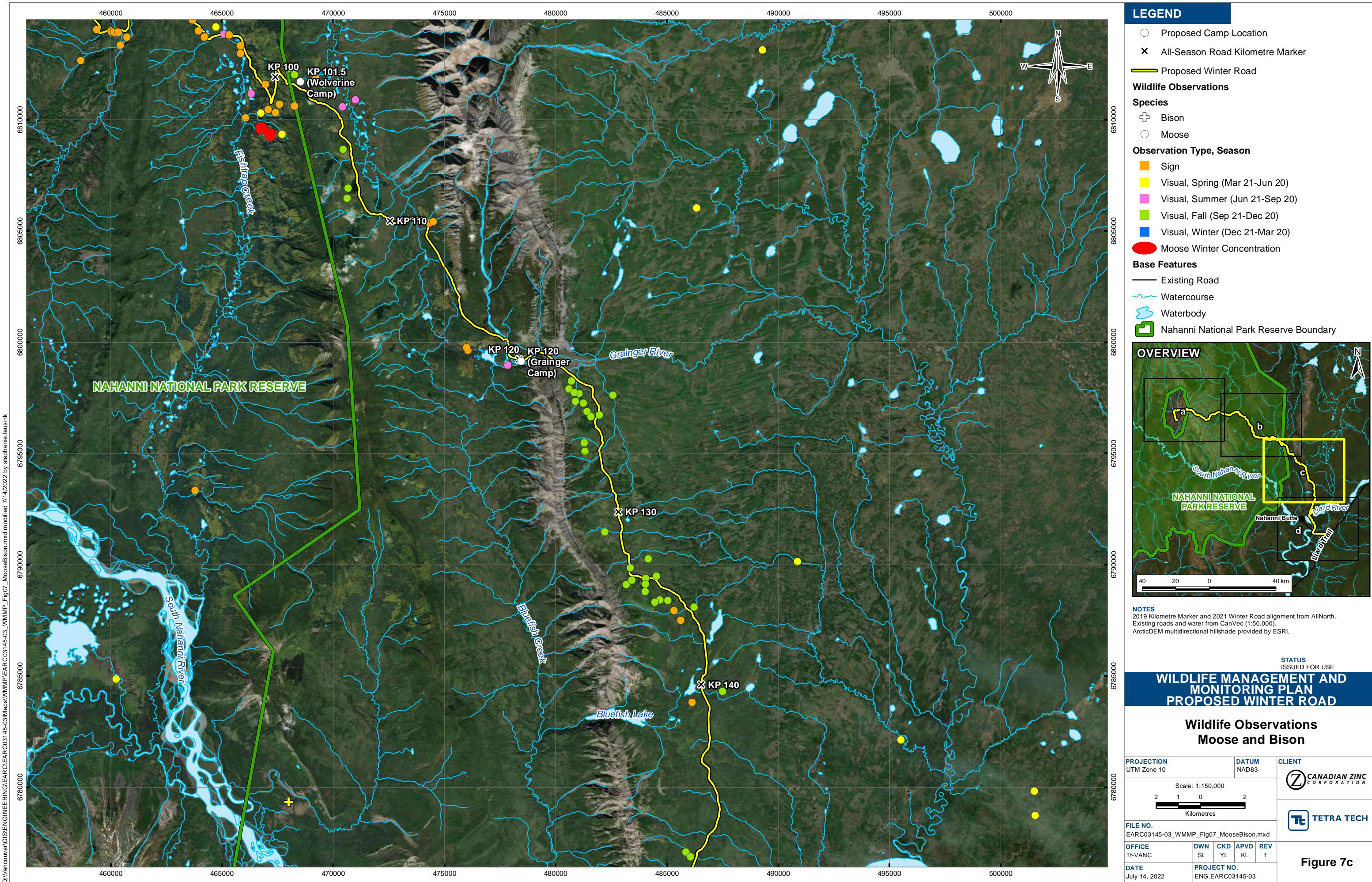


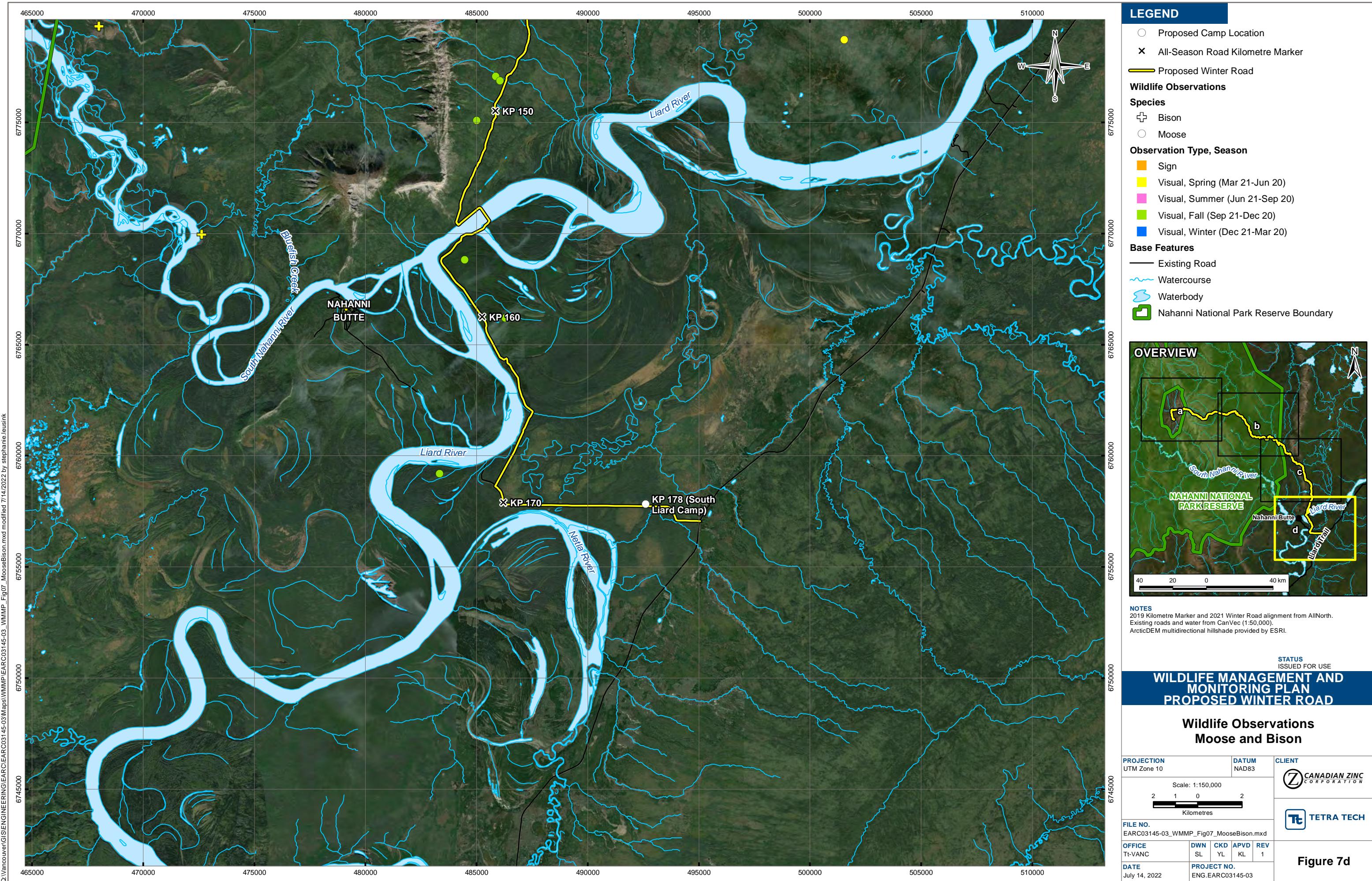












8.1.5.1 Overall Monitoring Approach

Overall, the monitoring program involves recording wildlife sightings and incidents, entering into a database, and relaying this information back to appropriate employees and contractors to inform their daily activities. All CZN onsite employees and contractors (including pilots) are responsible for reporting wildlife sightings on standard Wildlife Observation Logs and reporting wildlife incidents to a Dene Monitor or the QEP. A Dene Monitor (or the QEP) records and responds to the wildlife sightings (as required). Collectively, the Wildlife Observation Logs and Incident Reports help:

- track species presence (on and near) the WR, camps, and other worksites
- identify areas of potential and actual human-wildlife conflict
- reveal where mitigation may be required, is not working as intended, and/or where adaptive management may be required

Results from the Wildlife Observation Logs and Incident Reports are discussed during the daily tailgate meetings to inform daily Project-activities and support mitigation and adaptive management. Similarly, the QEP will ask the employees and contractors during the tailgate meetings if they have any additional wildlife sightings that they have not yet recorded, and if so, the QEP will record them.

Wildlife Observation Logs and Incidents Reporting is summarized in Table 10, outlined further below, and detailed in SOP #1 *Reporting, Responding to, and Deterring Wildlife*, respectively.

Table 10: Wildlife Observation Logs and Incidents Reporting Monitoring Summary

Purpose: Track Wildlife Sightings and Incidents to Inform Daily Activities and Support Mitigation and Adaptive Management						
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effects and Monitoring Rationale		
Wildlife Observation Logs	Species, number, and location of sighting	During the WR activities	Wherever sighted	These procedures are in place to prevent harm to wildlife.		
	Repeat sightings in past 3 days and within 1 km radius			Indicates areas of potential/actual Project-wildlife conflict based on detected wildlife.		
	Total number of Grizzly bear and wolverine independent sightings			Provides an early warning to proactively consider mitigation where observations are reoccurring.		
	Species involved and the number, location, and type of Wildlife Incidents			Indicates areas of Project-wildlife incidents and can be used to inform determination of adaptive management action.		
Related Programs						
Wildlife sightings and sign recorded during all wildlife monitoring programs are entered and tracked in the Wildlife Observation Log database.						

Wildlife, but particularly big game and Species at Risk, sightings are relayed to a Dene Monitor (or their designate, such as the QEP or CM) daily to identify areas of potential human-wildlife conflict. Daily monitoring helps inform proactive mitigations during the active Project period.

CZN will implement the following procedures:

- All CZN employees and contractors to report wildlife sighted on the standard Wildlife Observation Log posted at all Project accommodations and work sites. Wildlife Observations Log and Incidents Reporting called-in using the radio and or satellite phone will be recorded by a Dene Monitor (alternates include the QEP/CM).
- All CZN employees and contractors shall respond to wildlife sightings per SOP #1 *Reporting, Responding to, and Deterring* decision matrix.
- Document all wildlife sightings (including fresh wildlife sign, nests/dens) daily while carrying out Project activities.
- A Dene Monitor is responsible for the daily collection of all reported observations, and with support from the QEP, to proactively monitor for repeat sightings of big game/Species at Risk per SOP #1 *Reporting, Responding to, and Deterring Wildlife* decision matrix. Repeat sightings will be determined by simply referring to the date and location columns in the Wildlife Observation Logs or directly from the database.
- The QEP with support from a Dene Monitor will inform CZN employees and contractors where wildlife has been sighted in relation to their daily activities during the daily tailgate meetings and enter the wildlife sightings into the database. All wildlife observations, including those detected during other wildlife monitoring programs are entered into the Wildlife Observation Log database.
- A Dene Monitor, with support from the QEP, will immediately respond to all Wildlife Incident Reports following procedures outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife* decision matrix or the Bear Management Plan.

Data collected from the Wildlife Observation Logs and Incident Reporting supplement the data from other wildlife monitoring programs as shown in Figure 8. For example, the Blast and or Wildlife Hazard programs establish project setbacks from nests and dens also detected in the Wildlife Observation Logs. Similarly, all wildlife sightings and sign collected during all wildlife monitoring programs are entered into the Wildlife Observation Log and database to inform employee/contractor daily activities.

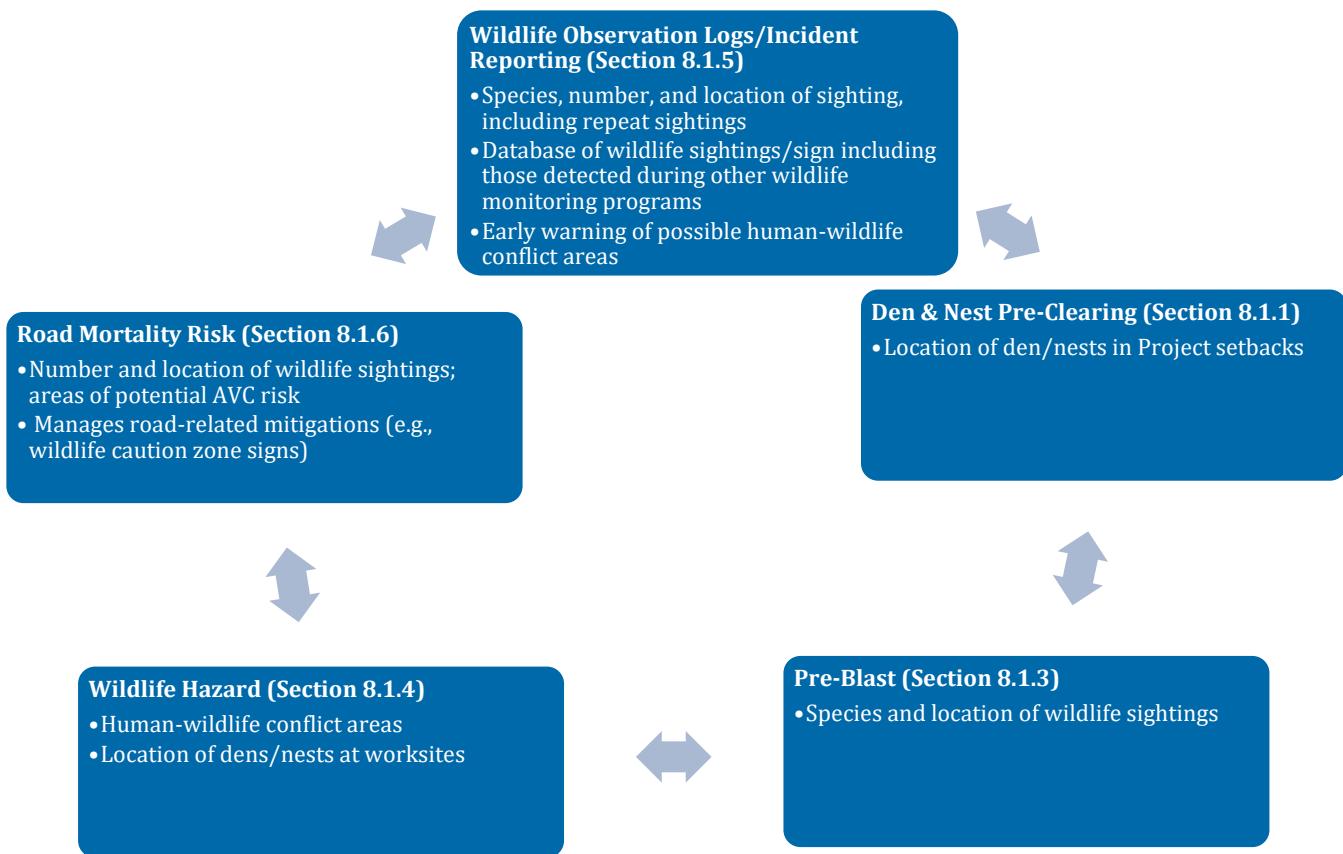


Figure 8: Relationship between Wildlife Observation Logs and Incident Reports to Other Wildlife Monitoring

8.1.6 Road Mortality Risk

Phase 1 construction of the WR does not include road operations and traffic is not expected to be a significant consideration during the WR. However, the objectives of this monitoring program are to locate wildlife trails that intersect with the Winter Road (WR), to proactively manage warning signs to reduce the potential risk of animal-vehicle collisions (AVCs) and monitor compliance with snow bank and collared pika mitigations to avoid road-related wildlife mortality.

AVCs are positively correlated to wildlife abundance, higher traffic volumes and speed limits, wide roads, low motorist visibility, and riparian corridors (Gunson et al. 2010). Of these, Clevenger and Huijser (2009) and Seiler (2003) believe that traffic volume is the primary factor that predicts the likelihood of AVCs occurring. Seiler (2003) predicts that wildlife successfully cross roads at the traffic volumes proposed for the ASR (estimated at 1.2 – 21.4 average annual daily haul trucks) and none would be killed. Since the WR has lower traffic volumes, slower speed limits (30 km/hr) and a narrow trail than the ASR, the WR is also predicted to allow wildlife to successfully cross.

Unlike the roads used in the Seiler (2003) model, the WR has slow vehicle speeds (30 km/hr) which further reduce the risk of an animal-vehicle collision (Seiler 2003). Combined with the very low traffic volume and the very slow speed limit (30 km/hr), AVCs resulting from WR activities are also expected to be very low.

During the environmental assessment, regulators and local Indigenous groups raised concern for wildlife mortality risk from AVCs. As part of the Review Boards Measure 6-3 (refer to Section 5.1.3), CZN is required to reduce the likelihood of significant impacts on wildlife from collisions with vehicles by identifying and communicating wildlife caution zones to road users where there is a reoccurrence of wildlife reported in an area, where Traditional

Knowledge identified trails, and where a remote camera system identifies road crossings and monitors non-mine related traffic. This Measure is met for the WR by this Road Mortality Risk monitoring program together with the Wildlife Observation Logs and Traffic Monitoring.

Baseline surveys completed to date incidentally recorded wildlife trails (Figure D4, refer to Appendix D). Wildlife trails intersect the WR in various locations as well as along the existing 1980s winter road. These existing wildlife trails are potential areas of AVC risk and are used at the beginning of the Project to inform mitigation and adaptive management and will be updated by subsequent trail sightings.

A wildlife trail also exists along the length of the existing 1980's winter road (that is currently regenerating) from approximately KP 40 – 120, as wildlife have been using this existing road for travel. As evidence by scat/pellets and the remote camera study, caribou, grizzly bear, and other wildlife also travel along the existing 1980s winter road from KP 1 to 17. Additional wildlife trails were identified along the WR alignment and were generally associated with riparian areas and intersecting local topographic features.

Baseline studies have also detected moose overwintering areas where concentrations of tracks were observed along watercourses and small drainages (Figure 7). These winter track concentrations were repeatedly observed during the 2022 spring survey and the same track concentration was recorded multiple times from different transects and survey events.

Extra vigilance is needed when searching for wildlife trails and installing caution zone signage in the areas of these identified trails and overwintering areas (Figure D4, refer to Appendix D).

8.1.6.1 Overall Monitoring Approach

The Road Mortality Risk monitoring program is summarized in Table 11, outlined below, and detailed in Appendix D *Road Mortality Risk Procedure*.

Monitoring is completed in two timeframes, daily while clearing (Clearing Scan) and weekly during all Project-activities (Road Survey), to search for fresh big game/Species at Risk trails that intersect with the WR footprint, manage warning signs, and monitor mitigations in place. The Clearing Scan and Road Survey are completed within the Project footprint.

Table 11: Road Mortality Monitoring Summary

Purpose: Surveillance of Wildlife Sightings and Trails and Mitigations in Place to Proactively Manage Wildlife Mortality Risk				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effects and Monitoring Rationale
Clearing Scan and Road Survey	Number and location of big game/ Species at Risk sightings and trails Location of Wildlife Caution Zone signs The mitigation and the number of mitigations perceived to be or shown to be noncompliant Number and location of AVC incidents	Daily during clearing Weekly during Project activities	WR Project	These procedures are in place to prevent harm to wildlife. Indicates areas of potential/actual Project-wildlife conflict. Provides an early warning to consider adaptive management action (e.g., new wildlife caution zone sign).

Table 11: Road Mortality Monitoring Summary

Purpose: Surveillance of Wildlife Sightings and Trails and Mitigations in Place to Proactively Manage Wildlife Mortality Risk				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effects and Monitoring Rationale
Related Programs				
Wildlife Observation Logs and Incidents Reporting: May indicate other areas requiring Wildlife Caution Zone signs or additional adaptive management based on repeat wildlife sightings and or an animal-vehicle collision				
Boreal Caribou Winter Track: May indicate other areas requiring Wildlife Caution Zone signs, particularly where boreal caribou tracks intersect with the WR				
Collared Pika Construction: Establishes areas where road mitigations are in place to prevent the storage of snow, rock, and road debris inside pika exclusion zone				

The Dene Monitors will be on site throughout WR activities to monitor and manage potential risks to wildlife. A Dene Monitor, under the direction of the QEP, is responsible for completing the Clearing Scan during clearing as ahead of equipment and touring the WR weekly during the Road Survey to verify mitigations are implemented and working effectively, advancing the adaptive management process (if required), and making improvements based on adaptive management.

Procedures for the Clearing Scan and Road Survey are described in Appendix D. A Dene Monitor, supported by the QEP, is responsible for identifying wildlife caution zones based on fresh trails identified during the Clearing Scan, Road Survey, and other monitoring programs as recorded in the Wildlife Observation Logs database, updating the sign locations as appropriate, alerting the Construction Manager and the checkpoint station attendant of wildlife caution areas, checking compliance to three key road-related mitigations, and making updates or improvements following adaptive management action. The Dene Monitors shall consider deploying caution zone signs at fresh trails identified during any of the monitoring program surveys and areas with a reoccurrence of wildlife sightings in the Wildlife Observation Logs. Signs are to remain installed for a minimum of 1 week until there is no longer evidence of regular wildlife use or based on Dene Knowledge.

Key road-related mitigations monitored in the Road Mortality program include:

- Avoiding risk to Collared Pika talus from snowplowing (the storage or deposit of snow, rock, or roadbed debris should not be stored within 10 m of pika talus site);
- Compliance with snow berm spacing and heights to allow wildlife to safely cross the road (snow banks should be less than 1 m high and with breaks \geq 10 m wide and every 300 m for wildlife to move off the road and through the breaks as vehicles approach); and
- Use of windrows, lumber, or other brush clearing material to reduce line of sight (where required) along intersecting linear features.

Data collected from the Road Mortality Risk monitoring program supplements the Wildlife Observation Logs (Figure 9). Similarly, data collected from the boreal caribou, collared pika, and traffic monitoring programs inform the Road Mortality Risk program as shown in Figure 9.

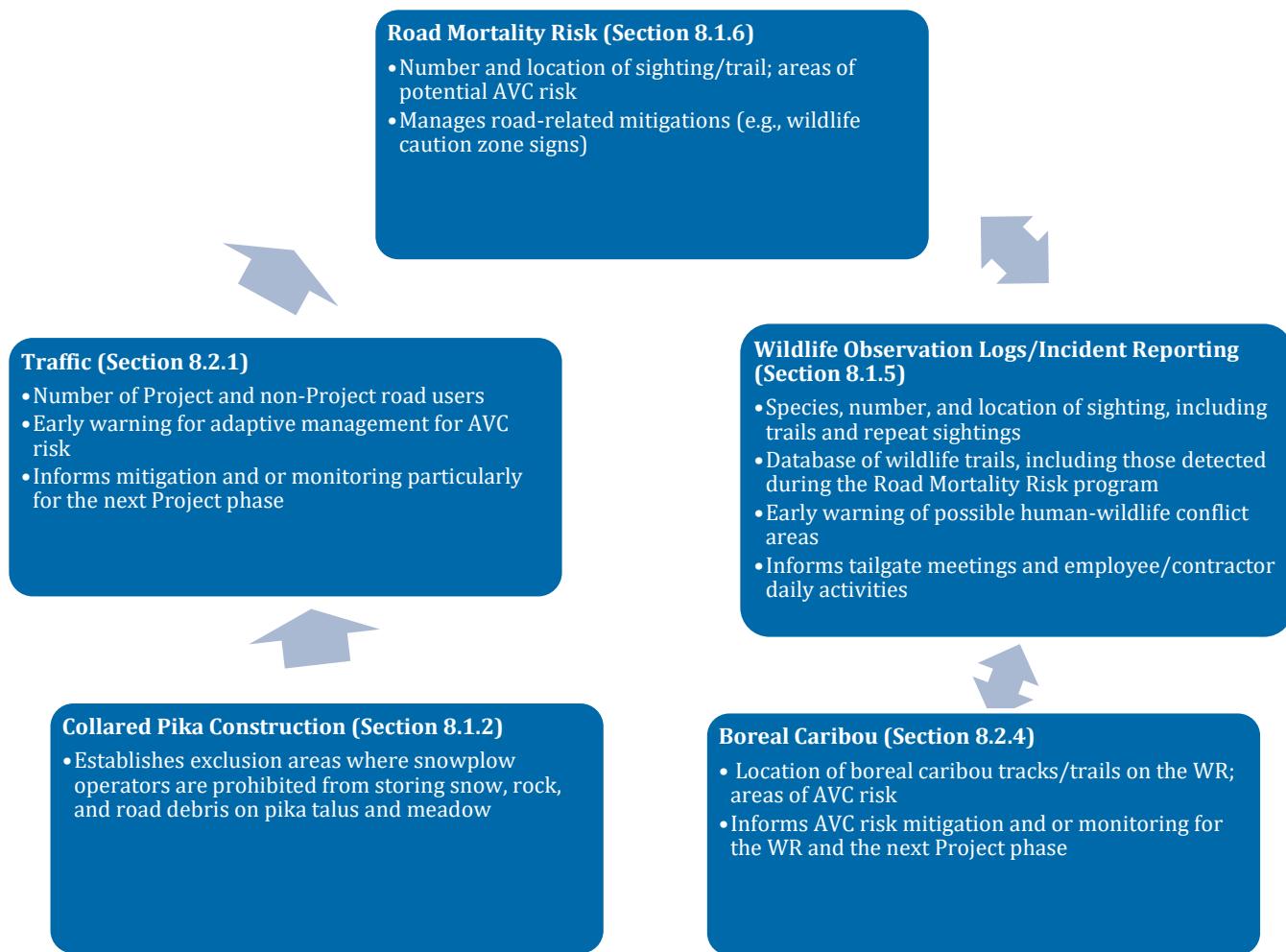


Figure 9: Relationship between Road Mortality Risk monitoring to Other Wildlife Monitoring

8.2 Effects Monitoring

8.2.1 Traffic

Phase 1 construction of the WR does not include Project-related road operations. Traffic is not expected to be a significant consideration due to the limited construction traffic, no road operation, and expected low interest in non-Project related access during this Project phase. Once connected to the Nahanni Butte Access Road, the WR will be considered a public road and access cannot legally be denied; however, it will be discouraged by the operation of an access controlled checkpoint.

The traffic monitoring objectives are to determine traffic and traffic levels (including non-Project vehicles) along the WR to inform adaptive management for other wildlife monitoring program, as well as the Traffic Control Mitigation and Road Operations and Maintenance Plan. Since there are no road operations planned for the WR project, traffic monitoring will become increasingly important for the next Project phase.

CZN will operate a checkpoint station along the WR to monitor the entry and exit of all Project and non-Project vehicles on the WR. The checkpoint will be staffed by monitors from the NDDB, per a commitment made by CZN, and will operate during the daytime (12-hour days) when the Liard River Ice Bridge is open. To supplement the checkpoint data, motion-sensing remote cameras will operate at both the checkpoint and north of the Liard River to monitor road use after checkpoint operating hours and will continue through to Phase 2.

The WR provides the only road access into the area, and all road traffic entering the area must pass through the checkpoint station. At the checkpoint station, drivers are notified where Project activities are occurring and non-Project vehicles for road safety. Updates on Project activities and non-Project vehicles are communicated to the checkpoint station attendant through radio, inReach to inReach, and/or between satellite phones. The following alerts will be discussed each morning and throughout the day:

- The Construction Manager will relay where construction is to occur and periods of temporary shut-downs (if required) to the checkpoint station attendant and Dene Monitors.
- The Dene Monitors will relay the locations of wildlife caution zones to the Construction Manager and checkpoint station attendant.
- The checkpoint station attendant will relay the locations of WR activities and wildlife caution zones to all Project-vehicles entering at the checkpoint, and only the location of WR activities to non-Project vehicles. The locations of wildlife caution zones will not be relayed to non-Project drivers.
- The QEP to notify Parks Canada whenever non-Project vehicles are encountered inside the park boundary.

The Traffic Monitoring Plan Summary is summarized in Table 12, outlined further below, and detailed in Appendix D.

Table 12: Traffic Monitoring Plan Summary

Purpose: To Inform Traffic-Related Adaptive Management				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effect and Monitoring Rationale
Checkpoint station	Daily number of Project and non-Project related road users, by vehicle type, inside and outside the checkpoint hours of operation, purpose of travel, and destination.	Daily during WR activities	WR checkpoint station	Helps inform adaptive management for other wildlife and traffic monitoring plans
Related Programs				
Data collected from Traffic Monitoring is used in the Wildlife Harvest program and Traffic Control Mitigation and Road Operations and Maintenance Plan				

8.2.1.1 Overall Monitoring Approach

At the staffed checkpoint, all Project and non-Project vehicles will be documented, including purpose of travel and vehicle size, by the checkpoint station attendant while on duty and the remote cameras using a standard datasheet (Appendix D). Procedures for traffic monitoring at the checkpoint station are described in Appendix D.

Data collected from traffic monitoring inform the determination of adaptive management for harvest pressure (Section 8.2.2) and the Traffic Control Mitigation and Road Operations and Maintenance Plan.

8.2.2 Wildlife Harvest

The objective of Wildlife Harvest Monitoring program is to monitor harvest levels along the Project to inform the ROC and support WR management decisions using a voluntary Wildlife Harvest Questionnaire at the checkpoint station. CZN agreed to provide support to NDDB to develop a harvest monitoring program to track and report on patterns and levels of harvest associated with the All-Season Road, and to include this in the WMMP. Similarly, Parks Canada, ENR, DFN, and LKFN raised concerns that the All-Season Road could provide new access to the Project area by hunters, which could result in increased wildlife harvest, especially from hunters outside the region. The current Wildlife Harvest Monitoring program will be

Access control measures are intended to monitor and manage non-Project related travel (refer to Section 8.2.1 *Traffic Monitoring*) and hunting pressure along the WR. Additional mitigations limit the potential for harvesting pressure to reach unsustainable levels by restricting non-Project access at locations where CZN has authority to do so, posting signs and installing a checkpoint station to deter non-Project road use, and installing remote cameras at the checkpoint station and north of the Liard River to monitor road use outside checkpoint operating hours.

The potential effects from harvesting activities along the WR will also be monitored through a voluntary Wildlife Harvest Questionnaire issued verbally at the checkpoint station. The objective of the Wildlife Harvest Questionnaire is to provide data to interested parties on minimum known harvest counts to evaluate whether harvest levels are perceived sustainable along the WR, and to use this knowledge to inform road management for the duration of the Project. This will be a voluntary survey completed by the checkpoint station attendant, where the participant's name is not recorded.

The Wildlife Harvest Monitoring Plan is summarized in Table 13 outlined further below, and detailed in Appendix D.

Table 13: Wildlife Harvest Monitoring Summary

Purpose: To Monitor and Inform the Technical Advisory Committee on Minimum Wildlife Harvests to Support Road Management Decisions				
Monitoring Approach	Measurable Parameter	Timing	Survey Area	Effects and Monitoring Rationale
Voluntary checkpoint station questionnaire	Species, sex, minimum number harvested, and harvest areas Perceived health of harvested animals Road use by community Questionnaire participation	Daily	On and near WR	Concern for increased mortality due to improved harvester access and increased harvest pressure. Meets agreed commitments that are important to the NDDB. Together with the traffic monitoring program, helps inform the determination of adaptive management actions to maintain sustainable harvest levels. Provides data on the questionnaire response rate and validity of the results.

8.2.2.1 Overall Monitoring Approach

The questionnaire will be verbal with the checkpoint monitor reading the questions to the participants and recording their responses. Each question is voluntary. This will provide a manageable means of monitoring a minimum known count of harvests and harvester access. The questions relate to: the community the harvester is

from, the type of hunting licence held, what hunting and trapping practices would be/have been undertaken, approximate harvest effort, species and number harvested, perceived health and/or body condition of the animal(s) harvested, general location of harvest effort (partitioned into 100 km² blocks on a map, refer to Figure D5 in Appendix D), and the participants impression of hunting pressure along the WR (Appendix D).

Results from the Wildlife Harvest Questionnaire will be entered in a harvest database, summarized, and discussed with the proposed Road Oversight Committee. Possible adaptive management strategies, if required, will be determined collectively. The results will be summarized to address interest in hunting/trapping/collecting, total number of voluntary responses (including refusals), harvester community and hunting licence types, traffic and traffic levels, count of minimum known harvests, harvest areas, harvest effort and hunt success, and perceived animal body condition. Although not part of the Wildlife Harvest program, a summary of the Wildlife Observation Logs (refer to Section 8.1.5) will also be provided to support the evaluation of harvesting pressure and perceived sustainability of harvests.

8.2.3 Northern Mountain Caribou

Northern Mountain Caribou are an important harvest species and are culturally significant, listed as Special Concern under both federal and territorial Species at Risk legislation. Some Northern Mountain Caribou occur near the WR, and although the environmental assessment concluded that the Project would have no population-level impacts, the potential to disturb and harm individuals is possible.

Northern Mountain Caribou are usually migratory (a few individual caribou may be the exception), moving up and down in elevation between seasons. Winter occupancy models predict areas along the WR where caribou are more likely to occur (Golder 2014a; 2014b), and thus, at higher risk of Project-related effects.

Baseline aerial winter surveys were completed in five survey periods from 2010 to 2019 (representing at least 13 survey days). Results indicate that overall caribou relative abundance is low during all surveys (Tetra Tech 2021c). Similarly, analyses of caribou distribution in relation to the WR was conducted using Parks Canada's individual collar data (Tetra Tech 2021c). This analysis was conducted on 18 collared female caribou across each available season and year (2015-2018; functioning collars in 2015 (n=18), 2016 (n=17), 2017 (n=14), and 2018 (n=7); relatively small number of collared animals in a single collar deployment). In any season, the proportion of time spent within 5 km or less of the WR was approximately 2% (Tetra Tech 2021c). However, collared caribou use near the WR was not compared to availability and as such, selection away from the road cannot be directly inferred and the percent of time spent near the road is a function of the migratory behaviour of caribou and that location fix intervals in the collar data has lower fine-scale precision for caribou movement. Full analyses of the remote collar data is presented separately in Tetra Tech 2021c.

A total of 46 remote cameras were also deployed in June 2019 and left to run until September 2020 from KP 0 to 56. Of the 46 cameras deployed, 21 were on the road alignment. Data from one camera was unavailable for analysis. The cameras were active for an average of 370 days each (min. = 23 days; max. = 465 days). Northern Mountain caribou were detected at 31% of the cameras (14 of the 45 for a total of 62 independent caribou detections). Camera detections of caribou were primarily during the post-calving and fall/rut seasons; limited detections occurred in spring, and none occurred during the winter or calving seasons. The caribou detection rate was highest in post-calving. The remote cameras detected more predators, such as grey wolf and grizzly bear, than woodland caribou potentially resulting from the same individuals being repeatedly captured by one or more cameras over time. The highest detection rate of caribou was in June 2020 at 1.07 detections/100 camera-days.

Individual caribou that do occur near the WR may experience sensory disturbances, habitat alterations, and increased risk of mortality from improved harvester and predator access and increased risk of animal-equipment collisions, which have the potential to affect local caribou distribution. The remote camera analysis suggests that caribou activity on the road alignment is highest around 5 am and noon. The LKFN, DFN, and Parks Canada also

raised concerns on the potential avoidance effects due to road disturbances, increased predation risk, and direct mortality on Northern Mountain Caribou from the Access Road, and recommended systematic monitoring, mitigation, adaptive management, and reporting to reduce potential effects.

In November 2021, Parks Canada raised concerns with respect to the efficacy of the remote camera program as a baseline and monitoring program for the all-season road. Parks Canada suggested a new collaring program would be an appropriate approach to fulfill caribou baseline data gaps and monitor potential effects from the all-season road.

8.2.3.1 Overall Monitoring Approach

Canadian Zinc is planning a caribou collaring program and pellet surveys to collect additional baseline and to monitor potential effects from the all-season road. The intent of the collars and pellet surveys are to monitor local caribou distribution relative to the road. The collar program is also used to determine whether caribou use particular valleys or ridgelines as movement corridors near the road and any seasonally important habitats.

CZN is currently developing the caribou collaring program for fall-early winter 2022 and the pellet survey for spring 2023. Together, the collaring and pellet surveys will inform future effects monitoring on mountain caribou from the ASR and will be detailed in the Phase 2 WMMP.

The mountain caribou surveys are summarized in Table 14 and further outlined below. Survey designs will be developed with Parks Canada and ENR.

Table 14: Northern Mountain Caribou Baseline/Monitoring Summary

Purpose: To Minimize Effects to Northern Mountain Caribou from the ASR				
Monitoring Approach	Measurable Parameter	Timing	Study Area	Effect and Monitoring Rationale
Collar Program	Seasonal habitat use, movement corridors, and local caribou distribution relative to the ASR	Starting fall/early winter 2022 (3 years)	Within 20 km of the ASR alignment	Concern for increased mortality (due to improved predator access, caribou-vehicle collisions, and increased harvest pressure) and change in distribution
Pellet Survey		Baseline spring 2023 and 2024	Within 4 km of the ASR alignment	Northern Mountain Caribou are listed as Special Concern under the SARA Regulators and local Indigenous groups have expressed concern on ASR effects to caribou Together with the harvest monitoring program and Road Mortality Risk (refer to Sections 8.2.2 and 8.1.6), helps inform the determination of adaptive management actions to minimize mortality effects on caribou from the ASR

CZN proposes to collar 20 females on rut range or during fall migration when caribou typically occur above the timberline and clustered in larger groups. Caribou within 20 km of the Access Road will be targeted for satellite collar deployment. Adult female caribou will be captured using a net-gun by a highly-trained team that specializes in these procedures and animal safety. This would include reconnaissance fixed-wing flights to find caribou, searching first in areas where caribou sign have previously been detected. Once located, a helicopter will be used to deploy the collars. Caribou will not be drugged. The collars would be programmed to automatically drop-off after three years.

During the Project, the QEP will monitor the locations of collared caribou (as the data becomes available) in relation to the WR and will respond with adaptive management when collared caribou are within 10 km of the WR.

The relocation data from collars will be analyzed to determine the overlap of collared caribou in space and time with the ASR, seasonal habitat use, and movement corridors.

The pellet group counts would supplement the collar data and are effective in areas of low animal abundance, as suspected here. Pellet surveys would be completed by the Dene Monitor and community guardians each spring targeting the period between snow melt and before full leaf out. Pellet surveys in spring 2023 would first establish the permanent transects/circular plots placed in areas of previously known caribou occurrence, collared caribou locations and possible movement corridors, and at various distances from the road. Subsequent surveys will be repeated in the established transects/circular plots. Caribou pellets found on transect/plots are recorded and removed to count pellet accumulation over time.

Caribou pellet surveys are planned to collect baseline data in 2023 and 2024 and effects monitoring for the ASR starting in 2025. Additional details of the monitoring program will be presented in the Phase 2 WMMP. A power analysis will be completed on the 2023 and 2024 data to assess sampling effort (number and length of transects/plots) required to detect change over time. Effort in subsequent years will be adjusted based on this analysis.

8.2.4 Boreal Caribou

The objectives are to monitor winter track density of Boreal Caribou, their predators, and alternate prey (moose/bison) along 1 km segments of the WR to manage risk of animal-vehicle collisions. Boreal Caribou are an important harvest species, culturally significant, and protected as a Threatened species under both the territorial and federal SARAs because of their small population size, threats to their habitat (e.g., forest fires and human development), and sensitivity to increased predation risk and human disturbances.

To limit potential Boreal Caribou effects, CZN realigned the WR to uplands along the eastern foot of the Nahanni Range during the environmental assessment EA0809-01 as this area was deemed less important for Moose and Boreal Caribou during stakeholder meetings. The WR, from approximately the Silent Hills east to the Liard Highway, crosses through Boreal Caribou range considered to be at the edge of the main Boreal Caribou range.

During the 2017 Public Hearing, it was identified that the boreal caribou range near the WR is flown annually for ENR's Moose and Bison surveys, and no caribou have been seen nearby. Similarly, during the CZN baseline surveys that were conducted periodically between 2010 to 2019, a total of one caribou observation was reported during all ten aerial surveys (the number of individuals at this observation was unreported). Boreal Caribou have also been recorded infrequently in the area by Nahanni Butte residents. This supports the revised alignment at the edge of Boreal Caribou main range, as recommended during EA0809-01 stakeholder meetings.

A winter occupancy model also predicts very low caribou occupancy (Golder 2014a; 2014b), and thus there is also a low likelihood of caribou-vehicle interaction. ENR, ECCC, and LKFN identified a need to monitor Boreal Caribou occurrence during operation of the road, and ENR has raised concerns of caribou-vehicle collision risk.

Across North America including in Banff National Park, locations prone to animal-vehicle collisions have been predicted based on reported animal observations (i.e., similar to information collected in the Wildlife Observation Logs) and winter track surveys (Huijser et al. 2008, Clevenger et al. 2002, Clevenger et al. 2010). A similar monitoring approach will be conducted to monitor Boreal Caribou along the WR.

8.2.4.1 Overall Monitoring Approach

The Boreal Caribou monitoring program will be conducted twice along the WR from KP 110 to the Nahanni Access Road (KP 170) between December 2022 to March 2023 (approximate) to increase the likelihood of detecting Boreal Caribou, should they occur in the area. The Boreal Caribou Winter Track Monitoring Plan is summarized in Table 15, outlined further below, and detailed in Appendix D.

Table 15: Boreal Caribou Monitoring Summary

Purpose: To Manage Risk of Caribou-Vehicle Collisions				
Monitoring Approach	Measurable Parameter	Timing	Study Area	Effects and Monitoring Rationale
Winter track surveys	Winter track density (per 1 km segment) of caribou, predators, and alternate prey along the WR	Two track surveys, scheduled at least 3 weeks apart between Dec 2022 to Mar 2023 (depends on a safe crossing at the Liard River)	Along WR from KP 110 – 170	<p>Concern for increased mortality (due to caribou-vehicle collisions) and distribution.</p> <p>Boreal Caribou are listed as Threatened under the federal and territorial SARAs.</p> <p>Meets agreed commitments that are important to the NDBB.</p> <p>Helps inform the determination of adaptive management actions to minimize risk of caribou-vehicle collisions.</p>
Related Programs				
Caribou observations (including fresh tracks) are also reported daily ahead of the clearing equipment (per the Clear Scan and Wildlife Observation Logs) and weekly during the Road Survey.				

Two winter track surveys will be completed; the first once the mini-mulcher trail is open (and a safe crossing is available on the Liard River) and the second either during a period of suspended travel or after the WR is closed in March. Surveys will be completed by Dene Monitors following standard winter track survey procedures using either snowmobiles and or a vehicle (Appendix D). A vehicle may be used when the snowbank heights begin to limit the visibility into the right-of-way from a snowmobile or is required for the safety of the surveyors.

The length of the WR from KP 110 to the Nahanni Access Road (KP 170), the portion of the WR within Boreal Caribou range, will be surveyed. To account for detectability, the surveyors will repeat the survey along 10 km of the WR. After the survey, the QEP, with support from the Dene Monitor, will enter the field results into the database. Field observations will be binned into 1 km sampling lengths along the WR, and within each 1 km length, analyzed for each monitoring parameter (local distribution and density of tracks crossing the WR for caribou, predators, and alternate prey tracks).

The ideal time to conduct the winter track surveys are when wildlife tracks are more easily visible in the snow, approximately 2 to 4 days after a snow or wind obliterating event, and when undisturbed by equipment tracks and snowplowing. The QEP, with support from a Dene Monitor, will schedule the track surveys as appropriate and consult with the Construction Manager to plan when snowplowing may proceed once each winter track survey is complete.

As part of the next Project phases, CZN will monitor Boreal Caribou, predators, alternate prey, and traffic using remote cameras, as recommended by ENR for the proposed all-season road. ENR suggested placing cameras at regular intervals along the road to increase the likelihood of detecting Boreal Caribou presence and to provide greater temporal coverage of periods when the road is operational.

8.2.5 Birds

The Mackenzie Valley Review Board concluded that there are likely to be adverse impacts on migratory birds from the construction and operation of the ASR due to habitat loss and alteration, mortality and harm, and disturbance. CZN committed to baseline surveys for birds and an effects monitoring program for bird species-at-risk. The baseline survey is described in the Birds Baseline report (Tetra Tech Canada, 2022). The main strategy to minimizing impacts to birds is minimization of the footprint (e.g., following the existing 1980s road alignment), restoration of cleared areas as early as possible, dust suppression (if needed) to avoid degradation, and clearing outside the bird nesting period.

8.2.5.1 Overall Monitoring Approach

The objective of the Bird Acoustic Monitoring program is to identify change to the bird community and to select bird species along the ASR over time. Birds will be surveyed annually using acoustic monitoring, consistent with the bird baseline survey. The Bird Monitoring Plan is summarized in Table 15 and outlined further below.

Table 16: Bird Effects Monitoring Summary

Purpose: To Minimize Effects to Birds				
Monitoring Approach	Measurable Parameter	Timing	Study Area	Effects and Monitoring Rationale
Surveys using acoustic monitoring	Change in mean survey species richness. Change in mean survey total abundance. Change in mean density of focal species.	Annually during the bird breeding season for 5 years starting in 2023	Along the entire length of the ASR	Concern for habitat loss, fragmentation, and sensory disturbance to bird distribution and abundance. Some species are listed under the federal and territorial SARAs. Helps inform the determination of adaptive management actions to minimize effects to bird distribution and relative abundance.

Data collection will include all bird species that can be detected using Autonomous Recording Units (ARUs) and where density can be estimated using the QPAD approach (see the Birds Baseline report for a description of the QPAD method). The monitoring parameters will be (1) change in mean survey species richness, (2) change in mean survey total abundance, and (3) change in mean density of focal species.

For change in mean density, detailed analyses will be on select focal species. The selection of focal species is based on:

- Federal conservation listing (SARA and COSEWIC).
- Species where predicted density is higher within 100 m of the ASR relative to the mean for the region, suggesting that habitat loss may be disproportionate relative to the region (see Table 6-1 in the baseline report).
- Indicator species that are representative of broad habitat guilds. The selected habitat guilds are: 1) coniferous/taiga forest, 2) deciduous/mixed forest, 3) open dry habitats (grassland, shrubland, and barren), and 4) open wetland. Two species from each habitat guild have been selected, in addition to those with Federal conservation listing.

Focal species are:

1. Canada Warbler: Federally listed; higher predicted density along and near road relative to the region; part of deciduous/mixed forest guild.
2. Olive-sided Flycatcher: Federally listed; slightly higher predicted density near road relative to the region; part of coniferous/taiga forest guild.
3. Ovenbird: Higher predicted density near road relative to the region; deciduous/mixed forest guild representative.
4. Red-eyed Vireo: Higher predicted density near road relative to the region; deciduous/mixed forest guild representative.
5. White-winged Crossbill: Slightly higher predicted density near road relative to the region; part of conifer/taiga forest guild
6. Ruby-crowned Kinglet: Slightly higher predicted density near road relative to the region; part of conifer/taiga forest guild
7. Swamp Sparrow: Higher predicted density near road relative to the region; open wet habitat guild representative.
8. Common Yellowthroat: Slightly higher predicted density near road relative to the region; Open wet habitat guild representative.
9. Alder Flycatcher: Open dry habitat guild representative.
10. White-crowned Sparrow: Open dry habitat guild representative.

Using data collected in 2017, the ability to detect change over time in select bird community metrics and across species densities was evaluated using Monte Carlo simulation of power. A -20% change in density may be detected with approximately 80 stations in five years for all species. That same change can be detected with fewer than 80 stations and/or in fewer years for many species. A -20% change in mean survey species richness and total abundance could be detected in two years of monitoring with fewer than 60 stations.

Birds will be monitored for five monitoring years starting in 2023, after the WR has been constructed. Survey locations will be based on the locations surveyed in 2017 and adjusted to address any data gaps. Additional survey intensity will be in areas where Canada Warbler density is expected to be highest. Higher rates of detection may improve the ability to detect a change in Canada Warbler density.

In the 2023 monitoring year, after construction of the WR and prior to the construction of the ASR, there are logistical challenges with deployment of ARUs. In that year, 30 ARUs will be deployed. When the ASR is operating, 80 locations will be surveyed using the same 40 ARUs and by moving them once during the breeding season. After five years of monitoring, six years of data will have been collected, including the baseline data from 2017.

After each monitoring year, the data will be analyzed consistent with the analyses contained in the baseline report. To determine the change in focal species density, total abundance, and diversity, a trend estimation approach will be used. The trend estimation approach spans the before and after time periods and aligns with the progressive nature of the road development (first WR then ASR) and provides the best opportunity to detect the response of the measurement metrics over time. Alternative analytical methods may be explored if any improvements in accuracy or improved interpretation can be realized. The annual analyses will include analysis of

power to detect change in richness, total abundance, and focal species density. The sampling strategy (number of survey stations and locations) may be adjusted in subsequent years based on the results of analyses incorporating the latest collected data.

9.0 ADAPTIVE MANAGEMENT

Adaptive management is a systematic, rigorous approach designed to link monitoring to management actions. It is a structured process of continual learning and improving management policies and practices based on data collected through mitigation and effects monitoring, Dene Knowledge, similar northern land use projects, and input from regulatory agencies. Adaptive management may be initiated at any time during the WR based on site-specific information collected by a Dene Monitor, when Dene Knowledge is provided to CZN and/or the ROC, and from lessons learned with annual reporting and analyses. The process of including Dene Knowledge into adaptive management is provided in Section 9.1 *Incorporation of Dene Knowledge*.

As adapted from framework developed by the Wek'èezhìi Land and Water Board (WLWB), the response framework is an approach for responding to the results of each monitoring program. This adaptive management framework assumes that the best management actions may not be defined up front but determined in response to specific changes documented through the WR Monitoring Programs and other means.

As a starting point, CZN uses pre-set management action levels and response strategies based on wildlife and wildlife habitat knowledge gained through baseline studies, implementation of the WMMP, and Dene Knowledge to improve management practices as particular instances and site-specific conditions arise. As the Project progresses, and through the process of adaptive management, the WMMP will be adjusted to incorporate modifications and/or additions to mitigation and monitoring programs, methods, and corporate SOPs.

The WMMP is a living document and will be updated periodically as experience is gained and new information is acquired. The wildlife monitoring procedures and on-site mitigation measures will be evaluated regularly (e.g., during established reporting cycles) and reviewed with Parks Canada, ENR, ECCC, and local Indigenous groups, as appropriate. Recommendations for improvement based on science, Dene Knowledge, newly listed Species at Risk, and lessons learned from the Project and others will be incorporated into subsequent editions of the WMMP.

An overview of the Response Framework process to manage and monitor wildlife is illustrated in the decision tree below in Figure 10 (adapted from WLWB 2010).

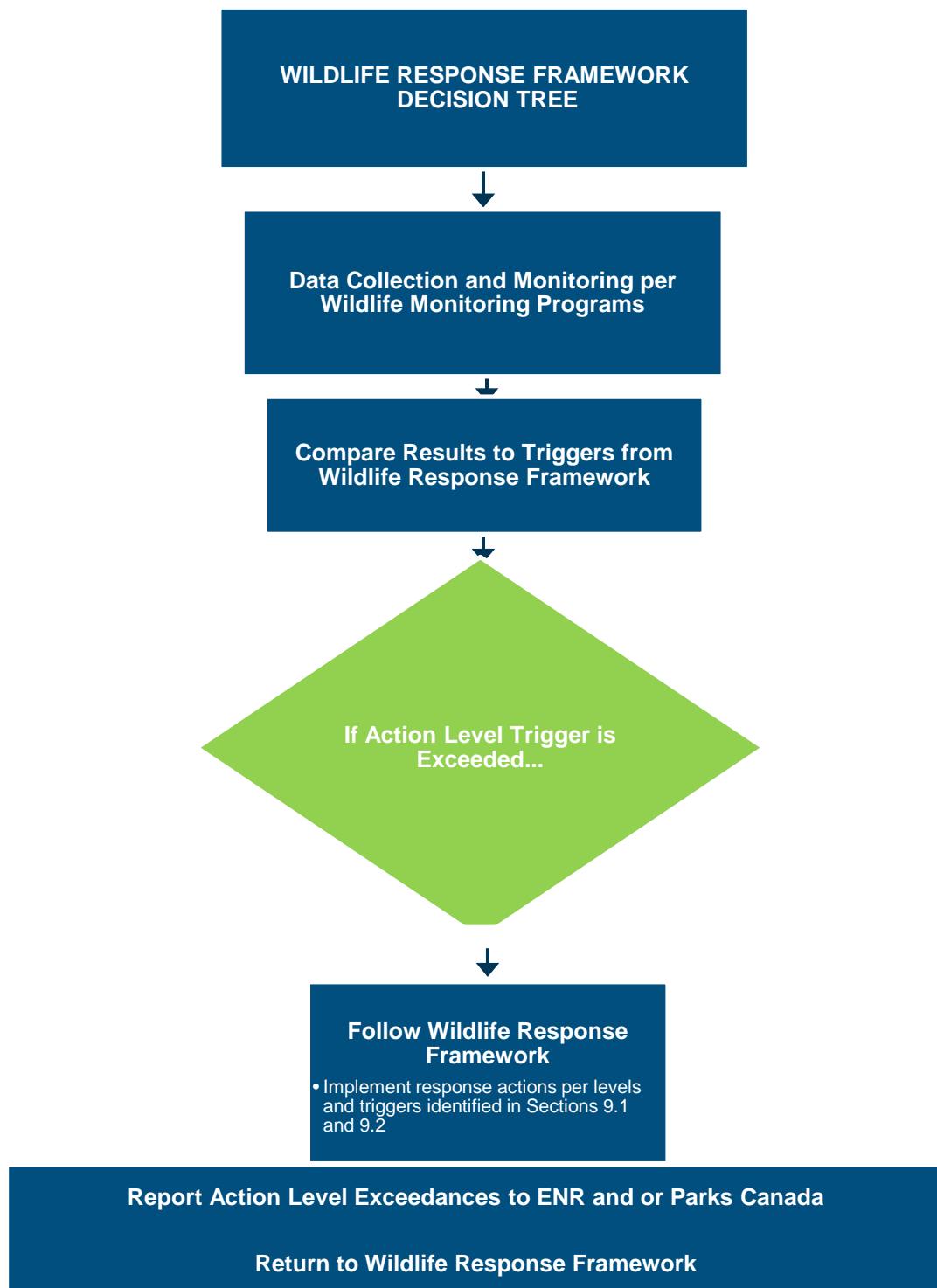


Figure 10: Overview of Proposed Response Framework Decision Tree (adapted from WLWB 2010)

9.1 Mitigation Monitoring

9.1.1 Den and Nest Pre-Clearing Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:
 - A den, lodge/dam, pushup, raptor nest, or bat hibernacula is detected outside the applicable setback during the Fall Survey.
- Moderate Action Level:
 - A bear den or wolverine natal den is detected during the Fall Survey within 800 m to winter clearing and 1.5 km to potential avalanche control sites.
 - A den, lodge/dam, pushup, raptor nest, or bat hibernacula is detected on the WR footprint by the Dene Monitor/QEP before the Project activity approached to within the setback notably, den/nest monitoring may occur several days ahead of the clearing equipment depending on the weather and clearing progress).
- High Action Level:
 - A den, lodge/dam, pushup/hibernaculum, raptor nest, or bat hibernacula is detected on the WR footprint after the Project activity approached within the setback.
 - Project activities are suspected to have disturbed a bear, wolverine, or other winter denning mammal from its den.
 - A bear den, wolverine natal den, beaver lodge/dam, muskrat push-up, raptor nest, or bat hibernacula is destroyed without a permit to do so.

Appropriate adaptive management actions are provided in Table 16.

Table 17: Den and Nest Pre-Clearing Adaptive Management Options

Adaptive Management Options	Den/Lodge/Dam/Hibernacula Activity				Raptor Nest
	Occupied	Unoccupied	Unknown/Suspected	Unoccupied	
1. Low Levels: Notify ENR and/or Parks Canada of all occupied and unoccupied den and nest locations;	✓	✓	✓	✓	
2. Moderate & High Levels: Relocate the WR activity to avoid destruction of the den, lodge/dam, pushup, hibernacula, and raptor nest;	✓	✓	✓	✓	
3. Moderate & High Levels: Relocate the WR activity outside the setback distances (but still within the expected Access Road right-of-way) to limit disturbance;	✓		✓		
4. Moderate & High Levels: If the WR activity cannot be relocated outside the setback distances, all of the following adaptive management actions to limit disturbance and monitor apply:					
▪ Reduce the size of the setback distance in consultation with ENR and/or Parks Canada and proceed with adaptive management to 1) limit disturbance and 2) monitor;	✓		✓		

Table 17: Den and Nest Pre-Clearing Adaptive Management Options

	Den/Lodge/Dam/Hibernacula Activity			Raptor Nest
▪ Reduce the duration of Project activities (and or noise levels) that occur inside the setback if possible. Considerations may include forego the first pass with the mini-mulcher or abstain from using a snowmobile to support the Clearing Scan inside the setback);	✓		✓	
▪ Monitor the den using a remote camera to determine if Project activities result in unintentional abandonment. Install the remote camera before Project activities start and leave to operate until after the activities inside the setback are complete. To avoid disturbing the den during camera setup/retrieval, any approach within 200 m of the den will be done on foot.	✓		✓	
5. High Level: If road relocation is impractical, acquire a permit from ENR and/or Parks Canada to destroy an unoccupied nest				✓
6. High Level: If a den/nest is found within the applicable setback distance when clearing or blasting, suspend Project activities, contact Parks Canada and/or ENR to determine appropriate mitigation, fill out a Wildlife Incident Report, and proceed with Project activities only once approved by the regulatory agency and adaptive management actions are applied.	✓	✓	✓	✓
7. High Level: If Project activities destroy a den/nest or suspected of disturbing a den. Investigate the cause, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident that may include the Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed.	✓	✓	✓	✓

9.1.2 Collared Pika Construction Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:
 - None. Refer to adaptive management responses relating to snow/rock/road debris inside pika exclusion zone in Section 9.1.6 (*Road Mortality Response Framework*).
- Moderate Action Level:
 - Direct loss of an active or inactive talus site during road planning.
 - Direct loss of meadow habitat (meadow within 10 m of the active or inactive talus site) during road planning.
- High Action Level:
 - The Project determined to have affected pika occupancy at the talus sites (i.e. an active pika site becomes inactive following WR construction)

Refer to adaptive management responses relating to snow/rock/road debris inside pika exclusion zone in Section 9.1.6 (Road Mortality Response Framework). Appropriate adaptive management responses include:

- Low Level:
 - None
- Moderate Level:
 - Re-align (minor adjustment to avoid direct loss) the Project footprint during planning if results in a direct loss of talus site and/or its associated meadow (i.e., 10 m from talus) to the extent possible.
 - If the Project footprint cannot be re-aligned during planning:
 - Reduce the size of the setback distance in consultation with ENR and/or Parks Canada based on the active presence of pika found during the construction survey and availability of additional nearby meadow and other talus sites.
 - Proceed with appropriate actions to limit disturbance (e.g., reducing the duration that WR activities occur within 10 m of the talus site is an appropriate action to limit winter disturbance).
- High Level:
 - Notify and consult with ENR and or Parks Canada within 24 hours of the observation if Project activities result in the direct loss of habitat without prior consultation with regulators and or the Project may have affected pika occupancy.
 - Investigate the cause, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident that may include the Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed.
 - Follow-up with re-training, a safety meeting, or employee/contractor reminders.

9.1.3 Blast Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:
 - None
- Moderate Action Level:
 - A known (occupied, unoccupied) or suspected bear den is within 1.5 km of a planned blast.
 - A big game/Species at Risk sighted within the setback before blasting began and deterrents were used to encourage wildlife to move outside the setback following procedures outlined in SOP #1 (on territorial lands only) or as instructed and authorized by Parks Canada (in NNPR only).
- High Action Level:
 - A big game/Species at Risk is sighted within the setback distance once blasting began and/or within a half hour after blasting.

- A known or suspected bear den (occupied, unoccupied) is within 1.5 km of an activated blast without prior consultation with ENR and or Parks Canada.
- Blasting is suspected to have disturbed a bear, wolverine, or other winter denning mammal from its den.

Appropriate adaptive management responses may include:

- Low Levels:
 - None
- Moderate Level:
 - Consider reducing the planned blast charge in consultation with ENR and or Parks Canada.
- Moderate & High Levels:
 - Prepare a Wildlife Incident Report.
- High Levels:
 - Notify and consult with ENR and or Parks Canada **within 24 hours** of the observation if Project activities are suspected to have disturbed a bear, wolverine, or other winter denning mammal from its den.
 - Investigate the cause, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident that may include the Blaster of Record, Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed.
 - Follow-up with re-training, a safety meeting, or employee/contractor reminders.

9.1.4 Wildlife Hazard Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:
 - A nest, den, hibernacula, or roost observed in or near a camp or worksite.
 - An installed mitigation, such as a sign, requires maintenance and/or replacement.
 - CZN has become aware of advanced mitigation techniques or a new BMP.
- Moderate Action Level:
 - An attractant is suspected when a big game/Species at Risk (and/or their fresh sign) has been sighted at a waste storage area one or more consecutive days (per the Wildlife Observation Logs) or during the weekly monitoring events (per the Worksite Check/Waste Audit).
 - A single monitored Project mitigation is perceived to be, or determined to be, not functioning as intended or noncompliant.
- High Action Level:
 - A wildlife residence or mineral lick observed in or near a camp or worksite and has the potential to be destroyed or disturbed by Project activity (i.e., inside setbacks and restricted activity periods (Table 4)).

- An incident of a big game/Species at Risk that has gained access to a Project attractant.
- Not all audited Project commitments and/or mitigations are implemented.

Appropriate adaptive management responses are provided below:

- All Levels:
 - Update the Worksite Check and Waste Management Audit field forms with new applicable mitigations that have been implemented.
- Low Level:
 - Follow the appropriate procedure outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife* if a den, nest, hibernacula, or roost is observed.
 - Repair, improve, and/or add new mitigation. For example:
 - Use flagging tape to exclude vehicles from driving off the Project footprint at a particular location;
 - Make repairs to prevent wildlife gaining shelter;
 - Turn light sources away from wildlife habitat or update to motion sensor lights, where appropriate;
 - Secure waste where inaccessible to wildlife and or use bear-proof containment; and
 - Incorporate improvements based on Dene Knowledge.
- Moderate & High Level:
 - Remove/manage unsecured attractants per the Waste Management Plan and this wildlife Plan.
 - Notify and consult with ENR, Parks Canada, and or ECCC **within 24 hours** of the observation if the wildlife residence or mineral lick has the potential to be destroyed or disturbed by WR activity or if a big game/Species at Risk gained access to an attractant. Follow the appropriate procedure outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife*.
 - Follow-up with a safety meeting, employee/contractor reminders, or re-training.
 - Increase the frequency of the Worksite Checks and or Waste Management Audits.
 - Increase the frequency of waste removal and/or washing of the waste container/storage area.
 - Investigate the cause, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident, potentially including the Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed.
 - Prepare a Wildlife Incident Report when a big game/Species at Risk has or potentially has gained access to an attractant.
- High Level:
 - Consider installing a fence around permanent camps or waste areas in applicable Project phase.
 - Work with the Spill Incident Response Team Supervisor for action.

- Update the Waste Management Plan, Spill Contingency Plan, and or SOP #2 *Reducing Wildlife Attractants*.

Once receiving a food reward, bears, wolverines, and wolves are likely to revisit and increase the risk of human-wildlife conflict. Mitigations and monitoring are in place to reduce these risks. The NWT *Wildlife Act* Section 56(4) indicates that killing wildlife for the defense of life or property is not defensible if it is the result of human-related mismanagement. Relocation of a bear, wolverine, or wolf that becomes a threat to human safety is a last resort option and may only be considered with prior consultation with ENR and or Parks Canada (including permits in place) and when all other management actions have proven unsuccessful.

9.1.5 Wildlife Observation Logs and Incident Reporting Response Framework

Action levels to trigger adaptive management action are:

- Low Level:
 - An observation of a big game/Species at Risk in or near camp or active worksite.
- Moderate Level:
 - A wildlife residence (nest, den, push-up, hibernacula, or roost) observed outside the Project setbacks and or restricted activity periods (Table 4) and thus has a low potential to be destroyed or disturbed by Project activity.
 - Reoccurring sightings of a big game/Species at Risk in the same general area (i.e., within 1 km) for a minimum of three consecutive days. Reoccurring sightings could suggest an available attractant (e.g., carcass, mineral lick, unsecured waste), a wildlife residence (e.g., den), and/or possible AVC risk area. Also refer to the Wildlife Hazard and Road Mortality monitoring programs in Sections 8.1.4 and 8.1.6, respectively.
 - Suspected harvesting of one or more big game/Species at Risk (e.g., harvested carcass found).
- High Level:
 - A wildlife residence (nest, den, push-up, hibernacula, or roost) observed inside the Project setbacks (i.e., in or near camp/worksit) and or restricted activity periods (Table 4) and thus has the potential to be destroyed or disturbed by Project activity.
 - An observation of a mineral lick within 2 km of the Project.
 - A reportable wildlife incident (e.g., accidental destruction of a wildlife residence, wildlife injury, deterrent use, large carnivore in active camp).
 - A big game/Species at Risk mortality resulting, or suspected, from Project activities.
 - More than three wolverine and five grizzly bear visual sightings during the Project.

Appropriate adaptive management actions may include:

- All Levels:
 - Relay wildlife sightings/encounters/conflicts, residences, and mineral lick locations to employees and contractors during the daily tailgate meeting to inform daily Project activities.
 - Ask employees and contractors if they have a wildlife sighting that has not yet been recorded on the Wildlife Observation Log; ensure the observation is recorded.

- Low Level:
 - Follow the appropriate procedures outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife*.
- Moderate Level:
 - Respond to a wildlife attractant following SOP #1 *Reporting, Responding to, and Deterring Wildlife* and SOP #2 *Reducing Wildlife Attractants*. Refer to adaptive management actions for *Wildlife Hazard Monitoring*.
 - Respond to a wildlife trail by adding a wildlife caution zone sign following the procedure presented in WMMP #5 Road Mortality Risk.
- Moderate & High Level:
 - A Dene Monitor to investigate the area to confirm the observation of a wildlife residence or mineral lick and or determine a possible reason for repeated wildlife sightings (e.g., den, a carcass or food source, wildlife trail, other Dene Knowledge). Respond to a wildlife residence or mineral lick following SOP #1.
 - Respond to a wildlife residence following adaptive management outlined in *Wildlife Hazard Monitoring*.
 - Investigate the cause, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident, potentially including the Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed. Depending on the root cause of the wildlife incident, appropriate adaptive management may also include actions identified in the Wildlife Hazard Mitigation (Section 8.1.5) and Road Mortality Risk (Section 8.1.6) programs.
 - Staff notification of the possible conflict area.
 - Temporary site closure of applicable worksites.
- High Level:
 - Increase the Road Mortality Risk monitoring frequency in areas along the WR and/or install temporary wildlife caution zone sign until wildlife no longer consistently reported in the area (refer to *Road Mortality Monitoring*).
 - Undertake monitoring at the mineral lick, such as installing remote camera(s) to determine seasonal use to inform mitigation(s) (e.g., seasonal restricted activities).
 - Undertake wolverine and or grizzly bear monitoring, such as habitat suitability or mortality risk spatial models to inform new mitigation.
 - Follow-up with re-training, a safety meeting, or employee/contractor reminders.
 - Update or improve Project policies or practices, add new mitigation or adjust existing (as required). Project policies or practices changed as a result of the WMMP may also require updating within the Traffic Control Mitigation and Road Operations and Maintenance Plan.

9.1.6 Road Mortality Risk Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:
 - Big game/Species at Risk trails observed during other monitoring programs, such as the Wildlife Observation Logs, Wildlife Hazard, and Boreal Caribou Winter Track monitoring programs.
 - Repairs or improvements are needed to the existing pika markers (i.e., painted rebar) that are distinguishing where the deposition of snow, rock, and road debris on active pika talus/meadow is prohibited.
- Moderate Action Level:
 - Road-related mitigations are found to be, or perceived to be, not functioning as intended or non-compliant. For example, a caution zone sign needs repairs or the breaks in the snow banks are too narrow or high.
- High Action Level:
 - An animal-vehicle collision, or near miss, with a big game/Species at Risk.
 - Snow, rock, or road debris was pushed onto an active pika talus or its meadow (the meadow within 10 m of the active talus site).

Appropriate adaptive management actions may include:

- Low Level:
 - Install/maintain wildlife caution zone signs.
 - Repair and/or improve the visibility of the marker (e.g., painted rebar) by:
 - Shoveling snow to expose the rebar immediately ahead of the clearing equipment.
 - Re-applying fluorescent paint to the rebar.
 - Installing a temporary sign or caution flagging tape to further distinguish the exclusion zone.
 - Reminding equipment operators, the purpose of the markers and snow, rock, and road debris cannot be pushed onto the pika talus/meadow within this zone. Confirm that the equipment operator's GPS proximity warnings are set appropriately.
- Moderate Level:
 - QEP/CM to instruct a snowplow operator to correct snow banks that are noncompliant.
 - Revise mitigation or Project procedures. For example:
 - Reduce the spacing of snow berm breaks at/near big game species/Species at Risk trails; and
 - Update the Traffic Control Mitigation and Road Operations and Maintenance Plan with adaptive management actions.
- Moderate & High Level:
 - Notify staff of the possible conflict area and/or implement a temporary site closure.
 - Increase the Road Survey frequency.

- Follow-up with a safety meeting, employee/contractor reminders, or re-training.
- High Level:
 - Investigate the cause of the animal-vehicle collision or near miss, prepare an investigation report, and implement corrective measure(s) based on the results of the investigation. Include all parties involved in the incident, potentially including the Dene Monitors, QEP, CM, and the Health and Safety Coordinator (HSC) as well as ENR and or Parks Canada as required. The investigation should determine what happened, why, and how preventing the incident failed. If a carcass is determined to be resulting from traditional harvesting, the Dene Monitor to follow carcass disposal procedures outlined in SOP #1 and no further adaptive management is required.
 - Temporarily reduce traffic of non-Project vehicles, as identified in the Traffic Monitoring program, should traffic volumes be suspected as a cause of the incident.
 - Reduce traffic volumes during periods when big game/Species at Risk are most often on the road (refer to the baseline caribou and remote camera report; Tetra Tech 2021c).
 - Improve driver sightlines at specific road locations.
 - Notify and consult with ENR and or Parks Canada **within 24 hours** of the observation if Project activities result in the direct loss of pika habitat and if snow, rock, or road debris was pushed onto the active talus or meadow, within the delineated exclusion zone.
 - Follow-up with a safety meeting, employee/contractor reminders, or re-training.

9.2 Effects Monitoring

9.2.1 Traffic Response Framework

Traffic on the WR will be monitored as per this Plan as well as the Traffic Control Mitigation and Road Operations and Maintenance Plan. The QEP will also advise Parks Canada whenever non-Project vehicles are encountered inside the park for Parks Canada to track.

The results from traffic monitoring inform adaptive management action for the Road Mortality Risk and Wildlife Harvest monitoring programs outlined in this Plan, as well as the Traffic Control Mitigation and Road Operations and Maintenance Plan.

9.2.2 Wildlife Harvest Response Framework

Results of the Wildlife Harvest Questionnaire collected at the checkpoint will be provided to the Road Oversight Committee monthly during WR activities for their review and timely implementation of adaptive management.

Adaptive management, as decided collectively with local Indigenous groups and applicable government agencies, will be undertaken to maintain an appropriate participation rate with the questionnaire and minimum harvest within sustainable levels, as determined by the local Indigenous groups.

Additional triggers for adaptively managing wildlife harvest on the WR, include:

- Evidence of non-Project vehicle access on the WR is observed;

- Evidence of non-Project vehicle access on the WR outside the checkpoint station hours, as determined from the daily review of the checkpoint's remote camera; and
- Evidence of hunting, fishing, or trapping is observed along the WR or documented in the Wildlife Harvest Questionnaire at the checkpoint station.

If non-Project traffic is identified or suspected on the WR it should be immediately reported to the Construction Manager and the following response actions will be implemented:

- Construction Manager, QEP, or a Dene Monitor will notify WR users of the location and identity of the non-Project vehicle;
- A Dene Monitor will be dispatched to monitor and report on the non-Project vehicle; and
- Construction Manager will investigate the non-Project vehicle incident for the following:
 - Reason for WR access;
 - Location and time of WR entry; and
 - Intended WR destination.
- Work with the Road Oversight Committee and applicable government agencies to develop appropriate adaptive management. This may include updating the Wildlife Harvest Questionnaire and educating harvesters about the importance of the questionnaire. The Traffic Control Mitigation and Road Operations and Maintenance Plan will also be updated, as appropriate, with adaptive management carried out in response to the wildlife harvest monitoring program.

Information from the non-Project vehicle investigation will be used to review CZN's Access Control procedures and operation of the checkpoint in subsequent Project phases, per the Traffic Control Mitigation and Road Operations and Maintenance Plan.

9.2.3 Northern Mountain Caribou Response Framework

Northern Mountain Caribou adaptive management action for the WR are triggered by the results of the collaring program, as well as the following mitigation monitoring programs: Blast, Wildlife Observation Log and Incident Reporting, and Road Mortality Risk. Provided that the collaring data is readily accessible, the most recent locations of collared caribou will be used to identify caribou within 10 km of the road and inform mitigations, such as installing caution zone signs at known crossing areas as well increase the frequency of the Road Survey in a 10 km radius of the collared caribou.

Baseline data from the caribou collaring and pellet surveys will be incorporated each year into the annual reports to inform adaptive management for subsequent Project phases and long-term monitoring of Project effects over time. As applicable over the long-term, additional adaptive management triggers and responses will be included in Phase 2 and may include permanent caution signage and or seasonal speed restrictions in areas of caribou movement corridors and seasonally important habitats.

9.2.4 Boreal Caribou Response Framework

Action levels to trigger adaptive management action are:

- Low Action Level:

- A fresh caribou trail (1-2 days old) intersecting with the WR.
- Moderate Action Level:
 - None
- High Action Levels:
 - Multiple fresh and old caribou trails intersecting across a wider segment of the WR that may indicate an overwintering area.

Appropriate adaptive management responses are provided below:

- Low & High Levels: Install and maintain wildlife caution zone signs at fresh trails and/or across larger road segments following procedures outlined in Section 9.1.6.
- High Level:
 - A professional biologist to photo verify the identified caribou trails.
 - Follow-up with a safety meeting, employee/contractor reminders, or re-training for extra vigilance in the area.
 - Consult with ENR/Parks Canada to reduce noise levels from Project activities.

Additional adaptive management action levels and responses related to Boreal Caribou are described in the Wildlife Observation Log and Incident Reporting and Road Mortality Risk monitoring programs for the WR.

Additional adaptive management triggers and responses will be included in subsequent Project phases per ENR's recommended remote camera program to monitor Boreal Caribou.

9.2.5 Bird Response Framework

The Bird Acoustic Monitoring program is designed to detect a -20% change in focal species density, species richness, and total abundance (these are the measurement metrics) in five year or less. A -20% change in any of the metrics after five years of monitoring will trigger adaptive management action. This is well beyond the time frame of the WR and applies to when the ASR is operational. The response will be to work with the Road Oversight Committee and applicable government agencies to develop appropriate adaptive management. Appropriate adaptive management will be highly dependent on the detected change (i.e., which measurement metrics are affected) and informed by detailed delineation of focal-species habitat and examination of and comparison to regional trends (e.g., other monitoring programs in the region or trends reported by the Boreal Avian Modelling Project). Potential mitigation could include:

- Enhanced restoration of unused portions of the WR or unused portions of the ASR (e.g., borrow pits used for construction).
- Provision of resources for offsets (e.g., for restoration of legacy impacts from other developments).

10.0 REPORTING

Issues and considerations regarding wildlife populations and effects will be discussed during the TAC meetings as well as through submission of reports and annual presentations.

Table 18 outlines the types of reports that will be prepared for the WR and are further described below:

Table 18: Reporting Types for the Winter Road

Report Type	Frequency	Responsible Person	Monitoring Program
Pre-Construction Report	Once prior to WR activities	Professional Biologist	1. <i>Den and Nest Pre-Clearing Monitoring</i> (Section 8.1.1) 2. <i>Collared Pika Construction Monitoring</i> (Section 8.1.2)
Construction Report	Every two weeks during WR activities	QEP	All
Monthly Harvester Questionnaire Report	Monthly during WR activities	QEP	Wildlife Harvest Monitoring (Section 8.2.2)
Annual Presentation	Once annually	CZN	All
Annual Report	Once annually	Professional Biologist	All

1. Pre-clearing/pre-construction reports: CZN will submit the results of the aerial *Den and Nest Pre-Clearing Monitoring* (Section 8.1.1) and the *Collared Pika Construction Monitoring* (Section 8.1.2) programs to ENR and Parks Canada prior to the start of WR activities. These reports will include the results of the monitoring surveys and adaptive management actions taken and will be prepared by a Professional Biologist.
2. Construction report every 2 weeks (in response to ENR's Revision 4 requirement): The QEP will prepare the construction reports, with support from a Dene Monitor and the Construction Manager, and provide to ENR and Parks Canada, at minimum every two weeks, during WR activities. The reports will describe the wildlife mitigations implemented, including the locations of wildlife caution zone signs and number of days in place, wildlife data collected under the various monitoring programs (including a copy of the Wildlife Observation Logs), wildlife incidents, and any adaptive management measures that were triggered and actions taken. Photos of mitigations and other wildlife results will be included, as appropriate.
3. Monthly Harvester Questionnaire report: The QEP will briefly summarize the Wildlife Harvester Questionnaire data and submit to the ROC for their review and consideration. The monthly harvester report will include the number of non-Project vehicles inside and outside checkpoint station hours of operation, community of origin, species, sex, and minimum number of animals harvested, species health, and harvest pressure comments.
4. Annual presentation: CZN will present the results of the WMMP during one of the proposed ROC meetings, which will involve regulators. A second presentation can be made to local Indigenous groups and communities separately in a more culturally-focused manner.
5. Annual report: Prepared by a Professional Biologist and provided to regulators and local Indigenous groups to solicit review of the effectiveness of mitigation measures and, following discussion in ROC meetings, to suggest modifications to mitigation and monitoring plans, as necessary. As per the REA (MVRB 2017; Measure 6-1, Part 3) the Annual report will be provided to Parks Canada, ENR, ECCC, NDDB, LKFN, and DFN (refer to Section 5.1.1). The Annual report is to include, but is not limited to:
 - a) Project review including the footprint spatial data, post-construction of the WR (refer to Section 7.3).
 - b) Issues of non-compliance, wildlife incidences, and mortalities (including wildlife collisions involving project-related vehicles on the WR and NWT highways).

- c) Mitigations implemented including locations of wildlife caution zone signage to inform more permanent management options.
- d) Summary of activities conducted under, and results of, the monitoring programs including action level exceedances and adaptive management response to inform subsequent Project phases.
- e) Effectiveness of mitigation and adaptive management, as well as any unforeseen issues and applicable advice from regulators, any changes implemented, and how Dene Knowledge informed these changes.
- f) Updates to the grizzly den habitat suitability model (as required) based on the habitat characteristics at newly detected dens, as well as maps to include new wildlife trails and observations of caribou, Dall's Sheep, large carnivores (bears, wolverine, wolves), moose, and bison. Approved updates to the WMMP, including the monitoring procedures, those informed by Dene Knowledge, Species at Risk status updates (i.e., Table 2 updates and camp Species at Risk posters), and mitigations (e.g., ENR's Woodland Caribou Best Management Practices for Industrial and Commercial Activities (as applicable)).
- g) Effects monitoring schedule for the next reporting period.
- h) Wildlife Observation Logs in a tabular format that includes coordinates or road KPs for submission to ENR's Wildlife Management Information System and to Parks Canada. Also submit the Wildlife Observation Logs to ENR's Wildlife Management Information System (WMISTeam@gov.nt.ca).
- i) The Wildlife Harvest dataset for submission to Parks Canada.

The Dehcho Land Use Planning Committee, ENR, and Parks Canada (and others as requested) will be provided with the post-Project digital footprint with the annual report. As per the REA (MVRB 2017) Measure 6-1, Part 3 data from the wildlife monitoring programs will be shared with Indigenous Organizations including NDDB, LKFN, and DFN upon request (refer to Section 5.1.1).

11.0 INCORPORATION OF DENE KNOWLEDGE

Part B of the Project's water licences contain two conditions related to the incorporation of Dene Knowledge into submissions required by the Mackenzie Valley Land and Water Board (MVLWB). One condition requires that CZN make every reasonable effort to consider and incorporate any Dene Knowledge made available to it. The second requires CZN to specifically identify any Dene Knowledge recommendations made and to describe how they were incorporated into each submission. In this section of the plan, we describe CZN's approach to meeting these licence conditions. Note that the approach described was developed collaboratively by the ROC, which is made up of representatives of the NDDB, the LKFN, and CZN.

Dene Knowledge studies of the area have been carried out in the past and are currently being updated by an independent consultant. Results of the Dene Knowledge studies are communicated directly to the communities in reports or recordings as appropriate. These studies provide valuable information about how things have changed over time which can then be used to help understand if additional environmental changes that happen during the Project are natural or not.

Although the existing Dene Knowledge studies are important, it also needs to be recognized that Dene Knowledge is not static; therefore, it is not possible to write down all the relevant Dene Knowledge for a Project activity in a static plan. As noted by a ROC member: "Dene Knowledge is always with us and in us, so we incorporate it as we go. We know things as we see them, and we change what we do as we go." For this reason,

the ROC believes that the Dene Monitor, who will participate in the day-to-day monitoring of the WR activities, are best-placed to observe activities in context as they happen and then to provide CZN with Dene Knowledge recommendations at that time, or at a later time via the ROC, as appropriate.

Based on the above understanding of Dene Knowledge, the ROC has proposed the following main ways to incorporate Dene Knowledge during all phases of the Project:

1. Management and Monitoring Plan review by the ROC.
 - a. For NDDB and LKFN, the ROC will act as the primary reviewer of management and monitoring plans for all Project phases.
 - b. The consultant working on the Dene Knowledge studies has also reviewed the WR management and monitoring plans and provided suggestions to the ROC with respect to the specific incorporation of Dene Knowledge where appropriate. The ROC will similarly consider plan-specific suggestions from the Dene Knowledge consultant prior to providing comments on Phase 2 and Phase 3 plans.
 - c. The ROC will provide comments, including suggestions for the incorporation of Dene Knowledge, directly to CZN.
2. Via the MVLWB and/or Parks Canada regulatory process for review and comment on Project management and monitoring plans.
 - a. Communities will have access to the results of any Dene Knowledge studies undertaken in the Project area. The study results can be used to inform comments from any party to the regulators for consideration.
 - b. During the regulatory review of plans, the NDDB and LKFN will provide comments, as necessary, on the incorporation of Dene Knowledge to Parks Canada and/or the MVLWB.
3. Ongoing Advice from the Dene Monitor and the ROC.
 - a. The Dene Monitor will have the opportunity to provide Dene Knowledge-based advice directly to CZN staff or other contractors during the WR activities. The Dene Monitor may also report back to the ROC if there is a need for Dene Knowledge-based adaptive management actions for any Project plan.

Based on Dene Knowledge-based input from community members or Dene Monitor, the ROC may recommend adaptive management actions for the Project.

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Erik Beever, Research Ecologist, United States Geological Service. November 3, 2018

Julie Thomas, Species at Risk Biologist, Yukon Environment, Fish and Wildlife Branch. November 27, 2018

TABLES

- Table A Phase 1 Project Commitments
- Table B Phase 1 Project Comments from Regulators
- Table C Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Table A: Phase 1 Project Commitments*

Commitment from REA* (original Project Reference #)	Subject	Commitment	Project Phase	WMMP Section
4 (PR#256)	Checkpoint reporting	CZN will monitor and record non-mining traffic activity on the all-season road, including the establishment of a checkpoint, and report this information annually.	Operation	8.2.1
5 (PR#55)	Signage	Signs will be posted advising road users that the land is the traditional land of the Naha Dehe Dene Band, and a request that the road not be used and that no hunting should occur. Signs will also warn of the dangers posed by frequent, heavy mine traffic.	Operation	7.4.2.3
9 (PR#55)	Wildlife mitigations	Develop standard aircraft procedures for flying into and departing from the proposed airstrip to accommodate wildlife if present on or near the airstrip.	Construction and Operation	7.4.2 7.5 SOP #3
81 (PR#355)	Line of sight	CZN commits to installing windrows, lumber, or other brush clearing material at intersections with other linear features to discourage access (and limit sightlines) to the road corridor by wildlife and humans	Construction	7.4
163 (PR#186)	Bear den surveys	Pre-clearing denning surveys identified for Grizzly Bears also extends to Black Bears. Environmental Monitors will survey for wildlife dens in favourable denning habitat (e.g., borrow sources) prior to clearing.	Pre-or Early Construction	7.4 7.5 8.1.1
162 (PR#341)	Bear den surveys	Survey crews will conduct ground-based reconnaissance den surveys from KP 170 to KP 36. These ground-based surveys will cover the entire 134 km (KP 36 to 170) along the proposed all season road. An aerial den survey will focus on the area along the proposed all-season road (KP 36 to 170) with: 1) moderate and high denning potential, 2) known den(s) identified during the ground-based surveys, and 3) proposed winter clearing (after October 1). Ground and aerial surveys will include areas overlapping with the previously developed winter road. The aerial survey will consist of flying evenly spaced transects, with a higher survey intensity in areas of previously identified dens.	Construction	8.1.1
164 (PR#55)	Caribou and other Wildlife	An alert system will be used to warn personnel of Woodland Caribou and other sensitive wildlife in the local area by relaying sighting information to vehicles/aircraft and equipment operators and on-site personnel.	Construction and Operation	7.4

Table A: Phase 1 Project Commitments*

Commitment from REA* (original Project Reference #)	Subject	Commitment	Project Phase	WMMP Section
165 (PR#186)	Caribou	If caribou are reported on the road or within 500 m of it, traffic or activity will cease at least 500 m from (or at first observation of) the animal(s) and all headlights turned off until the animal moves off at least 100 m away from the road or 5 minutes after last visual. Once traffic resumes, speed reduced to half the posted speed limit, 30 km/hr., within 1 km of the sighting.	Construction and Operation	7.4.2 SOP #3
166 (PR#186)	Caribou	If caribou are reported beyond 500 m of the road, traffic speeds are to be reduced to half the posted speed limit, 30 km/hr., within 1 km of the sighting.	Construction and Operation	7.4.2 SOP #3
167 (PR#55)	Community engagement	The wildlife and wildlife habitat mitigation and monitoring plan will include annual engagement with members of the Naha Dehe Dene Band to monitor measurable parameters of effects.	Operation	4.0 7.0 8.0
169 (PR#55)	Den and nest avoidance	Project employees and contractors will avoid all known or suspected den and nest sites.	Construction and Operation	7.1 7.4 7.5
171 (PR#55)	Fuel	Fuel storage facilities will meet industry standards for tank construction, location and spill containment.	Construction and Operation	7.4.3
173 (PR#55)	Harvesting	Prohibit hunting, trapping, harvesting, and fishing by site employees and contractors.	Construction and Operation	7.4
174 (PR#55)	Measurable parameters of effects	Amend the existing draft Wildlife Mitigation and Monitoring Plan, as necessary, to include the monitoring of measurable parameters of effects.	Pre-construction	8.0
175 (PR#55)	Pets	Pets will be prohibited along the all-season access road.	Construction and Operation	7.4 7.5
176 (PR#341)	Pika	Within collared pika range and where talus is present, CZN commits to avoiding talus to the extent possible, and conducting presence/not detected collared pika surveys in all borrow sources selected for development and along the proposed all-season road alignment that disturbs talus. CZN commits to conducting pika surveys to determine their presence prior to development (e.g., road alignment, borrow sources) in pika habitat. Should pika's occupy a proposed borrow source or portion thereof, prior to development, a replacement borrow source or an unoccupied portion of the same source (as some sources are large) will be selected for use (after confirming that no pika's occur within a sufficient buffer distance identified by a biologist).	Construction and Operation	7.4 8.1.2

Table A: Phase 1 Project Commitments*

Commitment from REA* (original Project Reference #)	Subject	Commitment	Project Phase	WMMP Section
179 (PR#370)	Pika	<p>Additional mitigation, beyond that previously identified in the DAR (e.g., low truck volumes, reduced traffic speeds, dust suppression, response to accidental spills, prohibit littering) specific to collared pika are:</p> <ol style="list-style-type: none"> 1. prohibit the storage of snow, including along roadside snow banks, on or within 10 m of talus habitat (within pika range); 2. prohibit the disturbance of talus habitat (within pika range) year-round unless pre-disturbance presence/not detected surveys have been completed and pikas were determined to be not present; and 3. if required, determine a sufficient buffer distance from which borrow construction can occur near active pika habitat, based on guidance from a biologist. 	Construction and Operation	7.4.2 8.1.2
181 (PR#55)	Policy	Wildlife will have the right-of-way, obligating drivers to stop (when safe to do so) for wildlife seen on or immediately adjacent to the road, to allow them to move away.	Construction and Operation	7.4.2
180 (PR#55)	Policy	A no hunting policy will apply for all Project employees and contractors while working and/or at the Mine site.	Construction and Operation	7.4
184 (PR#55)	Regulatory agency notification	The appropriate regulatory agencies (i.e., GNWT ENR and Parks Canada) will be contacted to receive additional direction regarding any new wildlife issues that arise.	Construction and Operation	4.0 7.4 8.0
187 (PR#55)	Reporting	Wildlife sightings along the access road and airstrip will be reported and evaluated, and if a problem area is identified, corrective management options for traffic and Project-related activities will be considered.	Construction and Operation	SOP #2 7.4.2 8.1.4 8.1.5
186 (PR#55)	Reporting	Report annual updates and results of the Wildlife Mitigation and Management Plan, Road Operations Plan, and inspections and enforcements.	Construction and Operation	10.0
188 (PR#100)	Retarder brakes	The use of engine retarders for braking will be discouraged but not prohibited since some road sections contain steeper portions, and drivers should retain the option to use any form of braking if necessary, for safety.	Construction and Operation	7.5
189 (PR#55)	Snow removal practices	Snow removal practices along the access road and airstrip will avoid high snow banks, so that wildlife can readily move off as vehicles/aircraft approach.	Construction and Operation	7.4.2 8.1.6
190 (PR#55)	Technical Advisory Committee	Issues and considerations regarding wildlife populations and effects will be discussed during the Technical Advisory Committee (TAC) meetings proposed by CZN in EA0809-002.	Pre-or Early Construction	4.0 10.0

Table A: Phase 1 Project Commitments*

Commitment from REA* (original Project Reference #)	Subject	Commitment	Project Phase	WMMP Section
192 (PR#186)	Use of explosives	Blasting is prohibited if caribou are observed within 1 km of the blast site until the animal moves out of the area.	Construction	7.5 8.1.3
193 (PR#55)	Waste management plan	The Waste Management Plan will prohibit littering, purposely feeding wildlife, and storing attractants accessible to wildlife. All waste foods and human garbage will be incinerated consistent with current industry good management practices to minimize wildlife attraction to the local area. Adaptive management will be applied to waste management practices. If wildlife are found to be attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.	Pre-or Early Construction, and Operation	7.4.1 8.1.4 Waste Management Plan
194 (PR#59)	Waste removal	Solid waste will be organized and stored securely so that it does not attract wildlife, will be removed from the site progressively as the operation is under way, and will be incinerated using a proper manner of incineration.	Construction and Operation	7.4.1 Waste Management Plan
195 (PR#59)	Waste removal	Non-combustible solid waste will be removed from sites by the end of construction and operation.	Construction and Operation	Waste Management Plan
196 (PR#55)	Waste removal	Adaptive management will be applied to waste management practices. If wildlife are found to be attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.	Construction and Operation, Closure	8.1.4
199 (PR#55)	Wildlife sighting logs	Wildlife sighting logs are to be completed by all Project employees and contractors for wildlife sightings (e.g., Dall's Sheep, caribou, Wood Bison) with respect to species, location along the access road/ airstrip, numbers, and reaction to Project activity. If a problem area is identified, corrective measures will be considered.	Construction and Operation	7.4.1 8.1.5
200 (PR#55)	Winter road management	The small portion of the winter road not used for all season access will be managed to prevent predator and non-Project related travel of the corridor, if necessary.	Construction and Operation	7.4
201 (PR#355)	WMMP Revisions	The proposed mitigation measures noted in DAR Addendum, Appendix E, Appendix C will be integrated into a revised draft of the WMMP.	Pre-or Early Construction	7.0
203 (PR#55)	Wildlife	ENR's Woodland Caribou Best Management Practices for Industrial and Commercial Activities (once developed) will be incorporated into the wildlife monitoring program, where feasible, to manage or mitigate habitat impacts and sensory disturbances on Woodland Caribou.	Construction and, Operations	10.0

Table A: Phase 1 Project Commitments*

Commitment from REA* (original Project Reference #)	Subject	Commitment	Project Phase	WMMP Section
205 (PR#59)	Sanitary and grey water	Sanitary and grey water will either be collected in tanks for subsequent transfer to trucks for off-site disposal at suitable locations, or processed locally (sumps), meeting the required standards for effluent dispersal. Specific locations will have approved plans which meet the regulatory requirements and site-specific conditions.	Construction	Waste Management Plan
207	Harvesting	CZN agrees to provide support to NDDB to develop a harvest monitoring program to track and report on patterns and levels of harvest associated with the road, and to include this in the WMMP.	Construction and Operations	8.2.2
208	Caution zones	CZN will develop a more formal, detailed approach to identifying and communicating seasonal "wildlife caution zones. Road operations will be controlled using a Journey Management System (JMS). This system will include driver journey and incident logs which are compiled, and wildlife sightings logged. Sightings will include the nature of the sighting and the location based on landmark and kilometre post (which will be sign-posted). The information will be noted by the driver at his next stop, and possibly by radio dispatch if animals are proximal to the road. Once a trend has emerged (which may occur over a few weeks), it will be discussed at pre-travel tail-gate meetings. Once an occurrence becomes common in terms of location, the road operations Supervisor will consider formalizing the caution zone with signage, although drivers will already be aware, and will have received instructions regarding caution. Road maintenance crews and environmental monitors will also be on the road, and they will also record wildlife sightings and provide the records for collation.	Construction and Operations	8.1.4 8.1.5
209	Boreal caribou	CZN will revise its WMMP to incorporate Commitment #6 from the technical session [which states: CZN commits to place wind rows or piles of cut lumber resulting from clearing for the right of way at intersections with linear features to deter human access, line of sight]	Construction	7.4
230	Boreal caribou	CZN will consult with the GNWT regarding the adequacy of the proposed mitigation and monitoring measures for Boreal Caribou.	Pre-or Early Construction	7.0 8.2.4

REA = Report of Environmental Assessment

* Only the Phase 1 commitments that relate to the WR have been addressed in this version of the WMMP. The remaining commitments will be addressed in the WMMPs developed during the next phases.

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60307	1	ECCC#1-WMMP, Plain Language Summary, Measurable Parameter in Table 18 – Monitoring Objectives	The Plain Language Summary and Table 18 describe the migratory bird effects monitoring solely with species densities. The scope of the effects monitoring should include abundance and distribution consistent with monitoring objectives outlined in section 6.2.7.	Environment and Climate Change Canada (ECCC) recommends that the Proponent change the wording from "species densities" to "species abundance and distribution" for migratory bird effects monitoring in the Plain Language Summary and Table 18.	Phase 2	N/A
60308	2	ECCC #2- WMMP, 5.1 On-site Education and Awareness Training, Borrow Pit Management and Reclamation Plan, Road Operations and Maintenance Plan, Invasive Species Management Plan	The Wildlife Management and Monitoring Plan (WMMP) states that project mitigation will include training and education to all employees and contractors. Section 5.1 of the WMMP describes specific training to be completed but does not include a commitment to maintain detailed records of education and awareness training provided to employees and contractors. The Borrow Pit Management and Reclamation Plan, the Road Operations and Maintenance Plan and the Invasive Species Management Plan also include several wildlife and wildlife habitat mitigation measures that are not included in the training programs.	ECCC recommends that detailed training records be maintained and documented and that this measure be added to section 5.1 of the WMMP . ECCC also recommends that the education and awareness training of employees and contractors covers all wildlife and wildlife habitat mitigation measures including those contained in the Borrow Pit Management and Reclamation Plan, the Road Operation and Maintenance Plan and the Invasive Species Management Plan.	Phase 1 and 2	7.1
60309	3	ECCC #3- WMMP, Table 18, Monitoring schedule	Migratory bird effects monitoring is proposed every 10 years during operations in Table 18, Section 6.2.7.3. of the WMMP. ECCC is concerned that a 10-yr monitoring interval may be inadequate. A power analysis using the baseline data is key to evaluating the efficacy of the current sampling design to meet the monitoring objectives as well as informing the monitoring schedule.	ECCC recommends that the Proponent conduct a power analysis with the collected baseline information to evaluate the efficacy of the current sampling design and to inform the monitoring schedule.	Phase 2	N/A
60312	6	ECCC #4- WMMP, 4.2.3 Species at Risk Act – General Prohibitions, Appendix 2, Updated Commitments Table Commitment 228	Section 4.2.3 states that "on federal land, the Species at Risk Act (SARA) applies to all wildlife species that are listed on Schedule 1 as Extirpated, Endangered, or Threatened (Table 2)." ECCC notes that the word "prohibitions" is missing from the sentence. The section should read "On federal land, the SARA prohibitions apply to all wildlife species that are listed on schedule 1 as Extirpated, Endangered, or Threatened." This description of the application of SARA prohibitions should be further expanded by adding that for migratory birds, protected under the Migratory Bird Convention Act (MBCA), SARA prohibitions apply wherever these species are found (i.e., federal and non-federal lands). This issue was identified in a previous review of the WMMP, as reflected in commitment #228.	ECCC recommends that this section be revised to accurately reflect the application of SARA prohibitions.	Phase 1	5.3.3
60313	7	ECCC #5 - WMMP 6.1.3.2 Harlequin Duck – Adaptive management	The first adaptive management response of this section suggests that a NWT Wildlife Act permit may be obtained to allow instream construction activities to continue should a Harlequin Duck nest be found nearby. The Harlequin Duck is a migratory bird and is protected and managed under federal legislation and the NWT Wildlife Act does not apply in this situation.	ECCC recommends that the Proponent remove the adaptive management response related to the NWT Wildlife Act involving the Harlequin Duck.	Phase 2	N/A
60314	8	ECCC #6 - WMMP, 6.2.7.1 Overall Monitoring Approach, 2017 ECCC guidance, ECCC comments on the 2017 Baseline Report, Appendix 2 Updated Commitments Table Commitment #161.	Section 6.2.7.1 states that "bird abundance by habitat will be estimated using a statistical model appropriate for the data". This is generally consistent with the guidance and comments ECCC provided the Proponent during the review of the 2017 Baseline Wildlife & Vegetation Field Report (see attachments). However, the analysis outlined in the ECCC guidance document has yet to be done to validate impact assessment predictions for all migratory bird species and to inform if additional mitigation measures are required for the project, as per commitment #161. Without this analysis, ECCC does not support the conclusion that "no modification to the existing effects assessment and/or mitigations are recommended based on the 2017 baseline surveys" (Section 3.1 of the 2017 Baseline Wildlife & Vegetation Field Report). In addition, the 2017 baseline report states that an effects assessment for Canada Warbler, listed as Threatened on Schedule 1, is required based on its detection at ten survey stations. This effects assessment has not been provided to date and is a requirement under S.79 (2) of Species at Risk Act. The effects assessment should follow the guidance ECCC already provided on how to analyze the data.	ECCC recommends that further analyses be conducted with the 2017 migratory bird baseline data to validate impact predictions and to inform if further mitigations are required in accordance with ECCC's guidance on how to use the data. ECCC also recommends that a Canada Warbler effect assessment, which follows ECCC guidance, be provided.	Phase 2	Canada Warbler Assessment submitted with the Phase 1 WMMP
60315	9	ECCC #7 - WMMP, Section 8 – Reporting	This section omits ECCC as an authority to contact should migratory birds and avian Species At Risk (SAR) mortality or injury be discovered (e.g., Bank swallow nesting colony damage from a collapsed stock pile).	ECCC recommends that this section be updated to ensure that ECCC is notified for all migratory birds and avian species at risk related wildlife incidents and contacted for advice related to migratory birds in all sections of the WMMP. Wildlife Enforcement Division can be reached at ec.dalfnord-wednorth.ec@canada.ca and the Environmental Protection Operations Division and the Canadian Wildlife Service can be contacted at ec.eenordrptno-eanorthpnwt.ec@canada.ca.	Phase 2	N/A
60316	10	ECCC #8 - WMMP, Appendix D - Timing Restrictions and Setback Distance Guidelines	ECCC notes that there is no nesting season period identified in Appendix D for birds (general). Information on timing restrictions can be found at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html	ECCC recommends that the Proponent use the general nesting period of May 1 to August 31 as a guideline for the project area.	Phase 1	Table 4
60354	18	ENR Topic 18: Draft Road Construction Management Plan, section 3.3, item d, page 12	The plan states that: "Pika: Prohibit the disturbance of talus habitat (within pika range) year round unless predisturbance presence/not detected surveys have been completed and pikas were determined to not be present".	1) Revise this section to include baseline data results, in addition to pika range, for prohibiting disturbance to talus.	Phase 1	Updated in the 2021 Pika Baseline and Habitat Loss Estimates report

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60357	21	ENR Topic 21: Management Plans – General	The management plans concerning construction, waste management and traffic control are not cross referenced well with the WEMP.	1) It is recommended to cross reference the WEMP linkages between the other plans that also have wildlife implications to make this link clearer.	Phase 1 and 2	8.0 Also refer to the other Management Plan
60359	23	ENR Topic 23: Post-EA Information Package, Page 60, Caribou Baseline	Caribou baseline data is to be collected between 2019, 2020, and 2021. In connection with the previous comment, how will baseline data information inform caribou monitoring? How will thresholds/actions be developed without first having a clear idea of baseline data? The baseline data collection could be impacted by construction activities.	1) It is recommended that baseline data is completed prior to construction activities.	Phase 1	Updated in the 2021 Caribou & Remote Camera report
60360	24	ENR Topic 24: WMMP, Plain Language Summary	Disagree with this statement: "Across the Dehcho region, the Species at Risk Committee (2012) have reported habitat to be nearly unchanged since the 1970s" The reference for this statement is not included in the References. More context of this statement is required as it is highly inconsistent with current knowledge of anthropogenic disturbance across the NWT. The Dehcho region has the highest densities of linear disturbance features in the NWT, and much of this linear disturbance was added to the landscape after the 1970s.	1) It is recommended to remove this statement altogether from the WMMP (it is repeated again in Section 2.0, page 6), or providing further justification and context for it. If this sentence is retained in the document, ensure the reference cited is included in the references list.	Phase 1	3.0 Plain Language Summary
60361	25	ENR Topic 25: WMMP - CZN's Environmental Monitor, Section 3.0, Page 7	Given the large area that will need to be monitored, and the wide range of environmental monitor duties and responsibilities, how many monitors will be hired for the project? What minimum qualifications will they need to fulfill their duties? What training will they need and receive?	1) Clarify how many Environmental Monitors will be hired for the project and how many will be working at any one time. Clarify the minimum qualifications and training requirements for environmental monitors in order for them to be able to fulfill their duties.	Phase 1 and 2	4.0
60362	26	ENR Topic 26: WMMP - Northwest Territories Wildlife Act, Section 4.2.4, Page 10	This section references the old Wildlife Act. Section 38 of the former Wildlife Act is now under sections 51 and 52 of the 2014 Wildlife Act.	1) Ensure that all references to sections of the Wildlife Act in the WMMP reflect the new Act that came into force in 2014.	Phase 1	5.3.4
60363	27	ENR Topic 27: WMMP- Prohibitions under Relevant Acts, Section 5.1	The 7th bullet references prohibitions under the federal SARA. Prohibitions that apply under the Wildlife Act should also be part of the On-Site Education and Awareness Training.	1) It is recommended to add the Wildlife Act to this bullet.	Phase 1	7.1
60364	28	ENR Topic 28: WMMP- Habitat Loss and Alteration - Project Footprint Section 5.2.1 - Construction Phase	None.	1) ENR also requests a copy of all as-built project footprint data; suggest this data be posted to the MVLWB registry to make it publicly accessible.	Phase 1 and 2	10.0
60365	29	ENR Topic 29: WMMP - Aircraft Altitudes and Setbacks, Section 5.2.2 - Mine and Airstrip	What mitigations are proposed for flights associated with the access road construction?	1) Minimum flying altitudes and setback distances should also be applied to any aircraft use associated with the construction of the winter and all-season road.	Phase 1	7.4.2 7.5
60366	30	ENR Topic 30: WMMP - Audits of Waste Management Practices, Section 5.3.1 - Wildlife Mortality and Hazard Management	None.	1) Provide a reference to the section of the WMMP that describes the frequency of these audits and which specific areas will be audited	Phase 1 and 2	8.1.4 WMMP Procedure #4
60367	31	ENR Topic 31: WMMP - Bear Den Surveys, Section 5.3.1 - Wildlife Mortality and Hazard Management	Bear den surveys should also be mentioned in this section, as protection of dens is more than just a sensory disturbance issue. Destruction or disturbance of undetected dens could also lead to bear mortality.	1) Mention bear den surveys in this section as well. Don't need all the details but provide a reference to the section of the WMMP where they are described in detail.	Phase 1	7.4
60368	32	ENR Topic 32: WMMP - Bird nest surveys, Section 5.3.1 - Wildlife Mortality and Hazard Management	If pre-clearing bird nest surveys are required because clearing will occur during the nesting period, the surveys should also try to document and protect bat roosting sites, given the range of 3 species overlaps with the project area.	1) If pre-clearing bird nest surveys are required, CZN should also develop survey protocols specific to bat roosts, including guidance on the types of suitable roosting habitat to look for, and the most appropriate time of day to conduct surveys to detect roosting bats. Pertinent information may be found in: • COSEWIC status report http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Little%20Brown%20Myotis%26Northern%20Myotis%26Tri-colored%20Bat_2013_e.pdf - see pages 18-20 • Laura Kaupas' thesis on Northern Myotis roosting behavior in the Fort Smith area https://prism.ucalgary.ca/handle/11023/3322 • SARC status report https://www.nwtspeciesatrisk.ca/sites/default/files/bat_status_report_and_assessment_final_apr617.pdf	Phase 2	N/A

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60369	33	ENR Topic 33: WMMP - Waste Management Audits, Section 5.3.1 - Wildlife Mortality and Hazard Management; page 16	None.	1) Develop an SOP and associated data sheet describing how often these audits will occur, which areas will be audited, and what specifically the Environmental Monitors are to look for.	Phase 1 and 2	8.1.4 WMMP Procedure #4
60370	34	ENR Topic 34: WMMP - Animal Deterrent Measures, Section 5.3.1 - Wildlife Mortality and Hazard Management; Page 16-17	This section lists different deterrents that will be available to Env. Monitors, but does not describe when it is appropriate to use each of the deterrents, and when it is appropriate to escalate from noise deterrents to physical deterrents. How long is an animal given to leave an area of its own accord, before deterrents are employed? When will the incident reports be made available to GNWT-ENR or Parks?	1) Develop an SOP describing how long animals will be given to leave an area of their own accord before deterrents are used, when it is appropriate to use each type of deterrent, and to escalate from noise-based deterrents to physical deterrents, and how soon after an incident to submit reports to GNWT-ENR and Parks Canada.	Phase 1	SOP #2
60371	35	ENR Topic 35: WMMP - Removal of Wildlife from Facilities and Infrastructure, 5.3.1.1 Prevention and Treatment of Problem Animals, page 17	Removal of wildlife that have gained access to camp facilities or infrastructure may require obtaining permits from GNWT-ENR, Parks Canada, or ECCC to capture or handle the wildlife depending on the species and location. (same comment and recommendation applies to Section 5.3.1.2)	1) Ensure that Environmental Monitors and other project staff are aware that removal of wildlife from facilities or infrastructure may require special permits, and that GNWT-ENR, Parks Canada, or ECCC should be contacted before any attempts to remove wildlife are undertaken.	Phase 1	5.3 7.4.1 8.1.4.2
60372	36	ENR Topic 36: WMMP - Bear Response SOP and BMP, 5.3.1.1 Prevention and Treatment of Problem Animals, Page 17	The 4th bullet in section 5.3.1.1 states that: "CZN's planned response to conflicts with bears (and other potentially hazardous wildlife) is included in the Bear Response SOP and BMP, respectively (Appendix B, Appendix C);" Appendix B makes no mention of the use of deterrents to respond to bears. It provides general guidance for all employees, but no specific guidance for Environmental Monitors or other staff that might respond to problem bears. It contains no details about incident reporting. Appendix C contains copies of 4 guidance documents (3 GNWT, and one Yukon), none of which have been tailored to CZN's specific circumstances or needs. The Bear Incident Response Guidelines provide contact information specific to the North Slave region, not the Dehcho Region. Environmental Monitors should be provided with a clear and concise set of SOP, which outlines appropriate use of deterrents, includes incident reporting forms, and clear instructions on who, when and where the incident report forms should be sent.	1) It is recommended to develop clear and concise Bear Response SOPs for the CZN project, including Incident Report forms and appropriate contact information for where the forms should be sent in the Dehcho region.	Phase 2	N/A
60373	37	ENR Topic 37: WMMP - Relocating or Destroying Wildlife, 5.3.1.1 Prevention and Treatment of Problem Animals, Page 17	Wildlife should be given some time to move away of their own accord before deterrent methods are employed, unless wildlife or personnel are at immediate risk of harm.	1) Explicitly state how much time wildlife will be given to move away of their own accord before implementing deterrent measures. Define the specific circumstances under which employees would resort to relocating or destroying wildlife. Clarify that, where safety permits, GNWT-ENR or Parks Canada should be contacted before any wildlife are relocated or destroyed. Clarify that permits may be required to relocated wildlife if it involves capturing and handling an animal.	Phase 1	SOP #2
60374	38	ENR Topic 38: WMMP - Hunting in Outfitter Zones, 5.3.1.1 Prevention and Treatment of Problem Animals, Page 17, Bullet 9	None.	1) ENR must also be involved in any discussions regarding hunting agreements or total harvest limits for non-Aboriginal harvesters.	Phase 1	7.4
60375	39	ENR Topic 39: WMMP - Wildlife on or Adjacent to the Road, 5.3.2.2 Traffic Management	The proposed mitigation that traffic will cease at least 500 m from caribou, Moose, Dall's Sheep, Mountain Goat, Grizzly Bear, and/or Wolverine observed on or within 500 m of the project footprint may be difficult to implement. If traffic are to stop at least 500 m from such sightings, it doesn't make sense for the speed reduction to also be within 1 km of the sighting (which is the same as saying 500 m on either side), since vehicles are required to come to a full stop. The vehicle speed reduction zone should be increased to at least 1 km on either side of a where the animal was sighted to provide a sufficient distance to slow down to the stopping distance of 500 m (or the distance at which the animal was first sighted if less than 500 m).	1) Vehicle speeds should be reduced within a minimum of 1 km on either side of areas where wildlife are seen on or adjacent to the road. Wildlife sightings and speed reductions should be communicated to other drivers by radio, and recorded in the wildlife sightings log.	Phase 1	7.4.2 SOP #1 SOP #3
60376	40	ENR Topic 40: WMMP - Moving Wildlife off the Road, 5.3.2.2 Traffic Management	None.	1) The JMS Coordinator should be provided with an SOP that they can refer to when providing instructions to drivers on how to move wildlife off the road, in the event that the CZN Env. Monitor is not available to respond.	Phase 1	SOP #2 SOP #3
60377	41	ENR Topic 41: WMMP - Response to Problem Wildlife Areas Identified Along the Road, 5.3.2.2 Traffic Management	The second bullet on page 20 states that "If a problem area is identified along the Access Road, such as frequent wildlife encounters, corrective management options for traffic and Project-related activities will be considered;" What options will be considered? Bullets 3 provide one concrete example of an actions that will be taken but are there other options. Has the wildlife baseline data collected by CZN to date been used to identify areas where problems might already be anticipated, such as areas where there are obvious game trails crossing the road?	1) Provide examples of the management options that might be considered if a problem area for wildlife is identified along the road.	Phase 1	8.1.6

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60378	42	ENR Topic None	None	2) If there is already baseline data that indicates areas where problems could be anticipated and avoided, provide maps showing those locations and indicating the management responses that will be pro-actively employed.	Phase 1	8.1.6 Figure D4
60379	43	ENR Topic 42: WMMP - Wildlife Sightings Reported by Two-way Radio, 5.3.2.2 Traffic Management	If the Environmental Monitor is not available to monitor radio communications for wildlife reported by other drivers and to record them in a log, this duty should fall to the Road Operations Supervisor.	1) Wildlife observations along the road reported by divers over two-way radio should be recorded in a wildlife sightings log by either the Env. Monitor or the Road Operations Supervisor, and submitted with annual reports.	Phase 1	7.4.1 7.4.2 SOP #1
60380	44	ENR Topic 43: WMMP - Snow Removal Practices, 5.3.2.3 Access Road and Access Control, page 21	Earlier in the WMMP it says that berm breaks will occur every 500 m, whereas in this section it says every 100 m.	1) Ensure that mitigations repeated in different sections of the WMMP are consistent.	Phase 1	7.3 7.4.2
60381	45	ENR Topic 44: WMMP - Flight Altitude Guidelines, 5.4 Sensory Disturbance Management	The GNWT's "Flying Low? Think again...." guidelines should be followed outside of Nahanni National Park Reserve	1) Add that "Flying Low? Think again...." guidelines will be followed when flying outside of the Park.	Phase 1	7.4.2
60382	46	ENR Topic 45: WMMP - Dall's Sheep Monitoring Program, 5.4 Sensory Disturbance Management	None.	None.	Phase 2	N/A
60383	47	ENR Topic 46: WMMP - Mineral Licks, 5.4 Sensory Disturbance Management	"Prohibit blasting when Dall's Sheep lambs within 2 km of the proposed Project (approximately Km 0 – 39 and Km 124 – 160) from May 1 to June 15;" How will it be determined whether Dall's sheep are within 2 km during this period? Visual scans using are unlikely to detect animals that are >1 km away.	1) Describe the techniques that will be used to determine whether Dall's sheep are within 2 km of blasting sites during the May 1-June 15 period.	Phase 2	N/A
60384	48	ENR Topic 47: WMMP - Blasting During Dall's Sheep Lambing Period, 5.4 Sensory Disturbance Management	"Minimize Project activities from April 1 to July 15 within 250 m of mineral licks (Km 156-157);" Does the reference to Km 156-157 imply that there is a known mineral lick in that area? If so, provide a reference to where this information came from. Were any surveys undertaken to evaluate whether there are other mineral licks within 250 m of other parts of the project footprint?	1) Clarify why the mitigation for mineral licks currently only applies within Km 156-157.	Phase 2	N/A
60385	49	ENR Topic 48: WMMP - Disturbance of Birds Nests, 5.4 Sensory Disturbance Management; 4th Last Bullet - Page 23	ENR reminds CZN that under the Wildlife Act (s. 51) all occupied bird nests are protected from disturbance or destruction, not just migratory birds and species at risk. CZN should also be aware of the proposed regulation under the Wildlife Act that will also protect unoccupied raptor nests from destruction, which may come into force in summer 2019.	1) Revise the wording of the 4th last bullet on page 23 (and all similar wording elsewhere in the WMMP) to "nesting birds" instead of "nesting bird species at risk (and other migratory birds)".	Phase 1	5.3.4 7.4 8.1.1.1
60386	50	ENR Topic 49: WMMP - Disturbance of Birds Nests, 5.4 Sensory Disturbance Management; 2nd Bullet - Page 24	ENR and Parks Canada should be contacted regarding mitigations for any non-migratory bird species that are not captured under the Migratory Birds Convention Act. (s)	1) Add GNWT-ENR and Parks Canada to the list of agencies to contact.	Phase 1	SOP #1 SOP #2
60387	51	ENR Topic 50: WMMP - Bear Dens, 6.1.1 Bear Den Mitigation Monitoring	Bear den survey areas should be indicated on maps, and aerial survey transect spacing should be specified and indicated on the map.	1) Include the maps of suitable black bear denning habitat in Tetra Tech EBA (2016) in the WMMP as it forms part of the mitigation monitoring plan. Add maps of the bear den aerial survey area, with planned aerial survey transects and specify the spacing of aerial transects.	Phase 1	WMMP Procedure #1 Figure D1
60388	52	ENR Topic 51: WMMP - Bear Dens, 6.1.2 Adaptive Management	Section 6.1.1.1 states that bear den surveys will be undertaken within 800 m of winter clear and 1.5 km of winter blasting respectively. Section 6.1.1.2 states that adaptive management is required if winter clearing is within 500 m of an active bear den.	1) Change the setback for proximity of winter clearing to active dens to 800 m, to be consistent with Section 6.1.1.1	Phase 1	8.1.1
60389	53	ENR Topic 52: WMMP - Bear dens, 6.1.3 Reporting	None.	1) Observed or suspected dens should also be immediately reported to GNWT-ENR or Parks Canada, so that the most appropriate adaptive management response can be discussed and identified.	Phase 1	8.1.1 WMMP Procedure #1
60390	54	ENR Topic 53: WMMP - Collared Pika Monitoring, 6.1.2 Collared Pika Mitigation Monitoring	This section does not reference the results from the Pika baseline surveys which indicated Pika presence in some proposed borrow sources (BP 33 and 34) and within talus habitat adjacent to the road within the specified setback distance of 150 m (Appendix 5-1). What happens at talus sites where Pika were observed to be active during baseline surveys, if no sign of current Pika activity is subsequently observed during pre-construction surveys? As some areas of active Pika presence have already been identified, will adaptive management be employed pro-actively? Which, out of those actions listed in Section 6.1.2.2, would be used to protect Pika and their habitat in these areas?	1) Reference the specific results of the existing baseline surveys for Pika, and explain what adaptive management actions will be implemented at sites where active Pika presence has already been confirmed within proposed borrow sources and within 150 m of the road alignment.	Phase 1 and 2 Also provided in separate report	8.1.2 WMMP Procedure #2
60391	55	ENR Topic 54: WMMP - Collared Pika Monitoring, 6.1.2 Collared Pika Mitigation Monitoring	None.	1) Explain why the surveys are timed to be between August and the first snowfall.	Phase 1	8.1.2 WMMP Procedure #2

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60392	56	ENR Topic 55: WMMP - Collared Pika Monitoring, 6.1.2 Collared Pika Mitigation Monitoring; 6.1.2.2 Adaptive Management	The selection of the appropriate adaptive management response depends on the context of each active talus site - i.e. whether it is in or adjacent to an area that will be cleared or used as a borrow source, whether changes to routing or selecting an alternative borrow source is actually a feasible option, and whether changes to the timing of construction would actually avoid the impact.	1) Selection of appropriate adaptive management strategies should be discussed with the Technical Advisory Groups.	Phase 1	8.1.2 9.1
60393	57	ENR Topic 56: WMMP - Pre-blast Mitigation Monitoring, 6.1.6 Pre-Blast Mitigation Monitoring	Why is the list of species that would trigger a postponement of blasting limited to those listed in the second paragraph of Section 6.1.6?	1) Blasting should be postponed if any big game species are detected within 1 km of the blast site. The list of species to monitor for in pre-blast surveys should be expanded to include any big game species listed in the Schedule A of the Wildlife General Regulations with the potential to occur in the project area (e.g. moose).	Phase 1	8.1.3
60394	58	ENR Topic 57: WMMP - Pre-blast Mitigation Monitoring, 6.1.6 Pre-Blast Mitigation Monitoring	The WMMP, and other documents, list borrow sources up to km 158, but there is no mention of where aggregate materials will come from to construct the portion of the road from km 160-173 (east of the Liard River). If there are any borrow sources being used, or blasting required, for that section of the road that is east of the Liard River, pre-blast surveys will also need to consider the presence of bison.	1) Please clarify which borrow sources will be used to construct the road from Km 160-173 and where blasting might occur along that section of the road.	Phase 1 and 2	2.0 No borrows for Phase 1
60395	59	ENR Topic 58: WMMP - Pre-blast Mitigation Monitoring, 6.1.6 Pre-Blast Mitigation Monitoring	The WMMP specifies a year-round 1 km setback for blasting, but it is unclear how surveying for evidence of target species along the winter road alignment near borrow sources or blast sites will be sufficient to detect target species within that radius in closed forest environments. Environmental Monitors may need to walk the perimeter of the borrow sources, or a transect through the forest following the perimeter at a specified setback distance, to look for evidence of target species in the area as well. It is also not clear whether blasting will be prohibited for the day if fresh tracks or fresh scat is encountered, because it may not be possible to determine if and when the animal has moved out of the area on its own accord.	1) Add further methods to the WMMP that will be used to provide greater certainty of detecting the presence of target species within the 1 km setback distance of blasting sights within closed forest environments.	Phase 1	8.1.3
60396	60	ENR Topic 59: WMMP - Recording Wildlife Sightings by Drivers, 6.1.8 Wildlife Observation and Incidents Logs	Wildlife sightings made by drivers should be reported immediately via two-way radio and entered into a log by the person responsible for monitoring radio communications or the Environmental Monitor. If drivers wait to report sightings until their next stop it may be too late to warn other drivers, they could forget the landmark or kilometer post where they saw it, or they may forget to write it down altogether.	1) Wildlife sightings made by drivers should be reported immediately via two-way radio and entered into a log by the person responsible for monitoring radio communications or the Environmental Monitor.	Phase 1	SOP #1
60397	61	ENR Topic 60: WMMP - Recording wildlife Sightings by Drivers, 6.1.8 Wildlife Observation and Incidents Logs, Page 43, Bullet 4	It may be unreasonable to expect the Environmental Monitor to map and analyze the wildlife observations, incidents, and stand-alone survey data.	1) Separate out data collection and database entry duties from mapping and analyses of data, and specify that someone with appropriate qualifications will be responsible for mapping and analyses.	Phase 1	8.1.5
60398	62	ENR Topic 61: WMMP - Reporting Wildlife Incidents, 6.1.8 Wildlife Observation and Incidents Logs, Page 44, Table 11	None.	1) Replace Nic Larter with Eve Lamontagne (Eve_Lamontagne@gov.nt.ca) as the GNWT ENR (Dehcho Region) Manager for Wildlife Research and Monitoring.	Phase 1	SOP #1 SOP #2
60399	63	ENR Topic 62: WMMP - Reporting Wildlife Incidents, 6.1.8 Wildlife Observation and Incidents Logs, Section 6.1.8.2 - Adaptive Management, Page 44,	None.	1) A single Project-related mortality of any big game species, not just those considered species at risk, should trigger an adaptive management review and potential response.	Phase 1	8.1.5
60400	64	ENR Topic 63: WMMP - Hotspots of Wildlife Occurrence, 6.1.8 Wildlife Observation and Incidents Logs, section 6.1.8.2 - Adaptive Management, Page 44,	How are "hotspots of wildlife occurrence" defined? How many wildlife sightings, near misses, or wildlife-vehicle collisions at a specific location along the road need to be observed before it is considered a hotspot? Will wildlife sightings be compiled and analyzed according to specific segment lengths along the road?	1) The WMMP should provide more detail on how "hotspots of wildlife occurrence" will be defined, and how data will be analyzed to identify them.	Phase 1	8.1.6
60401	65	ENR Topic 64: WMMP - Traffic Monitoring at Check Station, 6.2.1 Traffic Monitoring at the Checkpoint Station; 6.2.1.1 Overall Monitoring Approach	"The cameras will be inspected monthly to ensure functional operation, check batteries, and download memory cards."	1) Cameras should be programmed to take 1 photo each day at a pre-specified time, in addition to motion-triggered photos, to help ensure that the cameras are functioning as intended.	Phase 2	N/A
60402	66	ENR Topic None	None	2) Photos of any wildlife detected by the cameras should be saved for the purpose of reporting and confirmation of species identification.	Phase 2	N/A

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60403	67	ENR Topic 65: WMMP - Wildlife Harvest Effects Monitoring, 6.2.2 Wildlife Harvest Effects Monitoring	Will the questionnaire include information such as which community the harvester from, and what type of hunting licence (if applicable) they hold? This would help to provide more detailed information on who is using the access road for harvesting.	1) It is recommended the above question be answered.	Phase 1	Wildlife Harvest Questionnaire Datasheet, see WMMP Procedure #7
60404	68	ENR Topic 66: WMMP - Timing of Dall's Sheep and Lambing Area Effects Monitoring, 6.2.3 Dall's Sheep and Lambing Area Effects Monitoring	Dall's sheep lambing reconnaissance surveys are proposed to occur "prior to Mine operation" and "prior to Mine start-up". Given that there may be increased air traffic to the mine site associated with the construction of the access road to the mine, these surveys should take place prior to construction, meaning potentially in summer 2019.	1) Clarify the anticipated level of air traffic to the mine airstrip during the access road construction phase vs. the mine operation phase.	Phase 2	N/A
60405	69	ENR Topic None	None	2) Revise the timing of the aerial and ground-based reconnaissance surveys for Dall's sheep so that they occur prior to construction, rather than prior to operations.	Phase 2	N/A
60406	70	ENR Topic 67: WMMP - Timing of Dall's Sheep and Lambing Area Effects Monitoring, 6.2.3 Dall's Sheep and Lambing Area Effects Monitoring; Last bullet on Page 50	ENR is concerned that further Dall's sheep surveys could be cancelled on the basis of one round of surveys. If sheep lamb in a broader area than the 5 km radius study area, and move between different lambing areas among years, it could be falsely concluded that Dall's sheep do not lamb near the airstrip on the basis of one year's worth of surveys.	1) At least one more round of reconnaissance surveys for Dall's sheep should occur in the subsequent year if they are not detected on the first round of surveys, before deciding that no further mitigation measures would be implemented.	Phase 2	N/A
60407	71	ENR Topic 68: WMMP - Boreal Caribou Effects Monitoring, 6.2.5 Boreal Caribou Effects Monitoring; 2nd Paragraph Page 55	What is an "inter occupancy model"?	1) It is recommended the above question be answered.	Phase 2	N/A
60408	72	ENR Topic 69: WMMP - Boreal Caribou Effects Monitoring - Aerial Survey Method, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	Aerial surveys and winter track surveys are proposed prior to construction and every three years of road operation. Surveys may need to be conducted annually during the first few years of construction and operation to obtain enough data to determine whether the proposed 3-year interval would provide sufficient power to detect changes in measurable parameters. Another possibility would be to stagger aerial surveys and winter track surveys so they occur in alternate years, which would provide more temporal coverage.	1) Conduct aerial and winter track surveys for boreal caribou annually until enough data is collected to either 1) determine that boreal caribou are not present in the area, or 2) if they are present, evaluate whether scaling back to every 3 years would provide enough statistical power to detect changes in the measurable parameters.	Phase 1 (winter track) and 2 (aerial survey)	8.2.4
60409	73	ENR Topic 70: WMMP - Boreal Caribou Effects Monitoring, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	The aerial survey should not be characterized as "distance sampling" unless the intention is to measure perpendicular distance from the aerial transect lines to each wildlife sighting. Also, it is highly unlikely that the survey will record enough detections to estimate a detection function (typically at least 60 detections are required)	1) Refer to the aerial survey method as a "systematic aerial survey"	Phase 2	N/A
60410	74	ENR Topic 71: WMMP - Boreal Caribou Effects Monitoring - Aerial Survey Method, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	Given that boreal caribou are only likely to be present at low density in the study area, occupancy of aerial survey grid cells is more likely a relevant measurable parameter to monitor than relative abundance.	None.	Phase 2	N/A
60411	75	ENR Topic 72: WMMP - Boreal Caribou Effects Monitoring - snow track surveys, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	If surveyors are traveling by snowmobile along the cleared road surface (when the road is operational) they may not be able to see tracks at the edge of the cleared right of way very well if snowbanks are high. It might be better for monitors to do the surveys by truck when the road is driveable so they can more easily see over the snowbanks. The use of snowmobiles might be more appropriate at times when fresh snow has not yet been cleared from the road.	1) Consider conducting the snow track surveys by truck when snow banks along the road may make it difficult to see over them if traveling by snowmobile.	Phase 1	8.2.4 WMMP Procedure #7
60412	76	ENR Topic 73: WMMP - Boreal Caribou Effects Monitoring - snow track surveys, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	None.	1) Take geo-referenced photos of all wildlife tracks recorded during the winter track survey so that species identification can be independently verified.	Phase 1	8.2.4 WMMP Procedure #7

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60413	77	ENR Topic 74: WMMP - Boreal Caribou Effects Monitoring - Need for Camera-based Surveys, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.2 Adaptive Management	While the proposed combination of aerial surveys and road-based winter track surveys are likely to detect boreal caribou presence in the late-winter months, they do not provide year-round monitoring to detect potential interaction of boreal caribou with the road during other seasons.	1) ENR recommends the use of remote cameras placed at regular intervals along the road between km 121 and 160 to increase the likelihood of detecting boreal caribou presence in the study area and to provide greater temporal coverage of periods when the road is operational. A camera-based program would also increase detection of other big-game species year round, and could provide a comparison in wildlife crossing rates during times when the road is closed to traffic during the shoulder seasons vs. times when the road is operational.	Phase 2	N/A
60414	78	ENR Topic 75: WMMP - Boreal Caribou Effects Monitoring, 6.2.5 Boreal Caribou Effects Monitoring; 6.2.5.1 Overall Monitoring Approach	The results of recently completed baseline aerial surveys for boreal caribou may have implications for the design of the effects monitoring program.	1) The WMMP should be updated such that proposed survey methodology, and measurable parameters for the effects monitoring program explicitly consider the results of past and recently completed baseline surveys to help refine and further justify the proposed approach.	Phase 2	N/A
60415	79	ENR Topic 76: WMMP - Collared Pika Effects Monitoring, 6.2.6 Collared Pika Effects Monitoring; 6.2.6.2 Adaptive Management	The WMMP states that "Since large fluctuations of Collared Pika abundance and distribution can occur naturally over a brief time, a quantifiable threshold for adaptive management is unspecified. Pikas continued use of suitable habitat within 300 m of the Access Road is proposed as an adaptive management threshold." Given this statement, how can a monitoring program that is only conducted every 5 years hope to measure any fluctuations or to draw conclusions about "continued use"	1) Collared Pika Effects Monitoring should be conducted annually for at least the first 5 years of road operations to characterize natural fluctuations in abundance and distribution. The frequency of surveys thereafter could then be re-evaluated to determine the minimum survey interval necessary to detect change.	Phase 2	N/A
60416	80	ENR Topic 77: WMMP - Standard Operating Procedures, Appendix B - Standard Operating Procedures	The WMMP references standard operating procedures and standardized data collection sheets in several sections of the document, but none of them are included in Appendix B.	1) Develop Standard Operating Procedures forms and data collection sheets for inclusion in Appendix B for Wildlife Observations and Incident Logs, stand-alone routine surveys for wildlife, mitigation audits, etc.	Phase 1 and 2	SOP #1 WMMP Procedures #1-8
60511	175	ENR Topic 129: Wildlife: NWT Listed and Pre-listed Species at Risk	Sections 76 and 77 of the Species at Risk (NWT) Act require the Minister of Environment and Natural Resources to make a submission to the body responsible for assessing the potential impacts of a proposed development, or for considering a Land Use Permit or Water Licence application, respecting the potential impacts of the proposed development, Permit or Licence application on a NWT-listed or pre-listed species or its habitat. NWT-listed species are those that are on the NWT List of Species at Risk. Pre-listed species are those that have been assessed by the NWT Species at Risk Committee (SARC) but have not yet been added to the NWT List of Species at Risk. The Proponent should be aware that NWT-listed or pre-listed species at risk and their habitat may also be subject to protection under existing sections of the NWT Wildlife Act. As a best practice, ENR encourages the Proponent to consider potential impacts, mitigation measures and monitoring requirements for species at risk listed under the federal Species at Risk Act, as well as those designated as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that may occur in the project area, and the prohibitions that may apply to these species under federal legislation. The project area overlaps with the ranges of the following NWT-listed and/or pre-listed species: <ul style="list-style-type: none">• Boreal Caribou – Threatened in the NWT• Barren-ground Caribou - Threatened in the NWT• Grizzly Bear – Special Concern in NWT• Little Brown Myotis (bat) – Special Concern in the NWT• Northern Myotis (bat) – Special Concern in the NWT• Wood Bison – Threatened in the NWT• Western Toad – Threatened in the NWT There are impacts and potential impacts to NWT-listed or pre-listed species at risk, but they can be mitigated by our standard advice, existing LUP or WL conditions, or by mitigation/monitoring measures proposed by the Proponent.	1) Potential impacts to the species at risk listed above from the project include sensory disturbance, attraction to operations, destruction of habitat, risk of injury, risk of mortality, risk of contact with or ingestion of toxic substances, reduced habitat quality, disruption or barriers to movements or migration. ENR is satisfied that with application of the specific recommendations: <ol style="list-style-type: none">a) Within other sections of this letter to the Board;b) Within our letter submitted to the Proponent;c) As well as application of the wildlife mitigation and monitoring measures outlined in the Proponent's LUP/WL applications and supporting documents, potential negative impacts to the species at risk listed above can be avoided or minimized.	Phase 1 and 2	WMMP

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60512	176	ENR Topic 130: Cumulative Effects Tracking	Keeping track of the disturbance footprint of development activities is an important component of tracking and informing the management of cumulative effects on wildlife and wildlife habitat.	1) The Proponent should submit the bounding coordinates or geospatial data for the proposed project footprint and for the completed project footprint to the Land and Water Board for placement on the public registry. The Mackenzie Valley Land and Water Board's "Standards for Geographic Information Systems (GIS) Submissions" should be followed when submitting spatial data.	Phase 2	7.3 Phase 1 footprint will be entirely within the Phase 2 footprint, to the extent possible and within +/- 10 m of the final ASR right-of-way. Response to this will be when final ASR is built.
60513	177	ENR Topic 131: Wildlife Abodes	Subject to sub-section 51(2) of the Wildlife Act, it is illegal to break into, destroy, or damage a den, beaver dam or lodge, muskrat push-up or hibernaculum unless you have an Aboriginal or treaty right or a Permit to do so. Protection of dens, beaver lodges, muskrat push-ups, and hibernacula is essential to ensuring reproductive success and survival of both adults and young.	1) The Proponent should conduct pre-activity surveys within 800m of the project footprint to identify active bear dens if project activities will occur between September 30 and March 30. Surveys should be conducted in the fall to detect freshly dug dens.	Phase 1	8.1.1
60514	178	ENR Topic None	None	2) If an active bear den is detected, or suspected, the Proponent should implement and maintain an 800 m exclusion zone until the bear emerges in spring.	Phase 1	8.1.1
60515	179	ENR Topic None	None	3) If a bear den and exclusion zone would result in the halt of part or the entire program, the Proponent should contact ENR to discuss alternative mitigation options. The location of active bear dens should be kept confidential between the developer and ENR until after emergence in the spring.	Phase 1	8.1.1
60516	180	ENR Topic None	None	4) It is recommended that, if encountered, beaver lodges, muskrat push-ups, and hibernacula are not disturbed or damaged.	Phase 1	7.4
60597	10	LKFN Wildlife Management Plan	In response to REA Measure 15-4 (Support Aboriginal Monitoring Initiatives), CZN, NB and LK have been negotiating the framework for a Dene monitoring program which is intended to function as an integrated aspect of environmental monitoring for the project. In other projects, Aboriginal monitors have been trained to participate in permafrost monitoring. REA Measures 6-1 (Wildlife Management) and 10-2 (Archaeological Impact Assessment) require incorporation of traditional knowledge into the development and implementation of the environmental planning and monitoring. The updated traditional land use study work involving LKFN has not yet been completed but is underway.	We recommend the LUP conditions require that: (1) the Dene Monitoring program be integrated into the adaptive WMMP monitoring and management provisions; and (2) the results of the current Dene Knowledge Study update being conducted by LKFN and NDDB be incorporated into the WMMP	We interpret this comment to be directed at regulators not CZN	
60647	1	PCA #1 - General Comment- Monitoring and Baseline	Issues regarding baseline data and monitoring have been identified for a number of topics in the comments that follow. The general objectives of all monitoring are established in Report EA Measure 15-1, and include measuring the effects of the Project on the environment. This requires a monitoring program that clearly details expectations for effects detection, has sufficient sampling frequency and duration, justified methodological choices, and clearly defined parameters that have been sufficiently well-characterized in baseline condition to allow for effective monitoring.	Ensure monitoring and baseline data meet requirements outlined in the REA and in specific comments that follow. Ensure baseline collection occurs prior to project construction (i.e. prior to Phase 1)	Phases 1 and 2	WMMP

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60653	7	PCA #7 - General comment- Species at Risk effects assessment and monitoring	<p>Under the Species at Risk Act, the following must occur for all species at risk listed in Schedule 1 (including species of special concern): must identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects (mitigate) and to monitor them.</p> <p>The following are the Species at Risk listed under Schedule 1 of the Species at Risk Act that are in the area of the project:</p> <p>Collared Pika (special concern); Grizzly Bear (special concern); Mountain Caribou (special concern); Wolverine (special concern); Horned Grebe (special concern); Peregrine Falcon (special concern); Yellow Rail (special concern); Short Eared Owl (special concern); Rusty Blackbird (special concern); Boreal Caribou (threatened); Western Toad (special concern); Wood Bison (threatened); Common Nighthawk (threatened); Olive Sided Flycatcher (threatened); Bank Swallow (threatened); Barn Swallow (threatened); Canada Warbler (threatened); Little Brown Bat (endangered); and Northern Myotis (endangered).</p>	Ensure the appropriate level of baseline, effects assessment, clear monitoring program and adaptive management are outlined for all species at risk that could be potentially affected by the proposed project.	Phases 1 and 2	Table T3
60654	8	PCA #8 - General comment- Species at Risk permitting	<p>Under the Species at Risk Act, section 32 indicates that "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."</p> <p>The Competent Minister (Parks Canada within NNPR) does have authority to permit such activities but only under the following circumstances:</p> <p>(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.</p> <p>(2) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that</p> <ul style="list-style-type: none"> (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. <p>(3) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that</p> <ul style="list-style-type: none"> (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. 	<p>Ensure that project design and mitigations prevent the killing, harming, harassing or taking of a wildlife species listed as extirpated, endangered or threatened.</p> <p>If there is a potential to contravene these prohibitions, ensure that information required to meet section 73 of the SARA is provided for Parks Canada to determine if a SARA permit is required and if it can be issued.</p>	Phase 1	5.3.3 7.0
60666	20	PCA #20 - Appendix 1-2: alignment sheets	Known locations of bird species at risk are not included on the alignment sheets.	Include all species at risk locations along the environmental alignment sheets in Appendix 1-2	Phase 2	N/A
60696	50	PCA #50 - Draft Traffic Control MMP (App 4-1): Reporting and Plan Updates	Wildlife-vehicular collisions should be considered as an emergency if the animal is injured and in need of dispatch.	Identify contact information of appropriately trained staff or responsible Agency; develop protocols explaining who, how, and when to dispatch wildlife along the ASR	Phase 1	SOP #2
60704	58	PCA #58 - 2017 Baseline Wildlife and Veg Report (Appendix 5-1): Canada Warbler (p. 11) CORRECTION	The second sentence under section 2.1.9 Canada Warbler mentions three plus six stations where this species was recorded (i.e. a total of 9 stations). However, the first sentence of this section, and Table 2, list a total of 10 stations. Please correct.	Please correct the total number of survey stations at which Canada Warbler was detected so that it is consistent throughout section 2.1.9 (first and second sentences), and table 2.	Phase 2	Canada Warbler Assessment submitted with the Phase 1 WMMP
60705	59	PCA #59 - WMMP (App 5-2): "mitigation monitoring" in Plain language -mitigation/effects monitoring, and Monitoring	The use of the term "mitigation monitoring" is unclear. It is Parks Canada's understanding that "mitigation monitoring" is essentially sampling or inventorying to determine species presence (baseline).	Parks Canada recommends that activities under "Mitigation Monitoring" be referred to as baseline study / inventory.	Provided response to Parks already	

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60706	60	PCA #60 - Draft WMMP (App 5-2): Onsite Education and Awareness Training - Environmental Monitors	Throughout the management plans, the Environmental Monitor role is extensive and varied (for example managing human-wildlife conflict, species ID, monitoring surveys, spill response etc.) It is not clear what qualifications will be needed. What duties will be undertaken by a Professional Biologist (ex. R.P.Bio. or P.Biol.) and/or Qualified Environmental Professional (QEP)?	Please summarize all the duties of the Environmental Monitor and qualifications needed.	Phase 1 and 2	4.0
60707	61	PCA #61 - Draft WMMP (App 5-2): Onsite Education and Awareness Training - HWC management	Parks Canada notes that Environmental Monitors and other 'trained on-site staff' will have to be proficient in human-wildlife conflict (HWC) management. Situations and corresponding response operations for managing potential HWC are not defined. Note that under the Canada National Parks Act and Regulations, firearms are prohibited in National Parks.	Provide detailed plans (e.g., bear management plan) that clearly outlines the types of operational responses that will be used for different HWC situations. Indicate how the appropriate training will be obtained.	Phases 1 and 2	7.1 SOP #1 SOP #2 SOP #3 SOP #4
60708	62	PCA #62 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - HWC and Wildlife Attractants	It is not clear how wildlife attractants will be contained. Containers that are inaccessible to wildlife for storing petroleum and other wildlife attractants are a must. Containers should be bear resistant at the very least.	Specify container type for petroleum and other wildlife attractants.	Phase 1	7.3 7.4.1 7.4.3
60709	63	PCA #63 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - HWC and Wildlife Attractants	The submission generally outlines methods for detecting raptors and raptor nests. Empty nests will not be considered active. Parks Canada notes that most raptors have nest fidelity. If a nest is found preconstruction, but the bird is not present, it does not necessarily mean that the nest is no longer active.	Nest surveys must be done during the correct window to ensure bird detection if present. Parks Canada recommends that all raptor nests be treated as active, regardless of whether they are occupied during surveys, to ensure protection.	Phase 1	7.2 8.1.1
60710	64	PCA #64 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - HWC and Wildlife Attractants	It is outlined in the WMMP that several on-site employees will have training to deter and move wildlife away from the Project area, and that there will be a minimum of one trained employee on-site at all times. Parks Canada notes that wildlife deterrents must be used with caution, particularly when the fire hazard is high. These activities requires appropriate training and must align with the CPNA and National Park Regulations within NNPR.	Provide detailed plans (e.g., bear management plan) that clearly outlines the types of deterrent that will be used for responding to different HWC situations.	Phase 2	SOP #2
60711	65	PCA #65 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Prevention and Treatment of Problem Wildlife	No definition of a problem animal (e.g., a grizzly with cubs observed near camp vs escalating aggressive behaviour after receiving a food reward) is provided in this section. Parks Canada notes that this is key for managing human-wildlife conflict.	Clearly define what a 'problem bear' is and what actions will be taken to manage problem bears.	Phase 2	N/A
60712	66	PCA #66 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Prevention and Treatment of Problem Wildlife	A Bear Management Plan (as recommended by GNWT and Yukon Government's Standard Operating Procedure for avoiding conflict with bears in and around camp) has not been provided.	Develop a Bear Management Plan that is specific to CZN planned operations and activities.	Phase 2	N/A
60713	67	PCA #67 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Dealing with an Injured or Killed Animal	In terms of removing and/or destroying a carcass, Parks Canada notes that the appropriate regulator should be alerted to allow them to provide further instructions to ensure removal of wildlife attractants and collection of any required samples etc.	Clarify steps for dealing with wildlife carcasses (wildlife attractants), including communications with Regulators	Phase 1	7.4.1 SOP #2
60714	68	PCA #68 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Dealing with an Injured or Killed Animal	The plan does not clearly detail how wildlife deemed 'critically injured' will be euthanized, and who they will be euthanized by.	Clarify steps for dealing with critically injured wildlife, including communications with different Regulators	Phase 1	7.4.1 SOP #2
60715	69	PCA #69 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Traffic Management	A key part of mitigating traffic related impacts on wildlife requires information on important wildlife areas where there is a higher frequency of crossing. Baseline studies to identify important wildlife crossing areas have not yet been conducted.	Conduct baseline studies to identify potential wildlife crossing hotspots before construction activities commence to ensure that proper mitigations can be implemented during construction.	Phases 1 and 2	8.1.6
60716	70	PCA #70 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Traffic Management	Rules for yielding to wildlife are presented in the plan. Parks Canada notes that rules for yielding to wildlife are not consistent for all species or explained clearly (e.g., bison are treated differently, proximity to the road is not well-defined).	Clarify rules, and provide rationale for having different yield distances for different species along ASR.	Phase 1	7.4.2 SOP #3
60717	71	PCA #71 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Traffic Management	CZN indicates that if a problem area is identified on the road corrective management actions will be considered. It is unclear what these actions are and how/when will they be applied, particularly proactively.	Describe types of management actions that will be considered to mitigate wildlife hotspots on the road.	Phase 1	7.4.2 8.1.6 SOP #3
60718	72	PCA #72 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Sensory Disturbance Management	CZN indicates that if pikas are detected during clearing/construction activities, additional mitigation will be considered including waiting until summer so that pikas can move to adjacent habitat. Pikas are believed to be a philopatric species, meaning that they have a tendency to stay in or habitually return to a particular area (e.g., birthplace, breeding habitat).	Provide further detail how "additional mitigation will be considered" and how decisions regarding mitigation will be made. Provide literature that indicates that pikas will move to adjacent habitat when disturbed.	Phase 1	8.1.2

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60719	73	PCA #73 - Draft WMMP (App 5-2): Wildlife Mortality and Hazard Management - Sensory Disturbance Management	Comment: Distances for blasting activities and avoidance rules are not consistent for all species or very clear	Provide rationale for blasting distances for each species and avoidance rules when species at risk are detected/observed	Phase 1	7.4.1 8.1.3
60720	74	PCA #74 - Draft WMMP (App 5-2): Monitoring	Species listed on page 24 differs from those listed on page 8 of the document. It would be preferable to have one single list of all species and mitigations/monitoring plans.	Provide a comprehensive list of all focal species, including how they will be monitored and what steps will be taken for potential mitigation.	Phases 1 and 2	Table T3 Table 5
60721	75	PCA #75 - Draft WMMP (App 5-2): Monitoring	Grizzly bear is listed as Special Concern (Schedule 1; SARA) and is ranked as Sensitive in the NWT. It is unclear why Grizzly bear is not being monitored for potential impacts.	Provide a baseline, effects assessment and monitoring and adaptive management program for Grizzly bear.	Phase 2	N/A
60722	76	PCA #76 - Draft WMMP (App 5-2): Mitigation Monitoring - Bear Dens	The submission indicates that only black bear hibernating modeled was created. It is not clear why a Grizzly hibernating model has not been determined.	Please provide clarification on why a hibernating model for Grizzly bears has not been created.	Provided response to Parks already	N/A
60723	77	PCA #77 - Draft WMMP (App 5-2): Mitigation Monitoring - Bear Dens	The Bear Den Mitigation Plan states that bear den surveys will be conducted by aerial surveys prior to construction to ensure potential disturbances are minimized. Aerial surveys may be ineffective to detect bear dens because they are often located under forest canopy, snow or under blowdown.	Consider using non-aerial methods in conjunction with heli-survey to detect bear dens to increase detection probability. Camera and snow-track surveys may confirm bear localized activity along the ASR and potential den site areas off the road.	Phase 1	8.1.1 WMMP Procedure #1
60724	78	PCA #78 - Draft WMMP (App 5-2, section 5.4): Sensory Disturbance Management	CZN states that "Environmental Monitor will complete a Grizzly and Black Bear den survey in habitat favourable, on and near the proposed Project footprint, prior to clearing activities. If a den is found, mitigation will be considered depending on the circumstances and location, including restrictive timing windows appropriate for species denning use." It is unclear how circumstances and location will be considered in applying mitigations.	Outline how the circumstances and location will be considered.	Phase 1	8.1.1 WMMP Procedure #1
60725	79	PCA #79 - Draft WMMP (App 5-2): Mitigation Monitoring - Bear Dens - adaptive management	When an active bear den is detected, should state 800m from proposed winter clearing (not 500m) and within 1.5m of proposed winter blasting.	Change the wording from 500m to 800m on page 26.	Phase 1	8.1.1.1
60726	80	PCA #80 - Draft WMMP (App 5-2): Mitigation Monitoring - Collared Pika - pre-construction	The submission indicates that in terms of temporal scale, pika will be surveyed "once annually from late July to snowfall and prior to construction in pika range." Parks Canada notes that this is a broad window which may not be effective. It is better to survey pika when forage species are flowering (approximately late July, but baseline data should provide more specificity). In addition, it is a concern that "prior to construction" may mean surveying in winter when pika are least likely to be active and/or detected.	Please modify the plan to ensure that surveys are conducted when pika are most active and likely to be detected. Provide the methodology for the pre-construction surveys of Collared Pika (for example: search time per unit area).	Phase 1	8.1.2 WMMP Procedure #2
60727	81	PCA #81 - Draft WMMP (App 5-2): Mitigation Monitoring - Collared Pika - pre-construction	The proposed pre-construction monitoring approach only includes sign that indicates pika currently occupy a site (e.g., fresh haypiles, visual/vocal individual, and fresh urine). Pika naturally operate under a extinction/recolonization framework where abandoned sites become reoccupied in subsequent years.	Provide a revised summary of baseline that includes all inactive haypiles. Include old haypiles and other sign in the definition of occupied pika habitat to ensure suitable habitat is not destroyed during construction activities.	Phase 1	8.1.2
60728	82	PCA #82 - Draft WMMP (App 5-2): Mitigation Monitoring - Collared Pika - pre-construction	Gap: Proposed pre-construction survey data does not include covariates that may affect pika populations year over year (e.g., snow depth, onset of spring) or pika detectability (e.g., wind speed, time of day temperature).	Collect additional data during surveys to better explain pika presence/absence data	Phase 2	N/A
60729	83	PCA #83 - Draft WMMP (App 5-2): Mitigation Monitoring - Collared Pika - pre-construction - Adaptive Management	The submission indicates that if pika are detected during pre-construction surveys, one of the adaptive management options is to reschedule construction outside of the breeding period. This should also extend to outside of the haying period to ensure pika have enough forage to survive the winter.	If pika are detected, reschedule construction activities outside of the haying period. Haying tends to begin at the end of June - early July, presumably ending during 'green down'	Phase 2	8.1.2 WMMP Procedure #2
60730	84	PCA #84 - Draft WMMP (App 5-2): Effects Monitoring - Collared Pika - Overall Monitoring Approach	Gap: The proposed effects monitoring approach for Pika is based on presence/absence surveys. It is not clear how this approach will detect potential impacts from construction/road activities	Develop an appropriate survey design (e.g. including control sites and covariate measurements) that can detect change in pika populations as a result of the ASR, including potential analysis methods and metrics (e.g. occupancy, relative abundance, etc.) for doing so; Determine thresholds of effect (point at which mitigation will be necessary) using existing baseline data; Conduct a power analysis to determine the length of time (# of survey years), and to what extent (magnitude of change), that the proposed study design will be able to detect.	Phase 2	N/A

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ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60731	85	PCA #85 - Draft WMMP (App 5-2): Effects Monitoring - Collared Pika - Overall Monitoring Approach	A 5 year Pika monitoring schedule is too long to detect potential impacts from road activities, particularly if presence/absence is the metric. Adaptive management measures will not be effective if impacts on pika are immediate; There are natural fluctuations in pika populations over time due to extinction/recolonization dynamics. Baseline data is required to determine what these natural population fluctuations are. The reporting cycle for pika monitoring (i.e., annually) is inconsistent with the planned effects monitoring schedule (i.e., every 5 years).	Develop a before-after-control-impact (BACI) study design to appropriately monitor potential impacts to pika populations, which will require more frequent monitoring. Change the reporting cycle to match that of the effects monitoring schedule	Phase 2	N/A
60732	86	PCA #86 - Draft WMMP (App 5-2): Collared Pika - Effects Monitoring - Adaptive Management	Gap: The proposed adaptive management strategy for Pika is insufficient. Thresholds of effects have not been determined for adaptive management purposes; the proposed monitoring metric (i.e., presence/absence or 'pikas continued use of suitable habitat within 300m of the ASR') is not appropriate for monitoring a species at risk, particularly if sites are only monitored every 5 years.	Provide a quantifiable threshold that triggers adaptive management strategies using baseline survey data.	Phase 2	N/A
60733	87	PCA #87 - Draft WMMP (App 5-2): Collared Pika - Effects Monitoring - Adaptive Management	Comment: Suitable pika habitat should also include 'inactive' pika sites that were identified during pre-construction Mitigation Monitoring surveys.	Change the consideration of suitable pika habitat so that it includes all pika sites (active/inactive). Parks Canada recommends surveying all suitable pika habitat during Effects Monitoring surveys	Phase 2	N/A
60734	88	PCA #88 - Draft WMMP (App 5-2): Mitigation Monitoring - Western Toad - pre-construction	Gap: Pre-construction surveys for Western Toad are only proposed at one pond based on the assumption that it is at the northern limit of their range. The limit of their range is unknown and may be shifting.	Consider surveying other potential Western Toad habitat considering that the range is likely to have shifted due to climate change	Phase 2	N/A
60735	89	PCA #89 - Draft WMMP (App 5-2): Mitigation Monitoring - Western Toad - pre-construction	Pre-construction surveys for Western Toad are only proposed prior to full construction (Phase 2). There may be impacts associated with Phase 1 construction. For example, water withdrawal associated with winter road construction may however affect Western Toad habitat.	Parks Canada recommends conducting pre-construction surveys for Western Toad prior to winter road construction to ensure that they are truly considered baseline.	Phase 2	N/A
60736	90	PCA #90 - Draft WMMP (App 5-2): Mitigation Monitoring - Pre-Blast Mitigation Monitoring - all species	Comment: Pre-blasting surveys will be conducted to determine if caribou, sheep, wolverine, grizzly bear, or swans are in the vicinity. Bison are not included on this list, or any other large mammals (moose, goat, wolf, black bear etc.).	Provide rationale for not considering bison or other large mammals as in pre-blasting surveys and mitigations.	Phase 1	7.5 8.1.3
60737	91	PCA #91 - Draft WMMP (App 5-2): Mitigation Monitoring - Wildlife Observation and Incident Logs - overall monitoring approach	Comments: The submission indicates that incidents involving bears will follow ENR's Bear Encounter Response Guidelines. This document states that mine/construction personnel must undergo bear awareness training, and there must be a Bear Management Plan implemented.	Develop a Bear Management Plan that is specific to CZN planned operations and activities	Phase 2	N/A
60738	92	PCA #92 - Draft WMMP (App 5-2): Mitigation Monitoring - Overall Monitoring Approach	Gap: Wildlife Incident Contacts for Prairie Creek Mine Project (Table 11) needs to be updated. It should also include our Park Warden contact information, and details about when to call ENR and PCA	Ensure contact list for reporting wildlife incidents is up to date and includes instructions for when and who to report incidents of HWC to. Current contact information for Parks Canada includes: - Please update Jonathan Tsetso's phone number and email: 867-695-7753, jonathan.tsetso@canada.ca - Laurent Nikolaiczuk; Parks Canada; Park Warden, Nahanni National Park Reserve; 1-867-695-6430; laurent.nikolaiczuk@canada.ca - Nahanni Duty Officer (June 15-September 15 only); 867-695-6572	Phase 1	SOP #1 SOP #2
60739	93	PCA #93 - Draft WMMP (App 5-2): Effects Monitoring - Dall's Sheep and Lambing Areas - Overall Monitoring Approach	Gap: Baseline studies to determine location of lambing areas requires multiple years of data to determine accuracy/confidence	Monitor lambing areas before (baseline surveys) during and following (monitoring surveys) construction so that potential impacts can be determined (e.g., Before-After-Control-Impact study design)	Phase 2	N/A
60740	94	PCA #94 - Draft WMMP (App 5-2): Effects Monitoring - Dall's Sheep and Lambing Areas -Ground-based Behaviour Surveys	Gap: Thresholds of effects or 'significant impacts' (i.e., the observed fleeing distance of Dall Sheep after mine-related disturbance) have not been determined	Determine the fleeing distance at which adaptive management actions will be necessary to mitigate construction-related disturbances on Dall Sheep. Provide rationale for these thresholds.	Phase 2	N/A
60741	95	PCA #95 - Main Report and Draft WMMP- ECCC#1 to ECCC#8	Parks Canada supports the comments and recommendations made by ECCC regarding migratory birds and bird species-at-risk.	Not applicable	Phase 2	N/A

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60742	96	PCA #96 - Draft WMMP: existing caribou baseline	<p>Parks Canada notes several issues with Northern Mountain caribou baseline:</p> <ol style="list-style-type: none"> 1) Existing data has not been summarized to describe current knowledge of Northern Mountain Caribou distribution, relative abundance, or movement patterns in the project area. Partial data collation (mapping only) is proposed in the Main Report (p. 60), but is not discussed in the WMMP. 2) Gaps in baseline information have not been identified. 3) The effects assessment for caribou has not been reviewed in the context of updated baseline information. <p>The proponent's conclusion, for instance, that caribou "may infrequently occur near the Mine and Access Road" (p. 52) is undefined and unsupported. The Previous Studies confirm at a minimum that caribou have been observed in the project area in all seasons, during key life history stages (e.g. calving and post-calving), and repeatedly over time - which suggests that caribou use of the project area is not infrequent. Such information should be summarized and used to support or revise the effects assessment.</p>	<p>That the proponent provide a gap analysis for the Northern Mountain Caribou baseline, which:</p> <ul style="list-style-type: none"> - Summarizes current knowledge (scientific and traditional knowledge) visually and descriptively; - Identifies uncertainties and gaps in this baseline information; and - Links the current knowledge and gaps with assessed effect types, likelihoods, and magnitude 	Phase 1	Caribou Data Gap Analysis provided with the Phase 1 WMMP
60743	97	PCA #97 - Wildlife Management and Monitoring Plan: caribou baseline collection	<p>Parks Canada notes that several issues regarding caribou baseline data, and limitations of monitoring program to detect Project effects:</p> <ol style="list-style-type: none"> 1) There is minimal baseline information 2) A single baseline aerial survey, as proposed, provides limited understanding of the variability of caribou distribution or relative abundance in winter (e.g. variations in animal movement between years and by differing age and sex classes), particularly given the lack of precision possible from the survey methods, and gives no further information on potential impacts from year-round road operation. 3) Additional caribou aerial surveys in 2020 and 2021 are proposed in the Main Report (p. 60), but are not mentioned in the WMMP. All proposed data collection should be included in the WMMP. It should be noted that if the project proceeds according to the proposed timeline, these surveys cannot be considered baseline, as they take place after construction, and during winter road operational season (i.e. when impacts may already be occurring). 4) Mitigation monitoring is proposed at areas with high risk to wildlife or wildlife habitat, such as crossing locations that present a higher risk of wildlife mortality or camps that present a higher risk of human-wildlife conflict. Currently these locations are unknown for Caribou; crossing locations should be identified prior to construction, in order to implement preventative mitigations (e.g. signage, restricted speed zones, etc.). 5) There is currently no baseline information against which to compare the remote camera monitoring information. This baseline data needs to be collected before construction, as winter road construction may change caribou use of the area. 	<p>That the proponent provide a comprehensive baseline data collection program for Northern Mountain Caribou that:</p> <ul style="list-style-type: none"> - builds on the gap analysis; - is to be completed before construction; - provides the necessary data for comparison to the proposed monitoring programs; and - captures sufficient variability for monitoring to detect potential impacts from the ASR. 	Phase 1	8.2.3 Caribou Gap Analysis provided with the Phase 1 WMMP Baseline remote camera program (as recommended by Parks Canada) was developed in consultation with Parks
60744	98	PCA #98 - Wildlife Management and Monitoring Plan: caribou effects monitoring - aerial survey	<p>Parks Canada notes several issues with the Mountain Caribou aerial survey monitoring plan, including:</p> <ul style="list-style-type: none"> - There is no justification of monitoring decisions e.g. the choice to survey only in the winter. Reasoning should address methodological (e.g. sightability) and ecological justifications (e.g. animal movement rates). - There are no clear objectives for the survey (e.g. the level of effect detectable, and how this threshold was determined). "Significant change to distribution and abundance" (p. 52) is undefined. - It is unclear how an effect using aerial surveys will be detected, particularly given the lack of precision in the baseline survey. For instance, at what scale will it be capable to "evaluate higher risk areas of caribou-vehicle collisions" with a single year of data? - Survey frequency is insufficient to detect change over time, as there is no current understanding of the variability in Northern Mountain Caribou distribution or relative abundance in the winter season. Further, more frequent surveys are proposed for Boreal Caribou than for Northern Mountain Caribou, without any reasoning given for this choice. - No analyses are proposed other than "mapp[ing] in comparison to identified occupancy models", which is likely insufficient to detect change, given the low precision of the survey 	<p>That the proponent provide a comprehensive Northern Mountain Caribou effects monitoring aerial survey in discussion with Parks Canada, including:</p> <ul style="list-style-type: none"> - clear objectives; - sufficient sampling frequency; - justified methodological choices (including a power analysis demonstrating ability to detect effects of the ASR); and - likely analysis methods. 	Phase 2	N/A

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60745	99	PCA #99 - Wildlife Management and Monitoring Plan: caribou effects monitoring - remote camera study	<p>The remote camera study design needs further clarification to determine its ability to detect effects:</p> <ul style="list-style-type: none"> - It is unclear how the Parks Canada study design will be adapted to the specific context of the ASR project area (i.e. a longer road, narrower valleys, etc.) and a different caribou herd. - It is unclear how camera sites will be selected - the occupancy data is too coarse to provide camera survey locations at the proposed 3 km interval, and no caribou habitat suitability models have thus far been developed or proposed for the project. Existing wildlife crossing information along the ASR route should be collected prior to construction, to aid in choosing camera sites. - There are no clear objectives for the remote camera study (e.g. the level of effect that you plan to detect, and how this threshold was determined). "Significant change to distribution and abundance" (p. 52) is undefined. A power analysis was conducted in 2018 using the Parks Canada camera study data, which may provide some insight on the power to detect change. - As proposed, this program will not have any pre-construction baseline data against which to compare the monitoring results. It is therefore impossible to detect an effect. - A single year of remote camera data (or any data) is insufficient to detect effects, as it only describes animal distribution in that particular year. The remote camera study will need to continue year-round throughout the winter road phase, construction, and at least three years into ASR operation, to determine the effects of construction, different operational seasons, and increasing traffic volumes. - There is no description of how redeploying cameras monthly will affect analysis. Without an understanding of seasonal movements this may bias data, for example if caribou only use a certain area in a particular season, or if cameras are always placed in the same locations at the same time. You may wish to consider stratifying or reducing the study area rather than moving cameras. 	<p>That the proponent provide a comprehensive Northern Mountain Caribou effects monitoring remote camera study in discussion with Parks Canada, including:</p> <ul style="list-style-type: none"> - clear expectations for effects detection; - sufficient sampling frequency and duration; and - justified methodological choices that account for a different context than the proposed survey protocol (including a power analysis demonstrating ability to detect effects of the ASR). 	Phase 2	N/A
60746	100	PCA #100 - Wildlife Management and Monitoring Plan: caribou effects monitoring - other effects assessment	<p>p. 52 states that a Parks Canada collaring program could "also be used to further assess effects of the Mine and Access Road on Northern Mountain Caribou". The program ended in December 2018 and data is currently being analyzed; however, without ongoing data collection, this cannot be used to assess project effects.</p>	<p>That the proponent, Parks Canada, and indigenous organizations discuss options for continuing satellite collaring for Northern Mountain Caribou as a component of project effects monitoring.</p>	Phase 2	N/A
60747	101	PCA #101 - Wildlife Management and Monitoring Plan: caribou mitigations and adaptive management	<p>Proposed mitigations and adaptive management for Northern Mountain Caribou are considered the minimum given the lack of baseline information and inability to predict effects. Additional considerations for mitigation and adaptive management include:</p> <ul style="list-style-type: none"> - Prohibiting blasting when caribou calves are within 2 km of the project, following the precautionary approach applied to Dall's Sheep lambs - Predators often preferentially use linear features such as roads that make it easier to move across the landscape and caribou and moose can't escape in deep snow. This interactive effect of the road and predators on the road may be identifiable through the winter track surveys and the remote camera study; but has not been addressed in the adaptive management options. - Surveys are too infrequent to allow adaptive management, as reviews of Northern Mountain Caribou status are proposed to only take place every 5 years, which would not allow a timely response to any issues, or sufficient monitoring of mitigation effectiveness. - The effectiveness of the caribou aerial surveys should be evaluated sooner than 9 years into the project, for both Northern Mountain and Boreal Caribou surveys (not just Boreal caribou as proposed on p. 57). Power analysis and simulations can provide an understanding of the effects levels that can be detected from these surveys far earlier than 9 years. Further, these evaluations should not only be if caribou are not detected, as this is not an indication of survey success (i.e. a non-detection is not equivalent to an absence, as caribou are extremely difficult to detect, particularly in boreal forest). - A clear decision-making tree is needed to determine next steps after survey evaluations or power analysis. What options will be considered if the proposed monitoring programs are unable to detect effects? 	<p>That the proponent provide a detailed adaptive management plan for Northern Mountain Caribou, including:</p> <ul style="list-style-type: none"> - Regular and more frequent review of monitoring programs; - Identification of Northern Mountain Caribou sensitive seasons; - Thresholds for determining effects and initiating adaptive management; - A decision tree for caribou adaptive management; - Additional management options, including seasonal or diurnal restrictions on traffic, and alternative monitoring methodologies. 	Phase 2	N/A

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60748	102	PCA #102 - Wildlife Management and Monitoring Plan: Traffic Monitoring Plan adaptive management (Appendix 5-2, section 6.2.1.2)	<p>Other studies and literature reviews have found effects on caribou at much lower traffic volumes than 300-500 vehicles per day. For instance, a Parks Canada-contracted literature review and road impact study design (Steenweg & Polfus (2013)) and the preliminary results from the implemented study (Arnold et al. (2018)) both describe an effect on caribou from far lower traffic densities.</p> <p>Given this, the proposed thresholds for adaptive management are too high. Further, as described, they are based only on traffic volumes at the checkpoint, which may differ from traffic volumes at other areas along the road (e.g. close to the mine site, near camps or maintenance locations, etc.). Similarly, a measure of traffic volume alone does not account for different types or duration of traffic. Why is the traffic information from the Northern Mountain Caribou remote camera study not being proposed to also track and manage traffic volumes?</p> <p>Additionally, appropriate and potential adaptive management measures for traffic control should be identified prior to any issues occurring, not when the thresholds have been reached.</p> <p>Finally, it is unclear who will be leading the traffic monitoring program, as checkpoint station attendants conduct the monitoring, but Environmental Monitors do the reporting.</p>	<p>That the proponent identify realistic traffic monitoring thresholds for adaptive management and potential management actions, taking into consideration:</p> <ul style="list-style-type: none"> - Further information on the effects of traffic on wildlife, including Steenweg & Polfus (2013) and Arnold et al. (2018); - Spatial and temporal (diurnal and seasonal) differences in traffic volumes, and how these interact/overlap with wildlife sensitive periods; and - All proposed monitoring programs that will provide information on traffic volumes. 	Phase 2	N/A
60749	103	PCA #103 - Wildlife Management and Monitoring Plan: Wildlife Harvest Effects Monitoring (Appendix 5-2, section 6.2.2)	<p>While it is understood that the proponent is providing some suggested harvest monitoring options, in the absence of a regulator and community-determined program, it is unclear how harvest monitoring will be separated from other project impacts. For instance:</p> <ul style="list-style-type: none"> - It is unclear how effects of harvest pressure will be distinguished from other project effects when analyzing moose track relative abundance. - When conducting voluntary surveys, it is essential to know the response rate (i.e. number of refusals, and the number of unasked harvesters (those who pass the checkpoint when unmanned)) - Finally, it is unclear who will be leading the traffic monitoring program, as checkpoint station attendants conduct the monitoring, but Environmental Monitors do the reporting. 	<p>That the proponent, in discussion with regulators and Indigenous organizations, clarify aspects of the wildlife harvest effects monitoring to ensure that the program can detect any effects.</p>	Phase 1	8.2.2 WMMP Procedure #6
60750	104	PCA #104 - Main Report-pre-disturbance "monitoring"	<p>The main report outlines pre-disturbance "monitoring" prior to clearing that will take place for a number of species. It is not clear how this will take place. For example, it seems unrealistic that the environmental monitor will have sightlines within a 1km radius of blasting.</p>	<p>Provide the systematic pre-disturbance "monitoring" approach (including protocols) and the qualifications required of the individuals doing the work.</p>	Phase 1	8.1 WMMP Procedures #1-8
60751	105	PCA #105 - Main Report-setbacks for wildlife	<p>CZN outlines a number of set-back distances for both blasting and operations of the road. It is not clear how these set-back distances were determined.</p>	<p>Clarify how individual species set-back distances were determined.</p>	Phase 1	Table 4
60752	106	PCA #106 - Draft WMMP (Appendix 5-2, section 4.2.1)	<p>CZN provides the following regarding the Canada National Parks Act "The Canada National Parks Act enables Parks Canada to establish, manage (i.e., enforce), and maintain national parks and national park reserves. Prohibitions against hunting (except traditional subsistence harvesting) and possession of listed wildlife (or their parts, including eggs) are included. The management and maintenance of parks outlines pollution mitigation and clean-up expenses, and gives power to the Minister for the issuance, amendment, renewal, suspension, and/or cancellation of land use permits and water licenses for the Prairie Creek Mine and Access Road. Inquiries on the Canada National Parks Act are to be directed to Parks Canada."</p> <p>This wording does not reflect the extent of authorities that Parks Canada holds under the Canada National Parks Act and as a result can be misleading.</p>	<p>The proponent to provide clarity to Parks Canada on what authorities they would like reflected in this section. Parks Canada can help to re-write this section to better reflect the CNPA.</p>	Phase 1	5.3.1

Table B: Phase 1 Project Comments from Regulators Revision 01

ID		Topic	Comment	Recommendation	Project Phase	Phase 1 WMMP Section
60753	107	PCA #107 - Draft WMMP (Appendix 5-2, section 5.3.2.2)	CZN states that ``the Road Operations Supervisor, with recommendation from the CZN Environmental Monitor, will issue travel alerts to drivers. The report will include the species, number, geographic location, and approximate road km marker.'	Confirm that there will be seamless communication throughout all parts of the project area.	Phase 1 and 2	7.4.2 SOP #3 Phase 2 operations will have seamless communications once radio relay installed. It's impractical throughout Phase 1 area, but Phase 1 will track expected traffic departures and arrivals, and traffic will know in advance what other traffic is also on the road.
60754	108	PCA #108 - Draft WMMP (Appendix 5-2, section 6.2.3 Effects Monitoring)	CZN indicates within the WMMP that "The numbers of sheep lambing in immediate proximity to the Mine has not been documented; however, Golder (2012) suggest that it is possible that sheep may be lambing in proximity to the Mine and airstrip (i.e., the slopes above and to the east of the water storage pond)."	Indicate if the effects monitoring outlined for Dall's Sheep is specific to the mine and airstrip, or is it related to the ASR? Should it be modified to be relevant to the ASR?	Phase 2	N/A
60830	184	PCA #184 - Appendix 15-1: Road Operations and Maintenance Plan	Wildlife mitigations are identified in Section 3.10. Issues related to wildlife have been commented on by Parks Canada, specific to Appendix 5-2: Wildlife Management and Monitoring Plan. Parks Canada notes that the WMMP should provide the comprehensive approach to mitigation, which should be referenced appropriately in this document, not paraphrased.	Please update the WMMP, and reference it in this document.	Phase 1	WMMP
60861	215	PCA #215 - Letter re Sundog Apr 6 - impacts to Collared pika	The submission indicates that "the nearest recorded collared pika presence is in BP 34 (previously (2016) Km 34.4, now Km 34.6). Pika habitat and sign was noted adjacent to the road alignment where it parallels the previously proposed creek diversion reach, but the locations were unoccupied at the time of the survey. The continued absence of pikas will need to be confirmed prior to construction. However, there does not appear to be an impediment to moving the road alignment further into the slope over the reach location in terms of effects on pikas." Parks Canada notes that there was Pika sign at BP 35 as well, and at approx. KP 37.1. This proposed realignment looks like it encroaches slightly more on pika areas.	Ensure that the pika effects assessment, which should include accounting for inactive habitat, is updated to include the effects of this proposed realignment.	Phase 1	Refer to the 2021 Pika Baseline and Habitat Loss Estimates report
60630	29	Racher: Road Design Plans	In addition to engineering considerations, the road design plans should consider local and traditional knowledge especially with respect to wildlife access and crossing.	The requirements for the Road Design plans should require CZN to describe how local or traditional knowledge was considered and incorporated in road design in a manner consistent with EA Measure 10. We suggest this could also be a topic for discussion at the technical sessions.	Phase 1	4.0 8.0 9.1

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Wood Bison	<ul style="list-style-type: none"> ▪ Change in distribution along Winter Road (WR) ▪ Increased risk of animal-vehicle collisions 	<p>Key mitigations in place to minimize habitat creation and risk of mortality (bison-vehicle collisions):</p> <ul style="list-style-type: none"> ▪ WR design includes narrow right-of-way to minimize habitat creation and thus limit expanding distribution and risk of bison-vehicle collisions ▪ WR operations management (e.g., low travel speed, wildlife given right-of-way, snow berm management) ▪ Monitoring and reporting observations along WR 	<p>Bison occur north and south of the South Nahanni and Liard rivers, in the community of Nahanni Butte, and along Highway 7. They are likely habituated to people and traffic. No baseline surveys completed.</p> <p>Bison incidental sightings include:</p> <ul style="list-style-type: none"> ▪ Dec 2010 (13 bison observed in Nahanni Butte and community access road) ▪ Feb 2011 (3 bison observed near South Nahanni River) ▪ Feb 2014 (unreported number of bison observed) ▪ Mar 2014 (unreported number of bison observed) ▪ Mar 2019 (25 bison observed near South Nahanni River) ▪ April 2022 (10 bison observed near South Nahanni River) ▪ May 2022 (1 bison observed in Nahanni Butte) 	<p>WR effects monitoring will include the following program:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure <p>Mitigation monitoring is used to limit Project effects on bison and to improve the mitigation implemented. Mitigation monitoring will include the following programs:</p> <ol style="list-style-type: none"> 1. Wildlife Observation Logs: Number and location of detected bison sightings to keep personnel and contractors informed of bison activity in an area and serves as an early warning of possible human-wildlife conflict areas 2. Boreal Caribou Winter Track Surveys: Number and location of bison tracks along the WR to mitigate risk of bison-vehicle collisions 3. Road Mortality Risk: Location of wildlife trails intersecting with the WR and areas for wildlife caution signs. Includes the Dene Monitors weekly road survey to record wildlife, wildlife trails, and mitigation compliance. This provides systematic data on areas of vehicle collision risk and used to proactively minimize risk <p>Monitoring plans for the ASR¹ are the same as the WR.</p>
Boreal Caribou	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Increase risk of caribou-vehicle collisions ▪ Increase mortality due to improved predator access and harvest pressure ▪ Change in distribution (i.e., avoidance) due to WR ▪ Reduce habitat effectiveness because of spills 	<p>Key mitigations in place to minimize habitat loss and alteration, risk of mortality (caribou-vehicle collisions, predation), harvest pressure, and disturbances that could change caribou distribution:</p> <ul style="list-style-type: none"> ▪ WR alignment avoids important caribou habitat, as identified by Indigenous groups ▪ Access restrictions at locations where CZN has authority and thus reduces risk of mortality, harvest pressure, and disturbances ▪ Monitoring and reporting observations along WR to identify caribou crossing areas and implement measures to reduce risk of caribou-vehicle collisions ▪ Road operations management (e.g., low travel speed, wildlife given right-of-way, snow berm management) to minimize risk of habitat alterations and mortality risk 	<p>WR alignment moved to eastern toe of Nahanni Range, to extent possible, to avoid important caribou habitat that was identified by Indigenous groups. Also, during the 2017 Public Hearing, ENR identified that the area is surveyed annually for moose and bison, and during these surveys, no caribou have been seen near where the WR occurs. Thus, boreal caribou are expected to be in very low density near the WR. Baseline surveys includes:</p> <p>Winter aerial surveys provide data on caribou relative abundance and distribution during the winter:</p> <ul style="list-style-type: none"> ▪ Dec 2010 (0 caribou observed) ▪ Feb 2011 (0 caribou observed) ▪ Feb 2014 (unknown number of caribou observed in one group between the Nahanni Range and Silent Hills) ▪ Mar 2014 (0 caribou observed) ▪ Mar 2019 (0 caribou observed) ▪ Nov 2021 (0 caribou observed) 	<p>WR effects monitoring will include the following program:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure <p>Mitigation monitoring is used to limit Project effects on Boreal Caribou and to improve the mitigation implemented. Mitigation monitoring will include the following programs:</p> <ol style="list-style-type: none"> 1. Boreal Caribou Winter Track Surveys: Number and location of caribou tracks along the WR to mitigate risk of caribou-vehicle collisions 2. Wildlife Observation Logs: Number and location of detected caribou sightings to keep personnel and contractors informed of caribou activity in an area and serves as an early warning of possible human-wildlife conflict areas 3. Road Mortality Risk: Location of wildlife trails intersecting with the WR and areas for wildlife caution signs. Includes the Dene Monitors weekly road survey to record wildlife, wildlife trails, and mitigation compliance. This provides systematic data on areas of vehicle collision risk and distribution, and used to proactively minimize risk 4. Wildlife Hazard and construction monitoring: Project commitments and mitigations in place to protect habitat at camps and worksites. Proactively minimizes the risk to habitat by regularly ensuring proper management practices are in place and in working condition <p>Monitoring plans for the ASR¹ are the same as the WR, with exception a remote camera program will be implemented, as recommended by ENR, and the winter track surveys will be used to supplement the camera results.</p>

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Northern Mountain Caribou	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Increase risk of caribou-vehicle collisions ▪ Increase mortality due to improved predator access and harvest pressure ▪ Change in distribution (i.e., avoidance) due to road ▪ Reduce habitat effectiveness because of spills 	<p>Key mitigations in place to minimize habitat loss and alteration, risk of mortality (caribou-vehicle collisions, predation), harvest pressure, and changes in distribution:</p> <ul style="list-style-type: none"> ▪ WR alignment on existing road bed to reduce habitat loss and maintain similar level of predator access, to extent possible ▪ Access restrictions at locations where CZN has authority and thus reduces risk of mortality, harvest pressure, and disturbances ▪ Monitoring and reporting observations along WR to reduce risk of caribou-vehicle collisions ▪ Road operations management (e.g., low travel speed, wildlife given right-of-way, snow berm management) to minimize risk of habitat alterations and mortality risk ▪ Blast management (e.g., blast monitoring and setback distances) 	<p>Mountain caribou are migratory (a few individual caribou may be the exception), moving up and down in elevation as well as between seasonal areas. To date, there has been conflicting opinion on the “trace occurrence” of mountain caribou near the proposed road.</p> <p>Winter aerial surveys provide data on caribou relative abundance (minimum count) and distribution during the winter:</p> <ul style="list-style-type: none"> ▪ Dec 2010 (62 caribou observed in 8 groups over a 3 day survey) ▪ Feb 2011 (89 caribou observed in 9 groups over a 4 day survey) ▪ Feb 2014 (unknown number of caribou observed in a single group) ▪ Mar 2014 (0 caribou observed over a 2 day survey) ▪ Mar 2019 (0 caribou observed over a 4 day survey) ▪ Nov 2021 (0 caribou observed over a 6 day period) ▪ Mar-Jun 2022 (survey only includes NNPR; 0 caribou observed over six repeat surveys) <p>Baseline caribou winter and summer occupancy models also predict areas of caribou-vehicle collisions risk.</p> <p>Parks Canada's remote collar data (2015-2018) provides baseline data on seasonal habitat use (including elevation), seasonal distribution in relation to the WR, and seasonal and annual ranges (50% and 95% Kernel Density Estimation) for the collared caribou.</p> <p>The remote camera survey (16,634 active camera-days from Jun 2019 to Sept 2020) also detected caribou (62 detections at 14 of the 45 camera locations) in the western portion of the Project, up to approximately KP 25. The maximum detected group size was 3.</p> <p>Canadian Zinc is also planning a mountain caribou collaring program (fall/early winter 2022) and pellet survey (spring 2023) to collect additional baseline.</p> <p>One caribou, with a satellite collar, was incidentally observed July 2016.</p>	<p>WR effects monitoring will include the following program:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure <p>Mitigation monitoring is used to limit Project effects on Northern Mountain Caribou and to improve the mitigation implemented. Mitigation monitoring will include the following programs:</p> <ol style="list-style-type: none"> 1. Wildlife Observation Logs: Number and location of detected caribou sightings to keep personnel and contractors informed of caribou activity in an area and serves as an early warning of possible human-wildlife conflict areas 2. Road Mortality Risk: Location of wildlife trails intersecting with the WR and areas for wildlife caution signs. Includes the Dene Monitors weekly road survey to record wildlife, wildlife trails, and mitigation compliance. This provides systematic data on areas of vehicle collision risk and distribution, and used to proactively minimize risk 3. Blast monitoring: prohibits blasting when caribou within the restricted setback 4. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to protect habitat (e.g., spill prevention). Proactively minimizes the risk to habitat by regularly ensuring proper management practices are in place and in working condition <p>Monitoring plans for the ASR¹ are the same as the WR, with exception the ASR effects monitoring will also include the following programs:</p> <ol style="list-style-type: none"> 1. Caribou Collar: Collar of 20 females to inform seasonal habitat use, movement corridors, and local caribou distribution relative to the ASR 2. Pellet Survey: Spring pellets counts along permanent transects/plots to identify change in caribou use in relation to road over time

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Moose	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Increase risk of moose-vehicle collisions ▪ Increase mortality due to harvest pressure ▪ Change in distribution (i.e., avoidance) due to road ▪ Reduce habitat effectiveness because of spills 	<p>Key mitigations in place to minimize habitat loss and alteration, risk of mortality (moose-vehicle collisions), harvest pressure, and changes in distribution:</p> <ul style="list-style-type: none"> ▪ WR alignment on existing road bed to reduce habitat loss and maintain similar level of predator access ▪ Access restrictions at locations where CZN has authority to reduce risk of mortality, harvest pressure, and disturbances ▪ Monitoring and reporting observations along WR to reduce risk of moose-vehicle collisions ▪ Road operations management (e.g., low travel speed, wildlife given right-of-way, snow berm management) to minimize risk of habitat alterations and mortality risk ▪ Blast management (e.g., blast monitoring and setback distances) 	<p>Moose are expected to occur throughout the WR; however, are more commonly observed in the eastern half (approximate) of the Project.</p> <p>Aerial surveys provide incidental data on moose relative abundance and distribution at the time of the survey:</p> <ul style="list-style-type: none"> ▪ Dec 2010 (48 moose observations over a 3 day survey period across a large regional study area) ▪ Feb 2011 (31 moose observations over a 4 day survey period across a large regional study area) ▪ Feb 2014 (unknown number of moose observations) ▪ Mar 2014 (unknown number of moose observations) ▪ Mar 2019 (7 moose observations; all east of Nahanni Range over a 4 day survey period) ▪ Oct 2019 (45 moose observations over a 2 day survey period; the same individual(s) likely observed multiple times) ▪ Nov 2021 (105 moose observations; the same individual(s) likely observed multiple times) ▪ Mar-Jun 2022 (survey only includes NNPR; 56 moose observations; the same individual(s) likely observed multiple times) <p>Moose were also detected during ground-based surveys, including the remote camera survey (124 moose detections at 18 of the 45 camera locations; 16,634 active camera-days from Jun 2019 to Sept 2020)</p>	<p>WR effects monitoring will include the following program:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure <p>The following mitigation monitoring is used to limit Project effects on moose, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Observation Logs: Number and location of detected moose sightings to keep personnel and contractors informed of moose activity in an area and serves as an early warning of possible human-wildlife conflict areas 2. Road Mortality Risk: Location of wildlife trails intersecting with the WR and areas for wildlife caution signs. Includes the Dene Monitors weekly road survey to record wildlife, wildlife trails, and mitigation compliance. This provides systematic data on areas of vehicle collision risk and distribution, and used to proactively minimize risk 3. Boreal Caribou Winter Track Surveys: Number and location of moose tracks along the WR to mitigate risk of moose-vehicle collisions 4. Blast monitoring: prohibits blasting when moose within the restricted setback 5. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to protect habitat (e.g., spill prevention). Proactively minimizes the risk to habitat by regularly ensuring proper management practices are in place and in working condition <p>Monitoring plans for the ASR¹ are the same as the WR</p>
Dall's Sheep	<ul style="list-style-type: none"> ▪ Increase risk of sheep-vehicle collisions ▪ Increase mortality due to harvest pressure ▪ Change in distribution (i.e., avoidance) due to road ▪ Reduce habitat effectiveness because of spills 	<p>Key mitigations in place to risk of mortality, harvest pressure, and changes in distribution:</p> <ul style="list-style-type: none"> ▪ WR alignment traverses mainly in the valley bottoms below Dall's Sheep habitat, to the extent possible ▪ Access restrictions at locations where CZN has authority to do so to reduce the risk of mortality, harvest pressure, and disturbances ▪ Monitoring and reporting observations along WR to reduce risk of sheep-vehicle collisions ▪ Road operations management (e.g., low travel speed, wildlife given right-of-way, snow berm management) to minimize risk of habitat alterations and mortality risk ▪ Blast management (e.g., blast monitoring and setback distances) 	<p>Dall's Sheep are expected to occur in the mountainous portions of the Project. No baseline surveys have been completed; however, are recorded incidentally during all other surveys. Dall's Sheep are commonly sighted from KP 0-40 but have also been observed at Grainger Gap and near Nahanni Butte (refer to Figure 3c).</p> <p>Incidental Dall's Sheep sightings include:</p> <ul style="list-style-type: none"> ▪ Jul 2009 (56 observed during 3 day ground-based survey) ▪ Jul 2016 (52 sheep observed over a 7 day survey) ▪ Mar 2019 (13 sheep observed) ▪ Oct 2019 (6 sheep observed) ▪ Nov 2021 (9 sheep observed) ▪ Mar-Jun 2022 (survey only includes NNPR; 72 sheep observed) <p>Dall's Sheep were also detected during the remote camera survey (deployed June 2019; average 370 active camera days). Dall's Sheep were the most commonly detected species (363 detections) and were also detected at the highest number of camera locations (25 of the 45).</p>	<p>WR effects monitoring will include the following program:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure <p>The following mitigation monitoring is used to limit Project effects on Dall's Sheep, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Observation Logs: Number and location of detected sheep sightings to keep personnel and contractors informed of sheep activity in an area and serves as an early warning of possible human-wildlife conflict areas 2. Road Mortality Risk: Location of wildlife trails intersecting with the WR and areas for wildlife caution signs. Includes the Dene Monitors weekly road survey to record wildlife, wildlife trails, and mitigation compliance. This provides systematic data on areas of vehicle collision risk and distribution, and used to proactively minimize risk 3. Blast monitoring: prohibits blasting when sheep within the restricted setback 4. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to protect habitat (e.g., spill prevention). Proactively minimizes the risk to habitat by regularly ensuring proper management practices are in place and in working condition <p>Monitoring plans for the ASR¹ are the same as the WR, except a lambing area survey is being considered in proximity to the airstrip.</p>

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Wolverine	<ul style="list-style-type: none"> ▪ Increase harvest pressure ▪ Increase risk of human-wildlife conflicts 	<p>Key mitigations in place to minimize harvest pressure and risk of human-wildlife conflict:</p> <ul style="list-style-type: none"> ▪ Access restrictions at locations where CZN has authority to do so ▪ Waste management practices (e.g., storing inaccessible to wildlife) and waste audits to reduce risk of human-wildlife conflict ▪ Monitoring and reporting observations 	<p>Wolverines live at low population densities even under optimal conditions and occupy a variety of habitats. No baseline surveys have been completed; however, no wolverines have been reported in the observation logs since at least 2004. No wolverine-related incident has occurred at the mine site to date.</p> <p>Incidental wolverine data includes:</p> <ul style="list-style-type: none"> ▪ Jul 2009 (0 observed during 3 day ground-based survey) ▪ Dec 2010 (2 observations of wolverine tracks over a 3 day survey) ▪ Feb 2011 (1 observation of wolverine tracks over a 4 day survey) ▪ Feb 2014 (no reported wolverine sightings) ▪ Mar 2014 (no reported wolverine sightings) ▪ Mar 2019 (0 wolverine observations over a 4 day survey) ▪ Nov 2021 (1 observation of possible wolverine track) ▪ Mar-Jun 2022 (survey only includes NNPR; 9 observations of wolverine tracks; the same track may have been observed in repeat surveys) ▪ Camera survey (33 detection events at 11 camera locations; 16,634 active camera-days from Jun 2019 to Sept 2020) 	<p>WR effects monitoring will include the following programs:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure 2. CZN will undertake wolverine monitoring and or modelling work when the action levels are exceeded during the WR Project (refer to Section 9.1.5). <p>The following mitigation monitoring is used to limit Project effects on wolverine, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Observation and Incidents Logs: Number and location of detected wolverine sightings to keep personnel and contractors informed of wolverine activity in an area and serves as an early warning of possible human-wildlife conflict areas 2. Boreal Caribou Winter Track Surveys: Number and location of wolverine tracks along the WR to mitigate risk of wolverine-vehicle collisions 3. Blast monitoring: prohibits blasting when wolverine within the restricted setback 4. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place such as waste management audits. Proactively minimizes the risk of human-wolverine conflicts by regularly inspecting and correcting storage areas and waste management practices <p>Monitoring plans for the ASR¹ are the same as the WR</p>
Grizzly Bear	<ul style="list-style-type: none"> ▪ Increase risk of mortality from destruction/disturbance of dens ▪ Increased risk of human-wildlife conflicts 	<p>Key mitigations in place to minimize risk of den destruction/disturbance and human-wildlife conflict:</p> <ul style="list-style-type: none"> ▪ Pre-construction bear den survey to reduce risk to bears and bear dens ▪ Bear management plan with response matrix to potential human-bear conflicts 	<p>WR occurs when most Grizzly bears are hibernating; however, bears may begin emerging in March. Pre-clearing den surveys were completed in October 2019 and November 2021 and one active den observed. Pre-clearing den surveys will be repeated in October 2022.</p> <p>Baseline data includes:</p> <ul style="list-style-type: none"> ▪ Oct 2019 (1 grizzly bear and 1 den observed) ▪ Mar-Jun 2022 spring den surveys inside NNPR (2 grizzly bears observed and 11 dens, or suspected dens, over six repeat surveys) ▪ Preliminary grizzly denning habitat suitability model inside NNPR <p>Grizzly Bear were also detected during ground-based surveys, including the remote camera survey (133 Grizzly Bear detections at 20 of the 45 camera locations; 16,634 active camera-days from Jun 2019 to Sept 2020)</p>	<p>WR effects monitoring will include the following programs:</p> <ol style="list-style-type: none"> 1. Harvest Monitoring: Minimum number harvested and occurrence to monitor harvest pressure 2. CZN will undertake grizzly bear monitoring and or modelling work when the action levels are exceeded during the WR Project (refer to Section 9.1.5). <p>The following mitigation monitoring is used to limit Project effects on grizzly bear, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Pre-construction Den Survey: Locates dens with the objectives of avoiding the destruction of and disturbance to dens during Project clearing/construction 2. Wildlife Observation and Incidents Logs: Number and location of detected bear sightings to keep personnel and contractors informed of bear activity in an area and serves as an early warning of possible human-wildlife conflict areas 3. Blast monitoring: prohibits blasting when bears and bear dens (including suspected dens) within the restricted setback 4. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place such as waste management audits. Proactively minimizes the risk of human-bear conflicts by regularly inspecting and correcting storage areas and waste management practices <p>Monitoring plans for the ASR¹ are the same as the WR</p>

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Little Brown Myotis and Northern Myotis	<ul style="list-style-type: none"> Potential for blasting to disturb overwintering bats 	Key mitigations in place to avoid disturbing bats: <ul style="list-style-type: none"> Clearing scheduled during the winter to avoid sensitive maternity roosting period Should clearing be required in the summer, bat maternity roost searches will be completed concurrently with bird nest searches prior to clearing Winter blasting is prohibited within 2 km of the poljes 	Little Brown and Northern myotis are known to occur in the South Nahanni Watershed and in the polje area near the WR in the summer. Lausen (2006) concluded that the poljes surveyed near the WR did not appear to provide highly favourable summer maternity roosting habitat due to its higher elevation and cooler night temperatures. Overwintering may occur in the polje area. The WR alignment was re-routed to avoid the polje area. <ul style="list-style-type: none"> No baseline studies since no adverse Project interaction 	No effects monitoring programs are planned for the WR and ASR. The following mitigation monitoring is used to limit Project effects on bats, and to improve the mitigation implemented: <ol style="list-style-type: none"> Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize potential effects.
Collared Pika	<ul style="list-style-type: none"> Habitat loss from WR construction Increase mortality risk during winter construction 	Key mitigations in place to avoid suitable talus habitat and pika mortality: <ul style="list-style-type: none"> Re-alignment of the WR off talus habitat, to the extent possible to reduce habitat loss Pre-construction surveys to avoid habitat loss (realign Project) and or minimize risk of mortality Winter setback distances including prohibiting storage of snow on pika habitat 	Most of the WR within pika range exists as all season quality and requires only limited upgrading and no borrow development. Baseline surveys completed in 2016, 2017, 2019, and 2021 determined where suitable pika habitat exists near the WR, relative abundance, and probability of occurrence in relation to survey year and geographic factors. 45 talus sites meet or likely meet pika habitat criteria within 500 m of the WR from KP 15.0 to 38.1. Of these 45 sites, 38 are, or have once been, occupied by pika.	No effects monitoring programs are planned for the WR. The following mitigation monitoring is used to limit Project effects on pika, and to improve the mitigation implemented: <ol style="list-style-type: none"> Pika Pre-Construction Monitoring: pre-construction surveys to determine the spatial area of suitable talus habitat and pika presence prior to construction to inform adaptive management Wildlife Hazard and construction monitoring: Monitors compliance to Project commitments and mitigations in place such as snow storage off pika habitat Monitoring plans for the ASR ¹ are the same as the WR, with exception an collared pika effects monitoring program will be implemented
Horned Grebe	<ul style="list-style-type: none"> Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> Design, construct, and manage the WR to maintain natural drainage patterns Construction management practices to minimize accidental spills 	The WR occurs when Horned Grebes absent and avoids wetlands and ponds (i.e., Horned Grebe habitat). No Horned Grebes detected during the 2017 baseline surveys.	The Bird Acoustic Monitoring program does not include Horned Grebe as no potential habitat will be lost and no individuals have been detected. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented: <ol style="list-style-type: none"> Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes
Red-necked Phalarope	<ul style="list-style-type: none"> Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> Design, construct, and manage the WR to maintain natural drainage patterns Construction management practices to minimize accidental spills 	The WR occurs when Red-necked Phalarope absent and avoids ponds and large sloughs (i.e., Red-necked Phalarope habitat). No Red-necked Phalarope detected during the 2017 baseline surveys.	The Bird Acoustics Monitoring program does not include Red-necked Phalarope as no potential habitat will be lost and no individuals have been detected. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented: <ol style="list-style-type: none"> Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes
Peregrine Falcon	<ul style="list-style-type: none"> None due to the WR winter schedule 	Key mitigations in place to minimize risk to Peregrine Falcon: <ul style="list-style-type: none"> WR scheduled during the winter and avoids period when Peregrine Falcon are present WR avoids direct loss of cliff-nesting habitat 	The WR occurs when Peregrine Falcons absent. Baseline aerial scrape survey completed July 2016. No active scrapes detected, however a Peregrine Falcon was observed and thus an active scrape was assumed nearby. An additional cliff-nesting raptor survey is planned prior to the ASR.	No effects monitoring programs are planned for Peregrine Falcon. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented: <ol style="list-style-type: none"> Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place, such as construction schedule in the winter
Yellow Rail	<ul style="list-style-type: none"> Direct habitat loss Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> Design, construct, and manage the WR to maintain natural drainage patterns Construction management practices to minimize accidental spills 	The WR occurs when Yellow Rails absent and avoids wetlands (i.e., Yellow Rail habitat), to extent possible. No Yellow Rails detected during the 2017 baseline surveys.	The Bird Acoustics Monitoring program does not include Yellow Rail as no individuals have were detected in baseline surveys. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented: <ol style="list-style-type: none"> Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes

Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Short-eared Owl	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> ▪ Design, construct, and manage the WR to maintain natural drainage patterns ▪ Construction management practices to minimize accidental spills 	The WR occurs when Short-eared Owls absent. No baseline surveys completed for Short-eared Owls. This owl is nomadic, and their populations naturally fluctuate in abundance and distribution in direct association with small mammal populations. In the summer, nests are associated with large open habitats including bogs, marshes, and other non-forested areas dominated by grass or sedge. No Short-eared Owls have been reported near the WR to date.	<p>No effects monitoring programs are planned for Short-eared Owl. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes
Common Nighthawk	<ul style="list-style-type: none"> ▪ Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> ▪ Construction management practices to minimize accidental spills 	The WR occurs when Common Nighthawk absent. Common Nighthawks were detected at 48 of the 78 survey stations during the 2017 baseline surveys; mostly throughout the boreal forest zone; however, a single detection at KP 7.	<p>The Bird Acoustics Monitoring program does not include Common Nighthawk as a focal species because density could not be estimated from the detection data and because no loss of suitable habitat is expected. The following mitigation monitoring is used to limit potential Project effects on Common Nighthawk, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes
Olive-sided Flycatcher	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> ▪ Construction management practices to minimize accidental spills 	The WR occurs when Olive-sided Flycatcher absent. Olive-sided Flycatchers detected at 11 of the 78 survey stations within the previous burn (KP 48-60), at Fishtrap Creek, near an Unnamed Creek (KP 112), near Grainger Gap, and at the Liard River during the 2017 baseline survey. Olive-sided Flycatcher are predicted to occur at slightly higher densities near the Project relative to the region.	<p>The Bird Acoustics Monitoring program includes Olive-sided Flycatcher as a focal species. The following mitigation monitoring is also used to limit Project effects on Olive-sided Flycatcher, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Compliance to Project commitments and mitigations in place to minimize habitat changes
Bank and Barn Swallows	<ul style="list-style-type: none"> ▪ Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> ▪ Construction management practices to minimize accidental spills 	The WR occurs when swallows absent. Bank Swallows detected at three of the 78 survey stations near open water (a polje, Fishtrap Creek) and near an Unnamed Creek (KP 112) during the 2017 baseline survey. Barn Swallows were not detected.	<p>The Bird Acoustic Monitoring program does not include Barn Swallow as a focal species because no individuals were detected during baseline surveys.</p> <p>The Bird Acoustic Monitoring program does not include Bank Swallow as a focal species because 1) density could not be estimated due to the limited number of detections and 2) suitable breeding habitat is not expected to be present within the footprint.</p> <ol style="list-style-type: none"> 1. The following mitigation monitoring is also used to limit potential Wildlife Hazard and construction monitoring: Monitors Compliance to Project commitments and mitigations in place to minimize habitat changes
Rusty Blackbird	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Habitat alteration outside the winter season 	Key mitigations in place to minimize risk of habitat alteration: <ul style="list-style-type: none"> ▪ Construction management practices to minimize accidental spills 	The WR occurs when Rusty Blackbirds absent. No Rusty Blackbirds detected during the 2017 baseline survey.	<p>The Bird Acoustics Monitoring program does not include Rusty Blackbird as no individuals were detected during baseline surveys. The following mitigation monitoring is also used to limit potential Project effects on Rusty Blackbirds, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Monitors compliance to Project commitments and mitigations in place to minimize habitat changes
Canada Warbler	<ul style="list-style-type: none"> ▪ Direct habitat loss ▪ Alteration outside the winter season 	Key mitigations in place to minimize risk of habitat loss and alteration: <ul style="list-style-type: none"> ▪ WR follows the proposed ASR alignment to minimize direct habitat loss to the extent possible ▪ Construction management practices to minimize erosion and accidental spills 	The WR occurs when Canada Warblers absent. Canada Warbler detected at 11 of the 78 survey stations in the deciduous, mixed forests, and open shrubby areas in the Silent Hills and east of Nahanni Front Range. Canada Warbler are predicted to occur at higher densities near the Project relative to the region.	<p>The Bird Acoustics Monitoring program includes Canada Warbler as a focal species. The following mitigation monitoring is also used to limit potential Project effects on Canada Warbler, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Monitors compliance to Project commitments and mitigations in place to minimize habitat changes

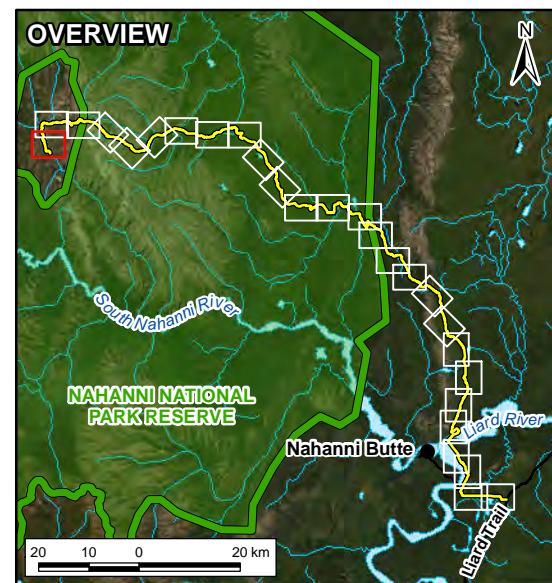
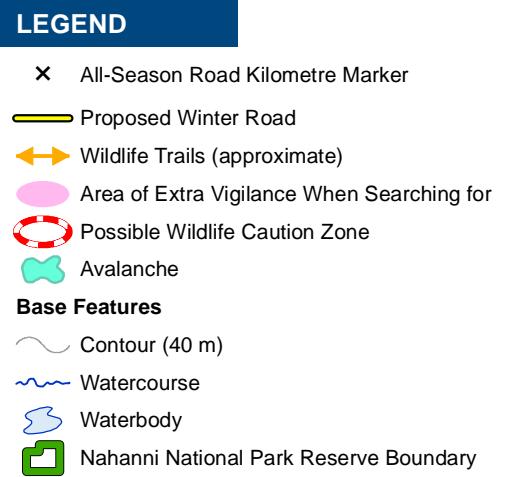
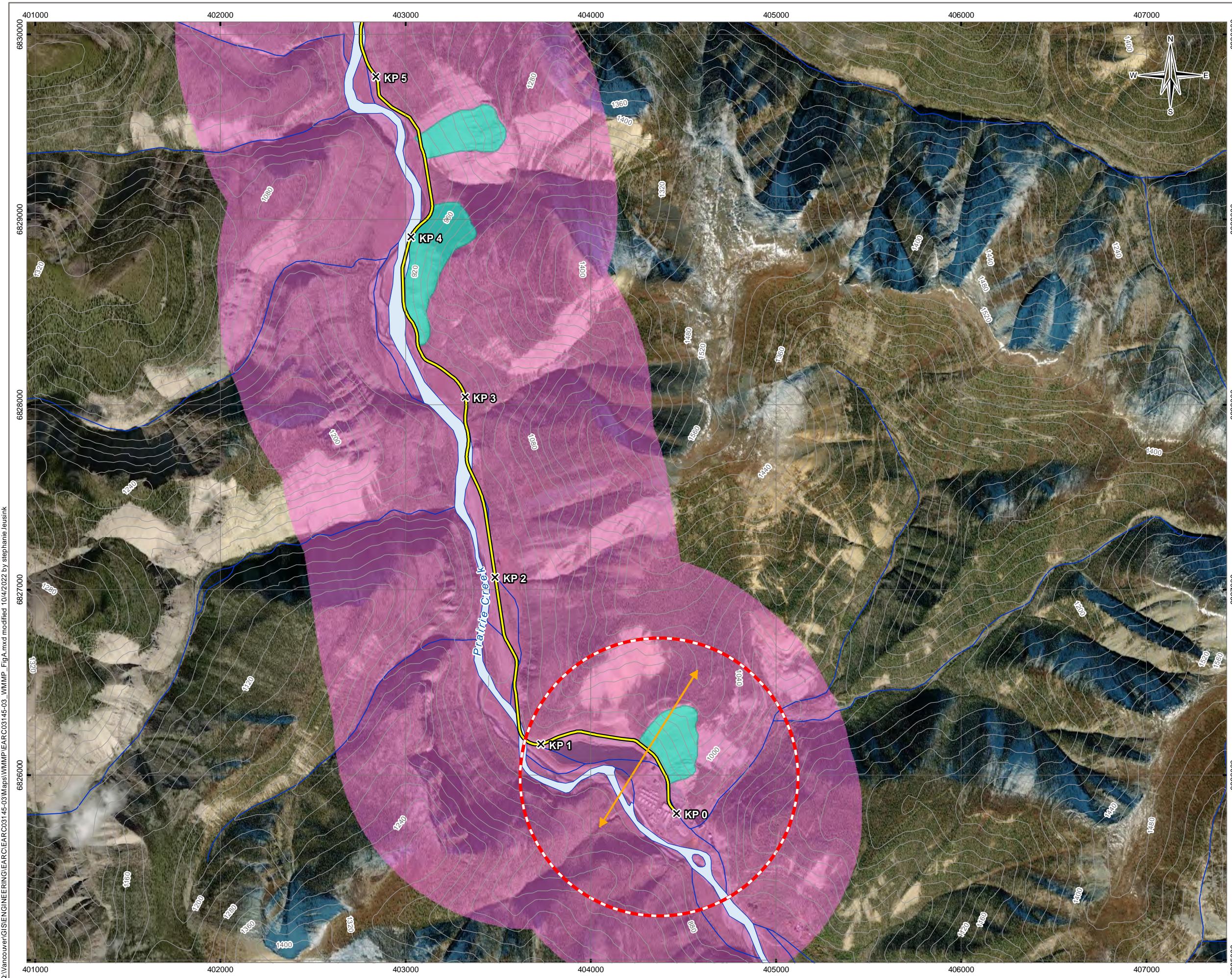
Table C: Key Harvest Species and Species at Risk Potential Effects, Baseline, and Monitoring

Species	Potential Effects	Mitigation	Baseline Surveys	Monitoring
Western Toad	<ul style="list-style-type: none"> ▪ Habitat alteration outside the winter season 	<p>Key mitigations in place to minimize risk of habitat alteration:</p> <ul style="list-style-type: none"> ▪ Construction management practices to minimize erosion and accidental spills ▪ Design, construct, and manage the WR to maintain natural drainage patterns in the spring 	<p>The WR occurs when Western Toad are hibernating. Western Toad abundance is typically greatest in forests less than 100 m from water year-round based on known ecology across their range; however, may extend several kilometers from the breeding pond in the summer. Based on the presumed species range, Western Toads may occur south of the Liard River.</p> <p>A Breeding Pond Survey is planned prior to, or in early phases of, ASR construction (as agreed with ENR). The survey will target the area south of the Liard River to provide data on species presence and important breeding pond distribution. If detected, then survey will continue proximal to the road north of the Liard River.</p>	<p>No effects monitoring programs are planned for the WR or ASR. However, the following mitigation monitoring is used to limit potential Project effects, and to improve the mitigation implemented:</p> <ol style="list-style-type: none"> 1. Wildlife Hazard and construction monitoring: Monitors compliance to Project commitments and mitigations in place to minimize habitat changes

1. These plans are preliminary and will be further described in the ASR WMMP

APPENDIX A

ACCESS ROAD MAP BOOK



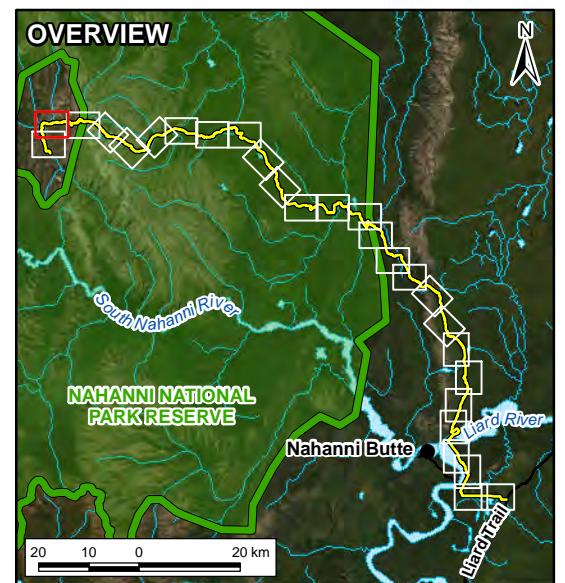
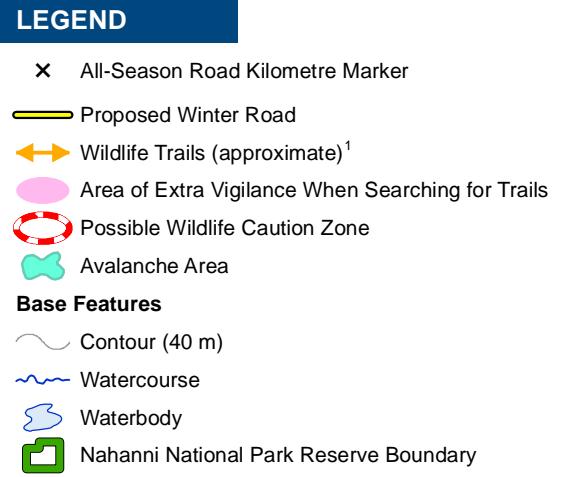
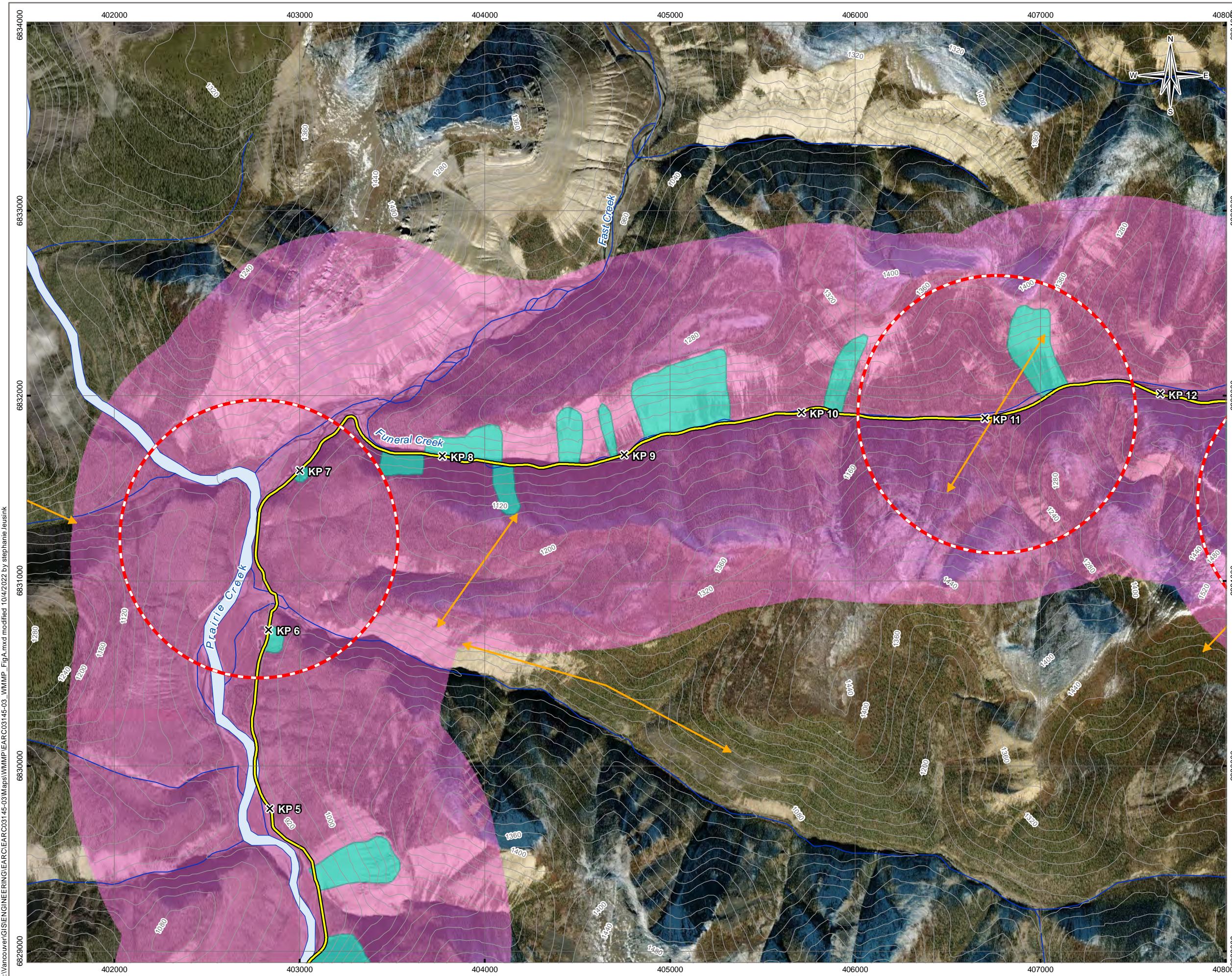
STATUS
ISSUED FOR REVIEW

**WILDLIFE MANAGEMENT AND MONITORING PLAN
PROPOSED WINTER ROAD**

Map Book

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Tt-VANC	SL MRV KL	4
DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

A1



NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: ESRI; Maxar (2016-2019).

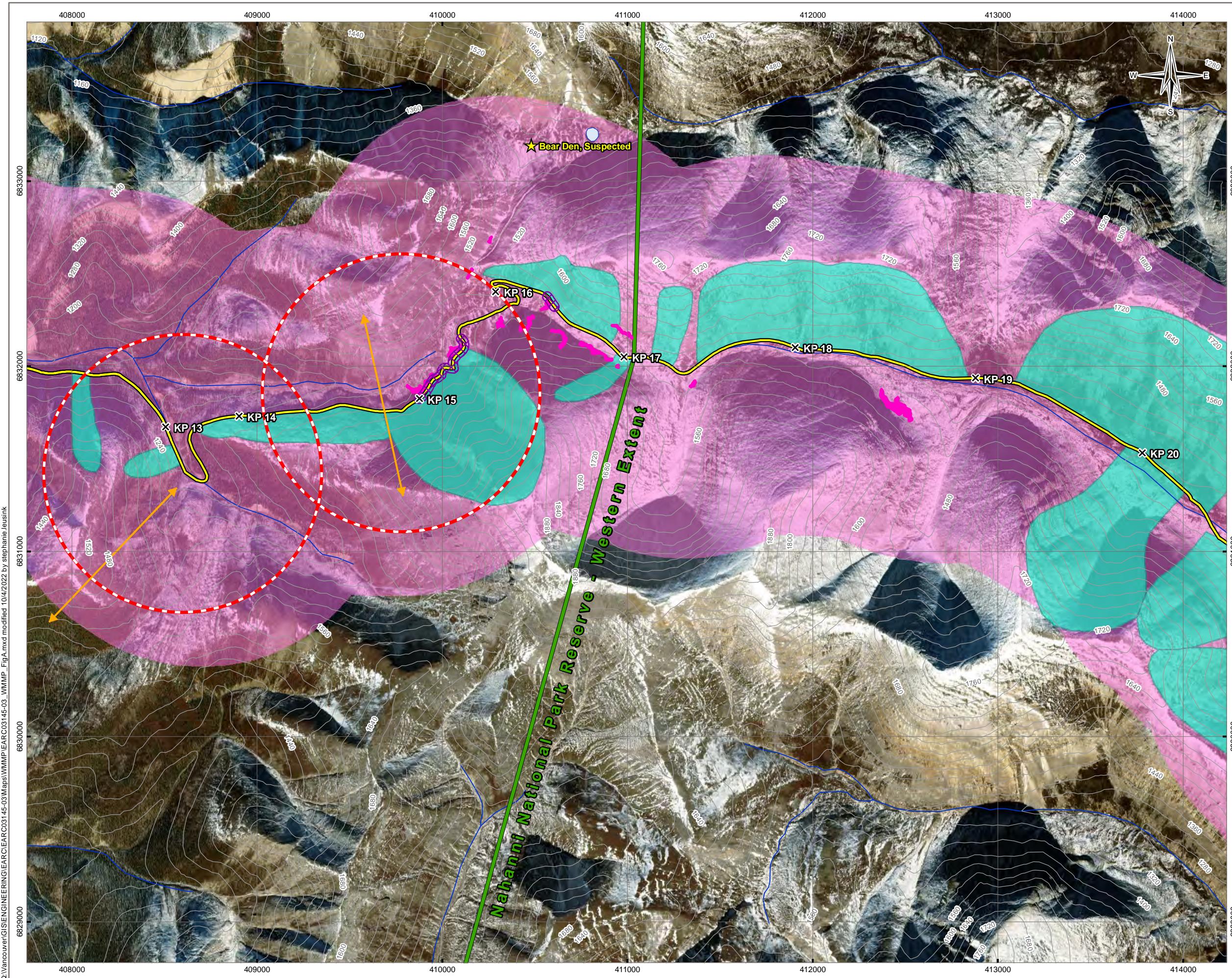
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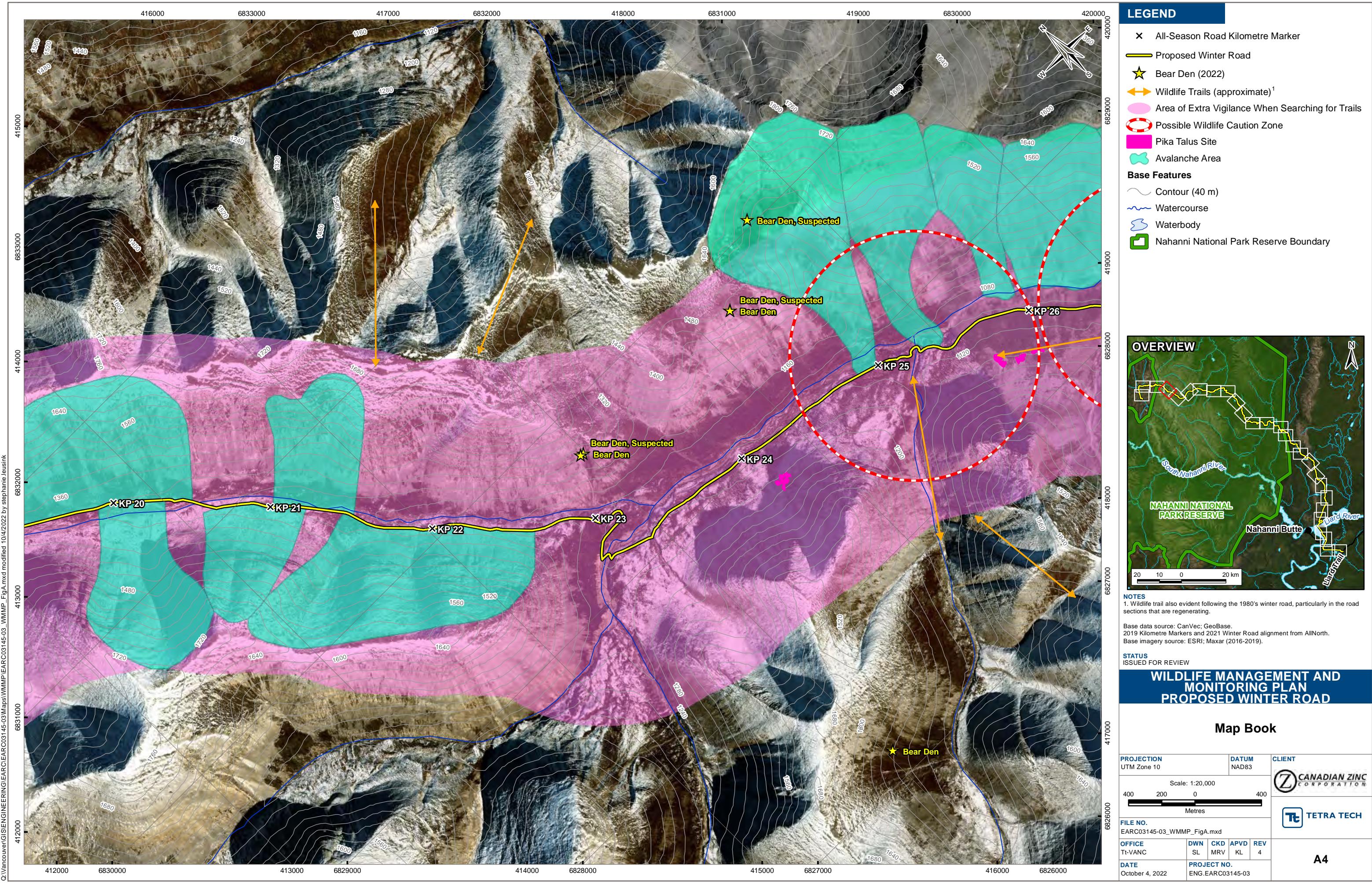
WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

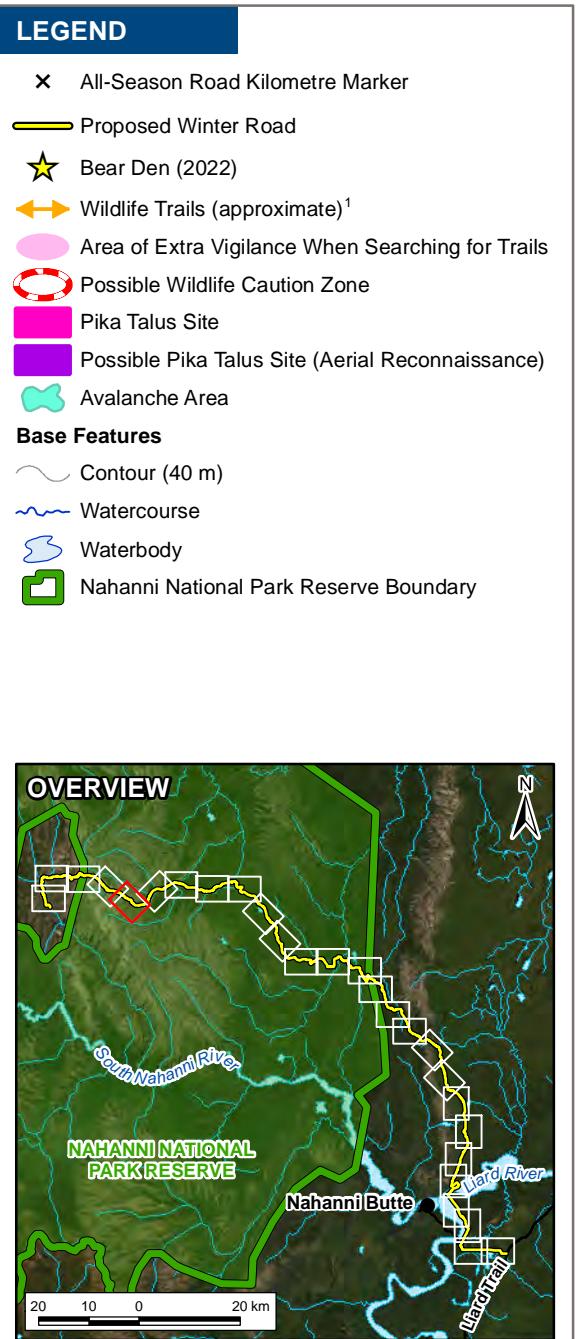
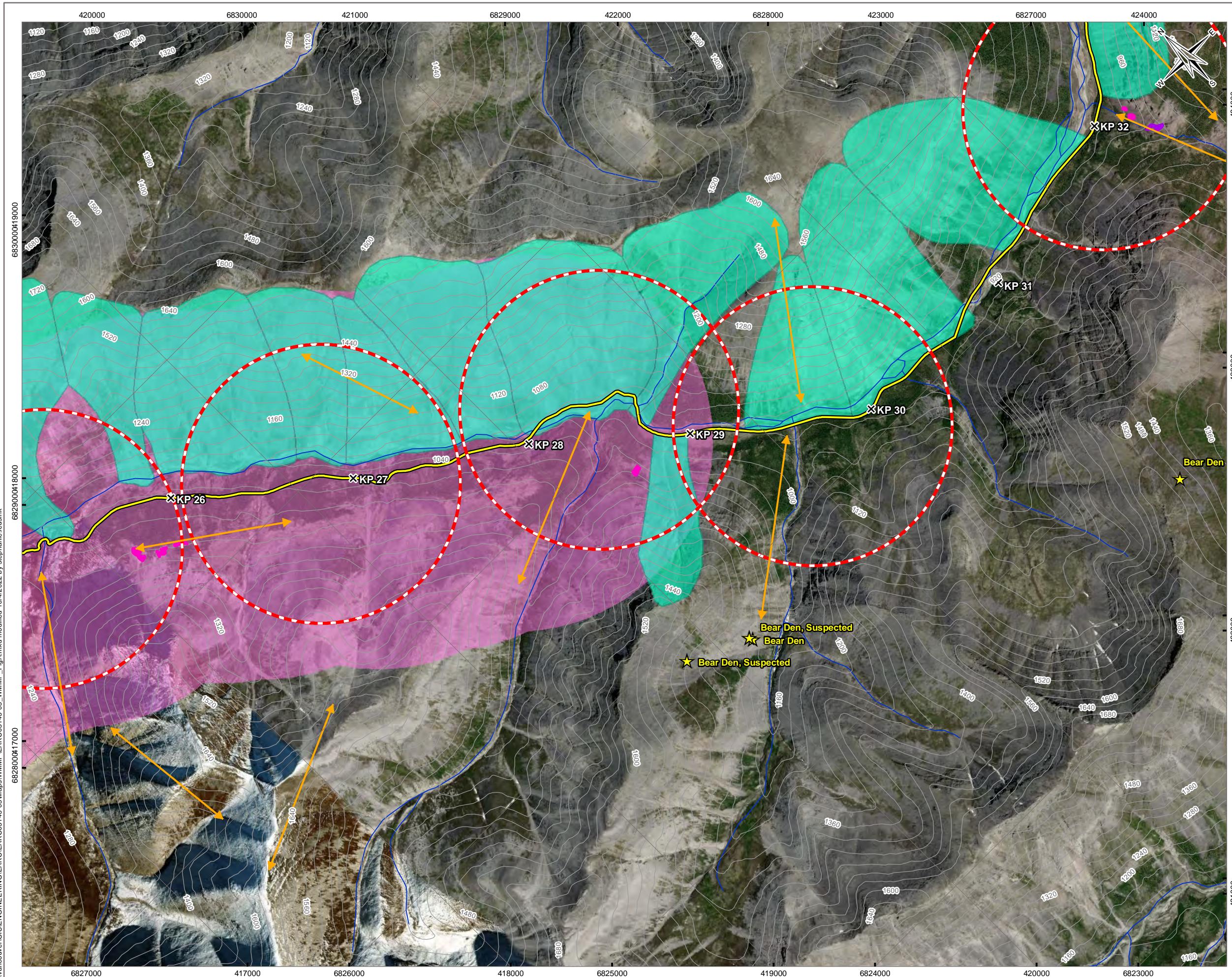
Map Book

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DATE	PROJECT NO.	
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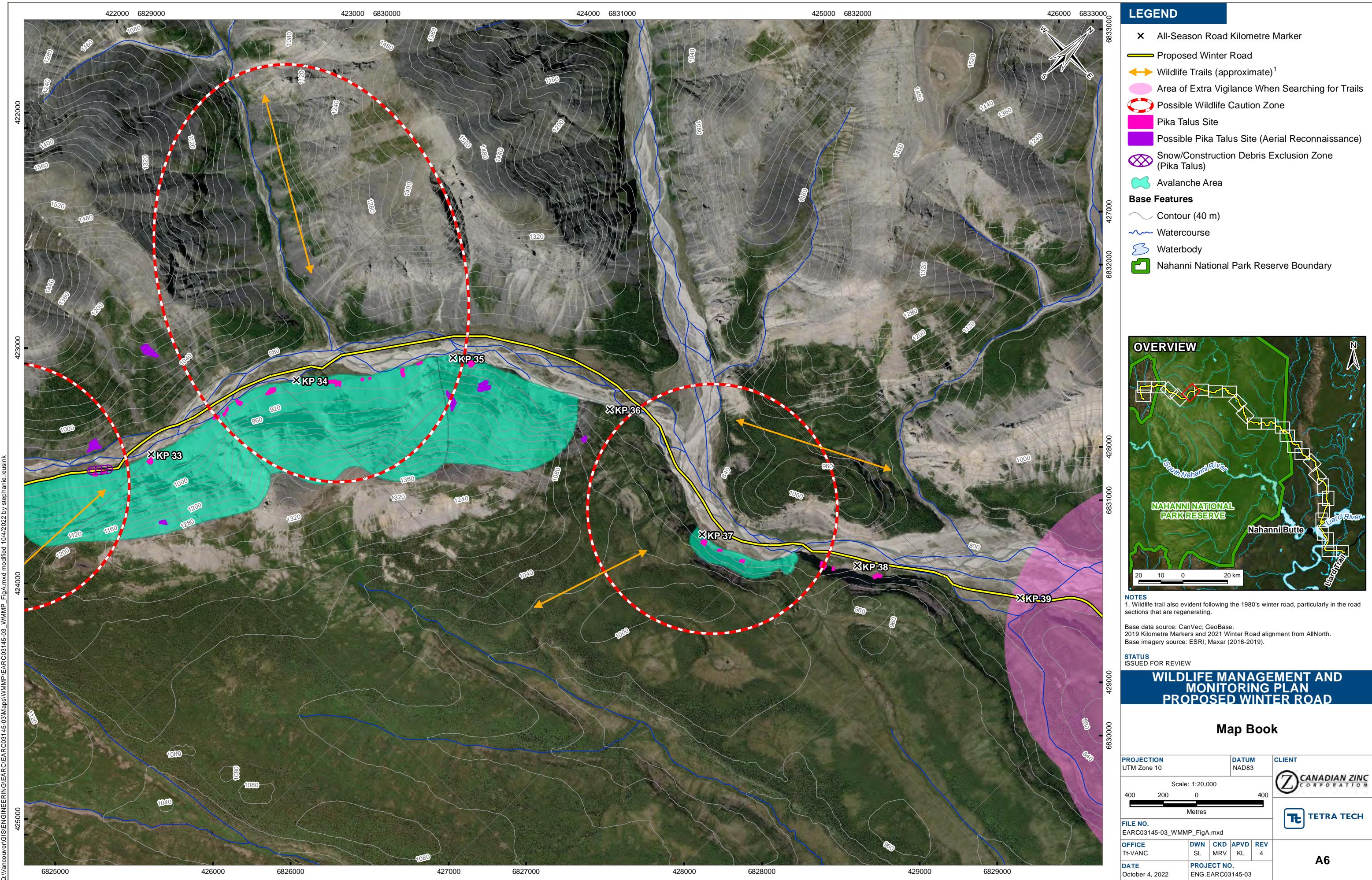


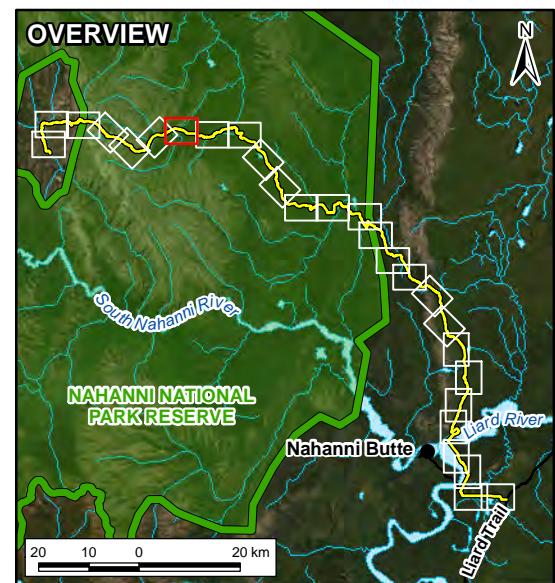
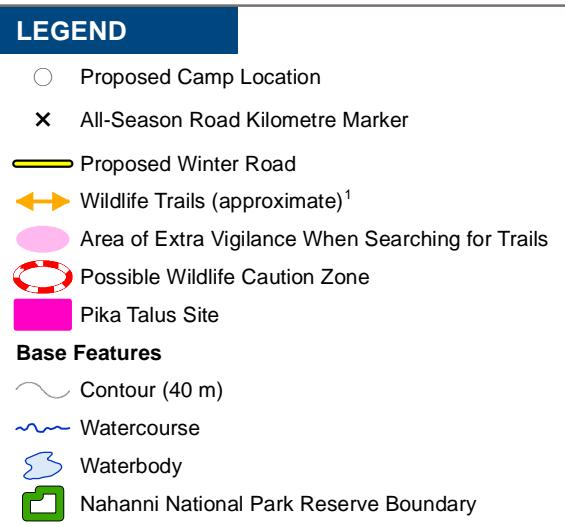
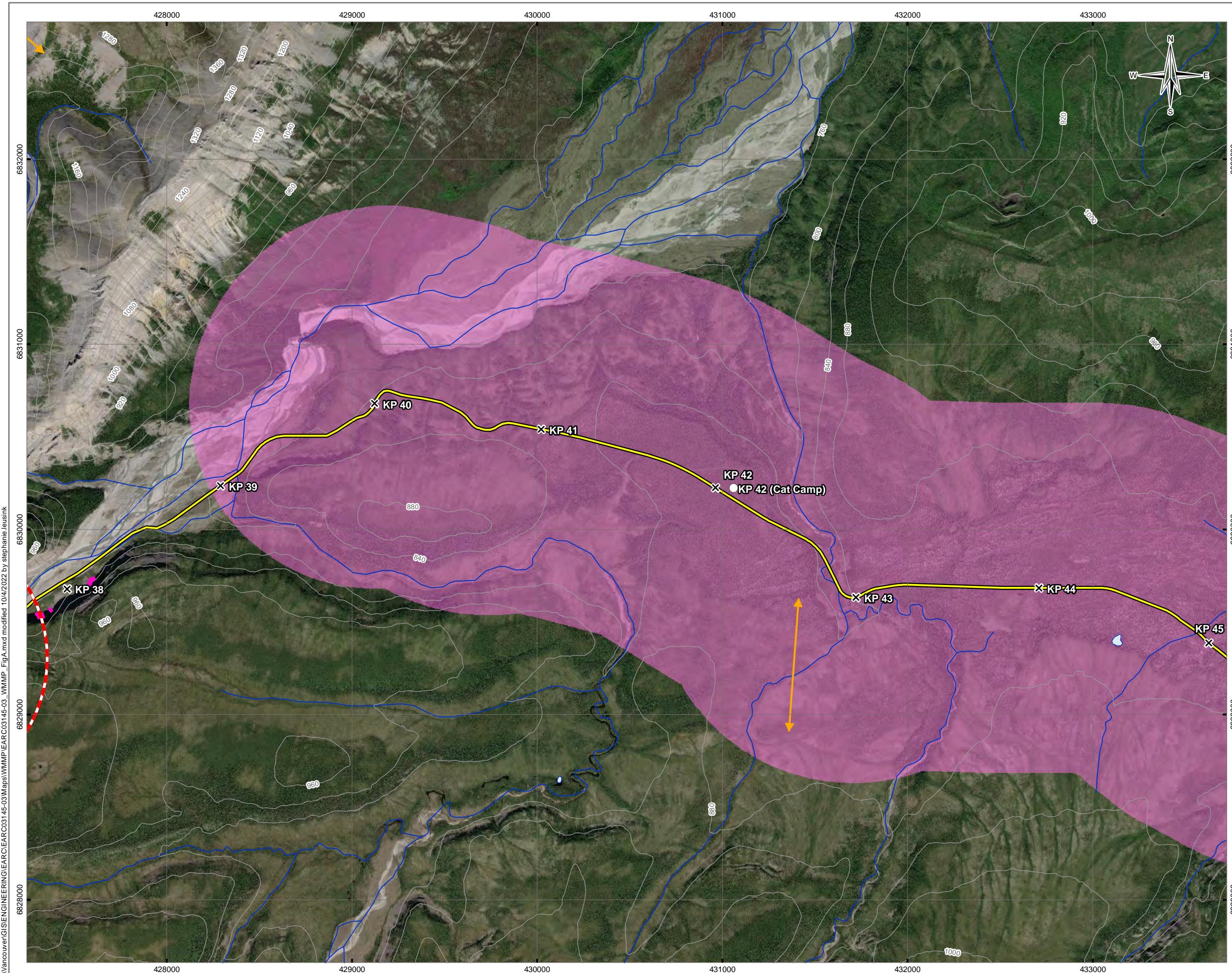
WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

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400	200	0
Metres		
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DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

A5





NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: ESRI; Maxar (2016-2019).

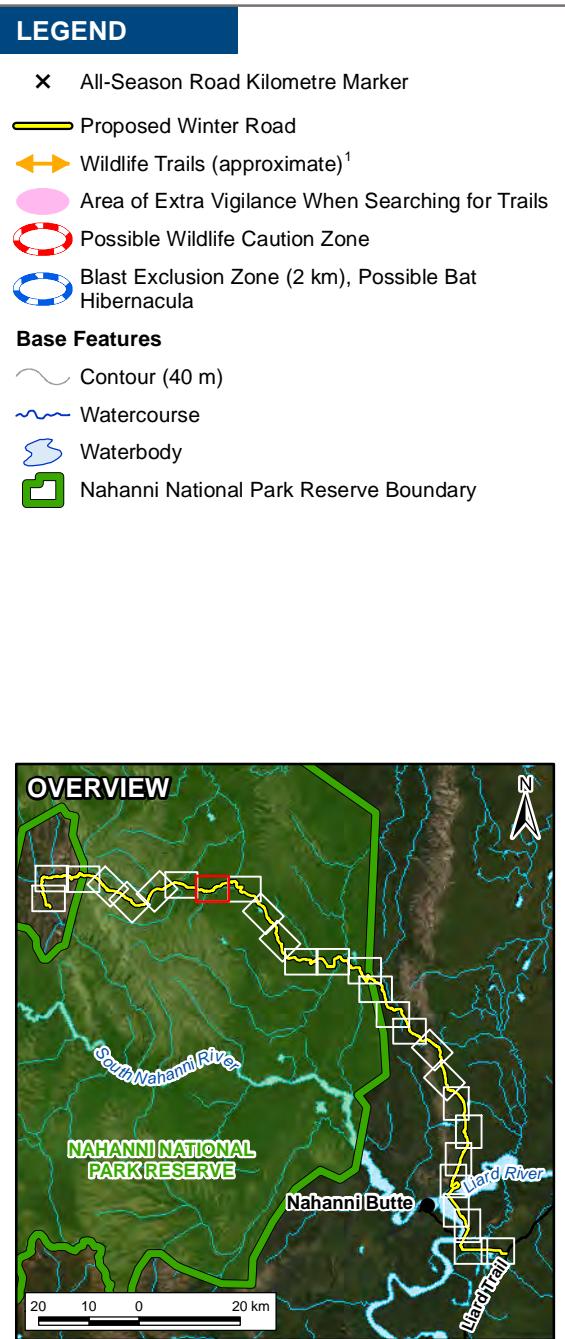
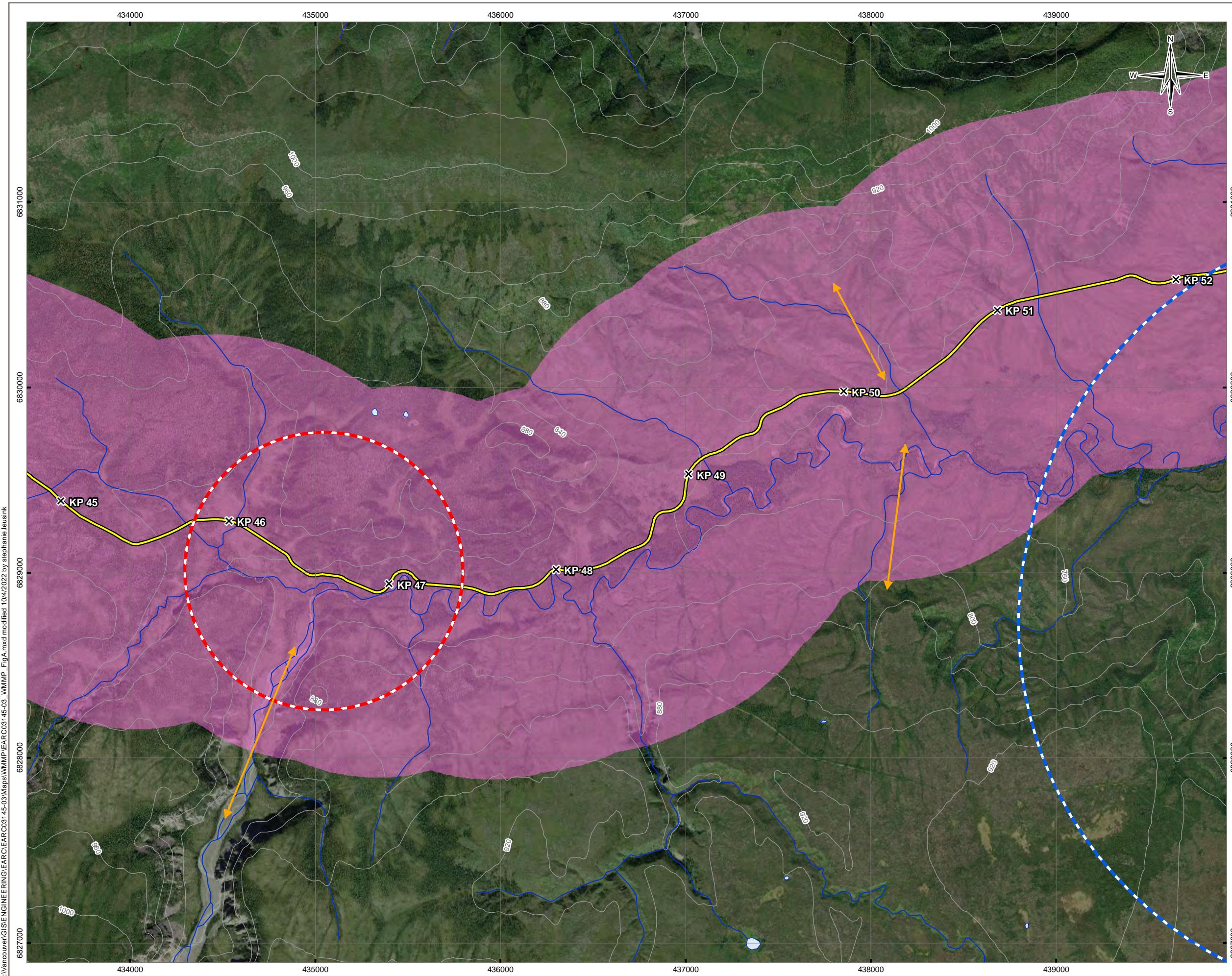
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WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

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DATE	PROJECT NO.	
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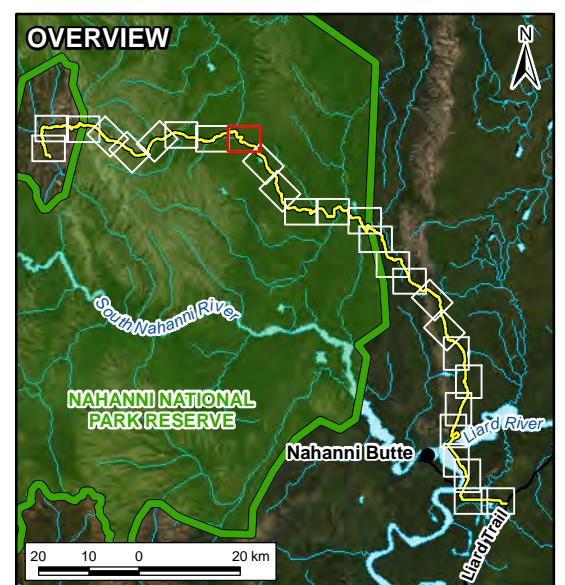
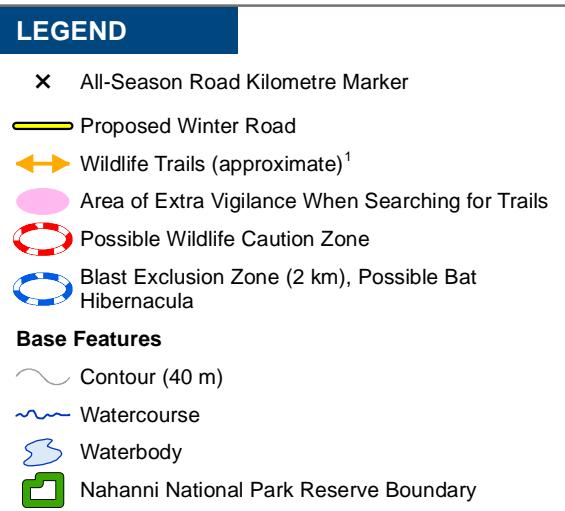
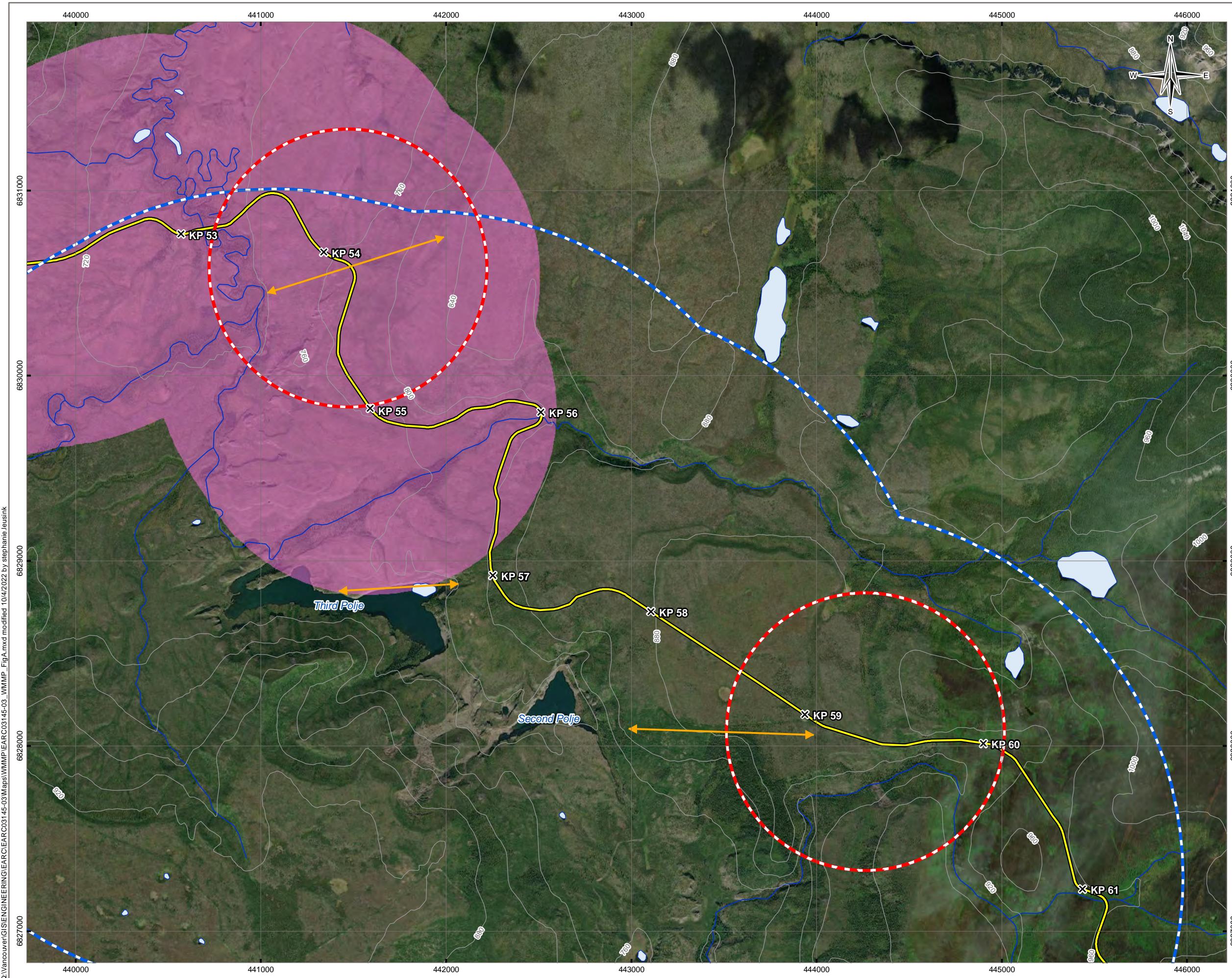


WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

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DATE	PROJECT NO.	ENG.EARC03145-03
October 4, 2022		

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Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: ESRI; Maxar (2016-2019).

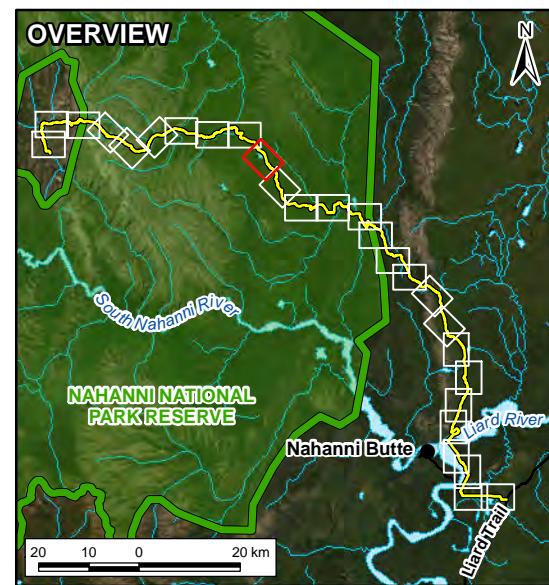
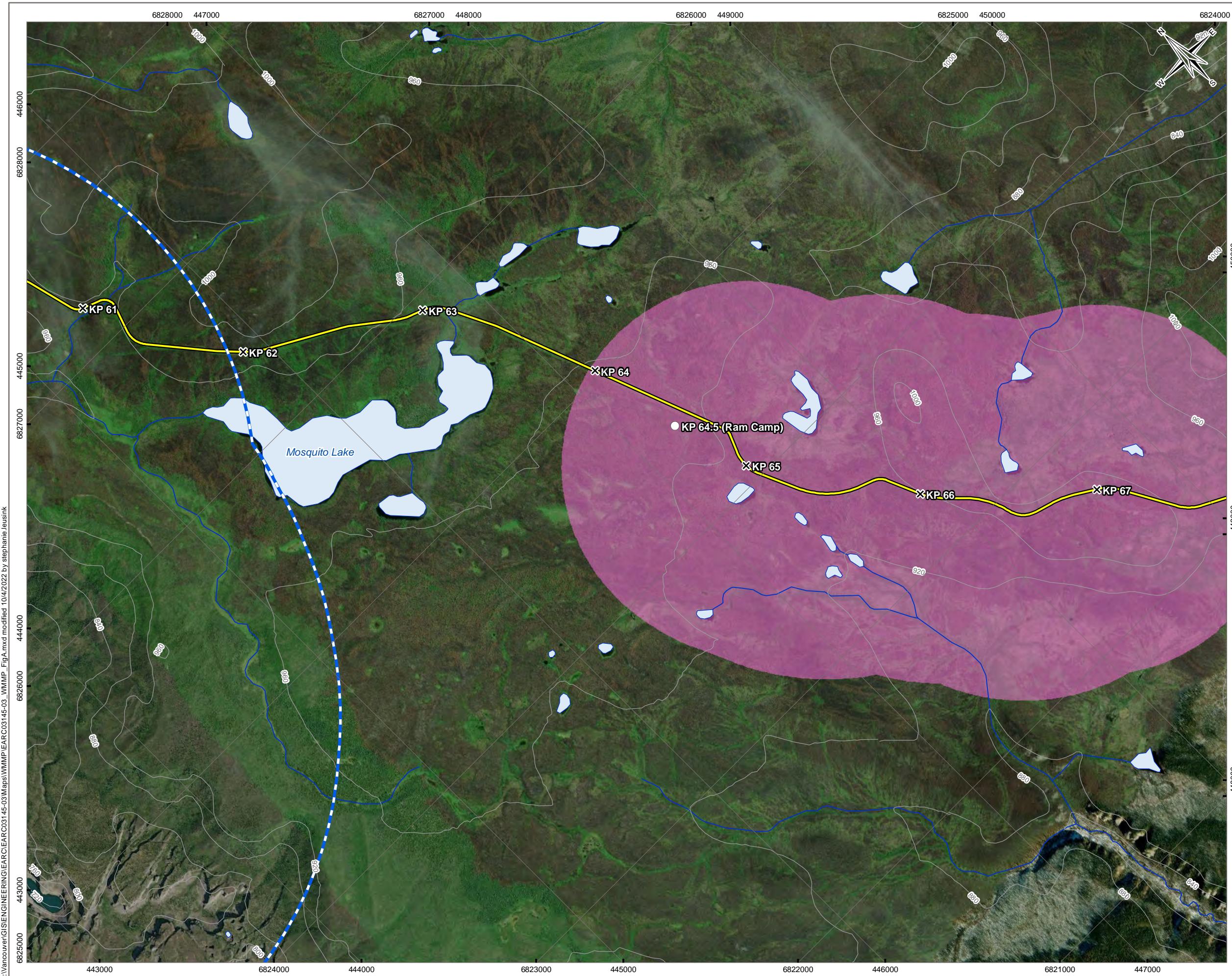
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WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

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Tt-VANC	SL MRV KL	4
DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

A9



NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: ESRI; Maxar (2016-2019).

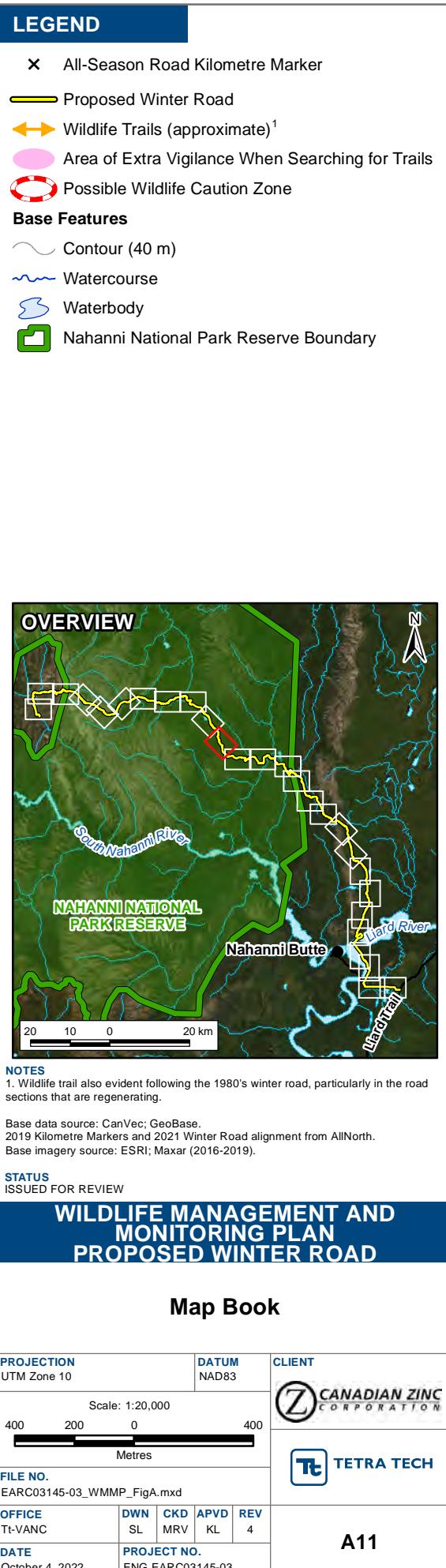
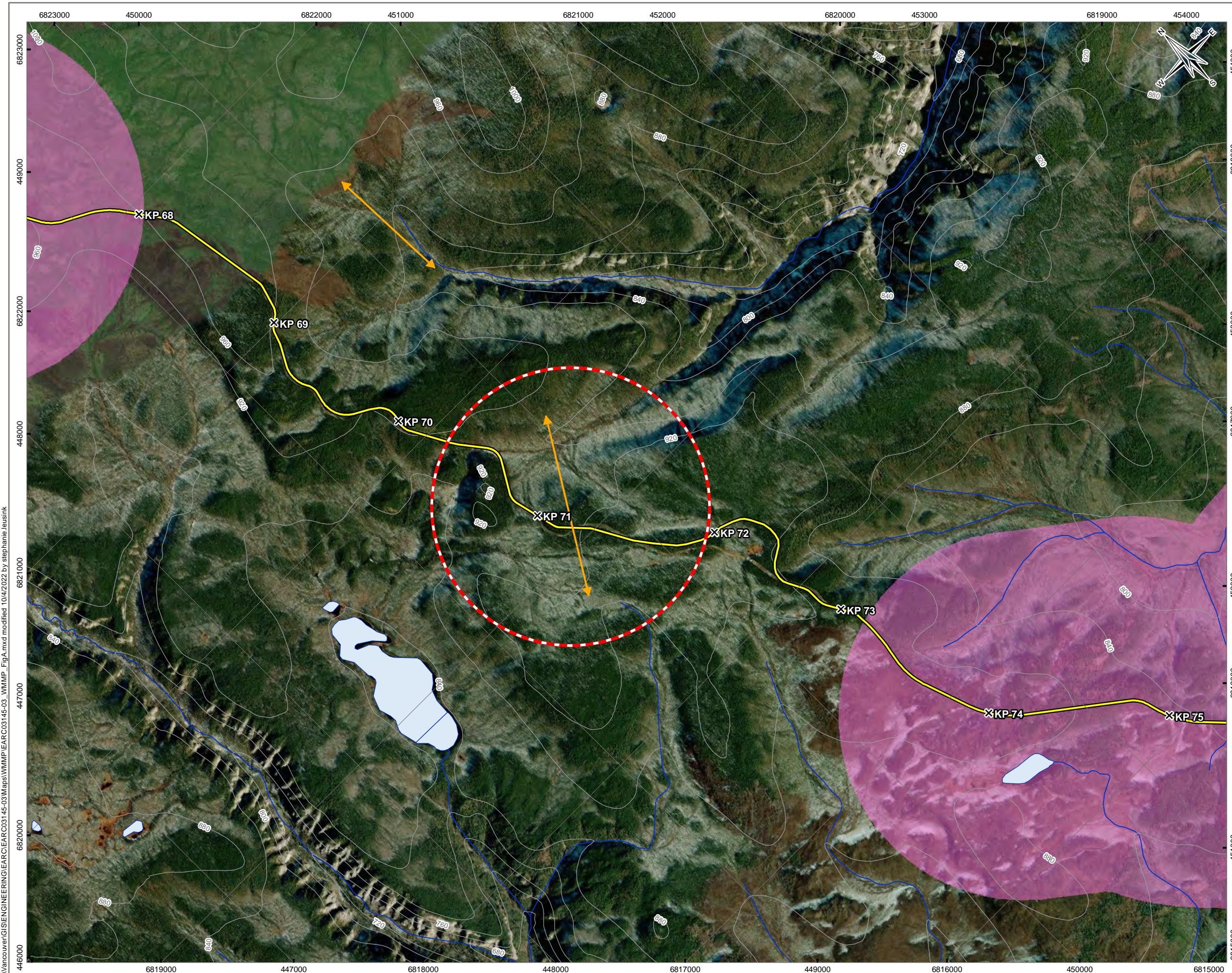
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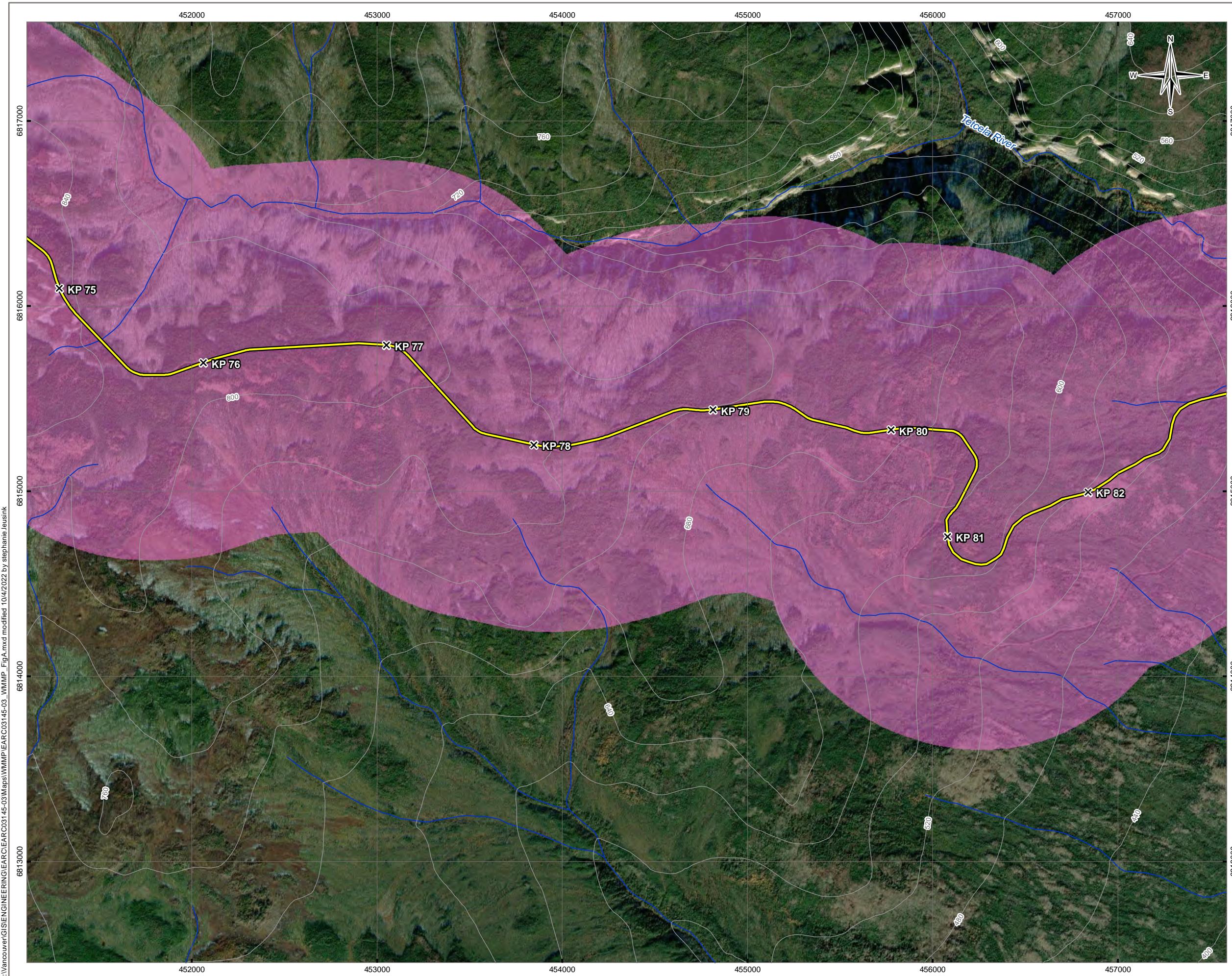
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Map Book

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DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

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LEGEND

- X** All-Season Road Kilometre Marker
- Yellow line** Proposed Winter Road
- Pink area** Area of Extra Vigilance When Searching for Trails

Base Features

- Contour (40 m)
- Watercourse
- Waterbody
- Nahanni National Park Reserve Boundary



PROJECTION
UTM Zone 10 **DATUM**
NAD83

Scale: 1:20,000
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Metres

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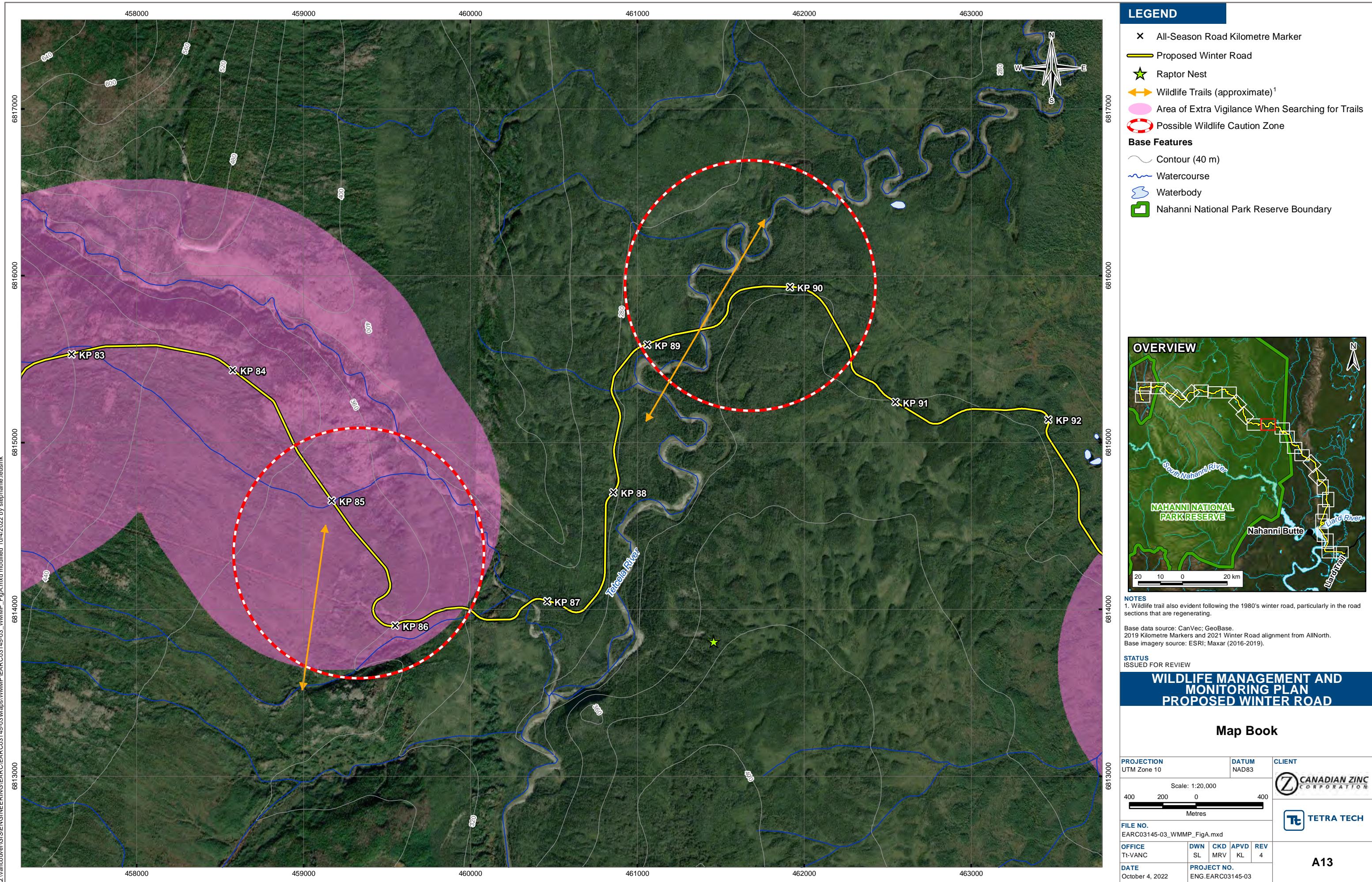
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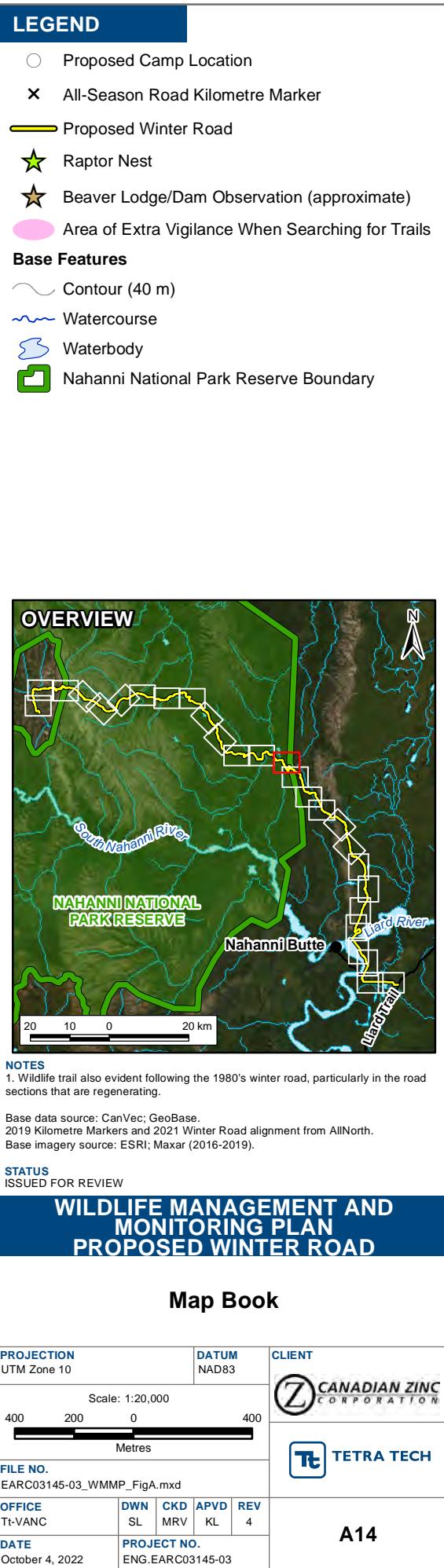
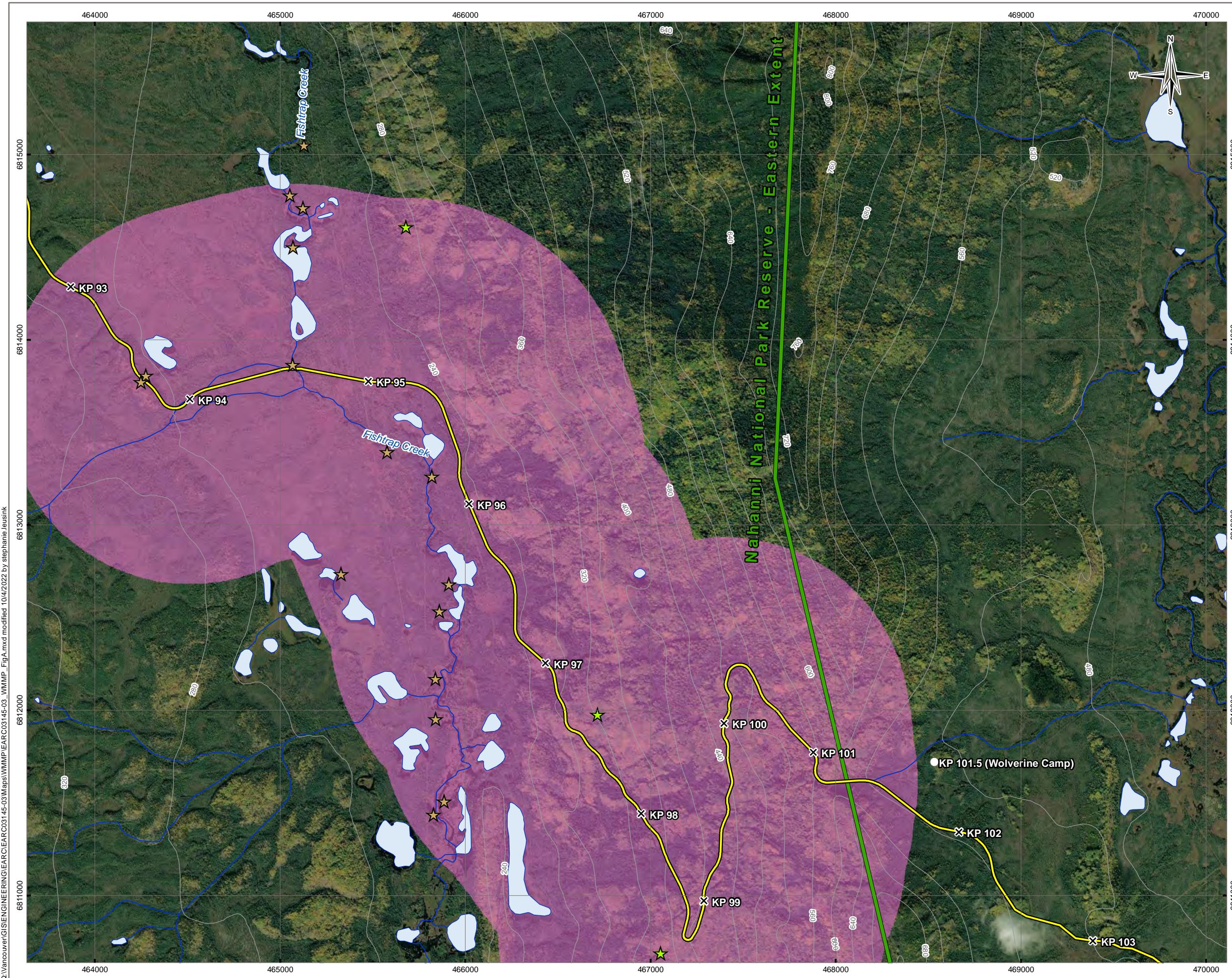
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ENG.EARC03145-03

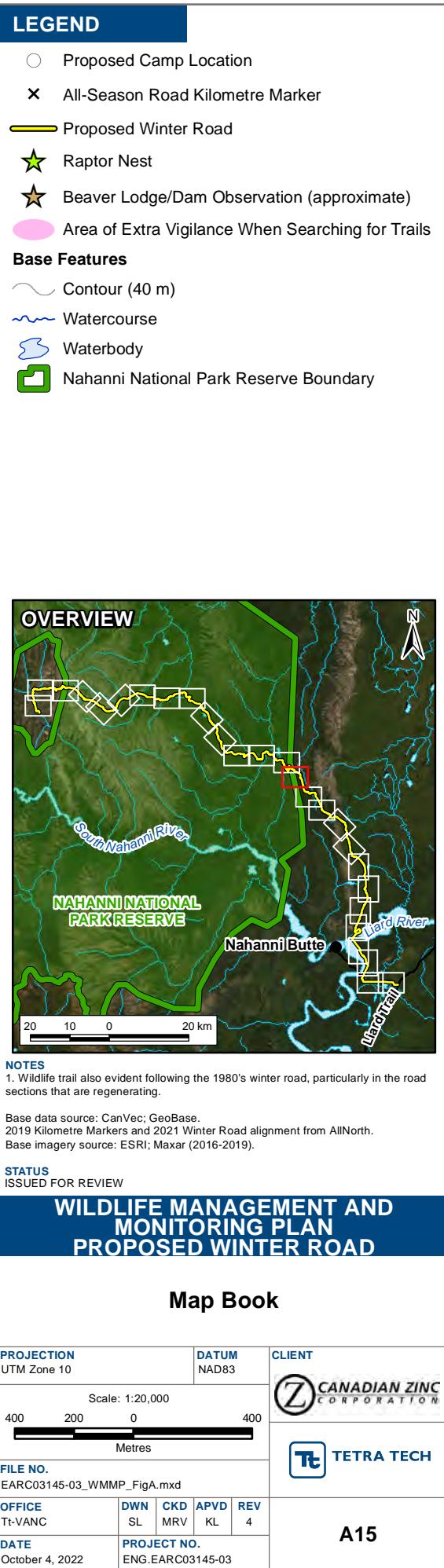
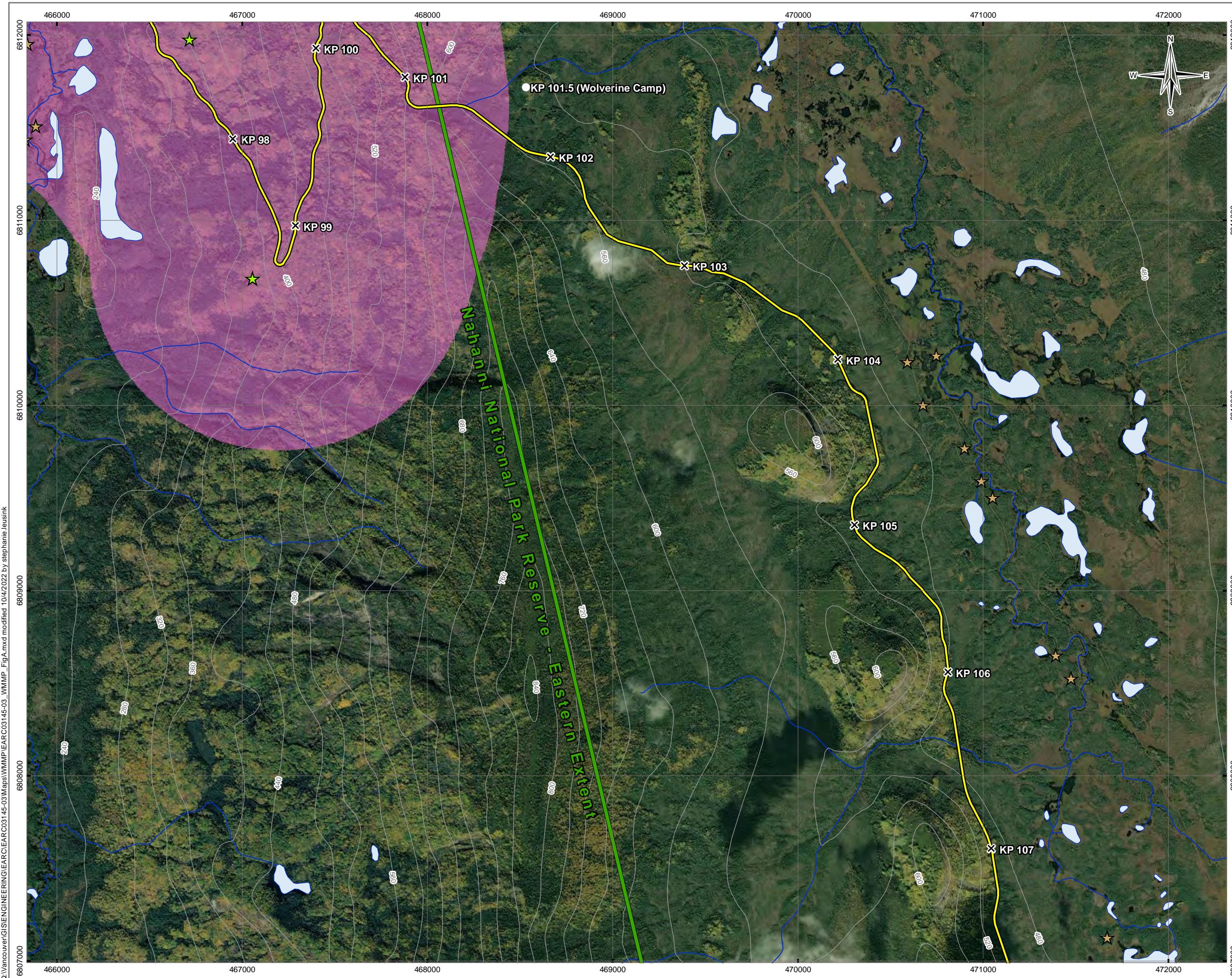
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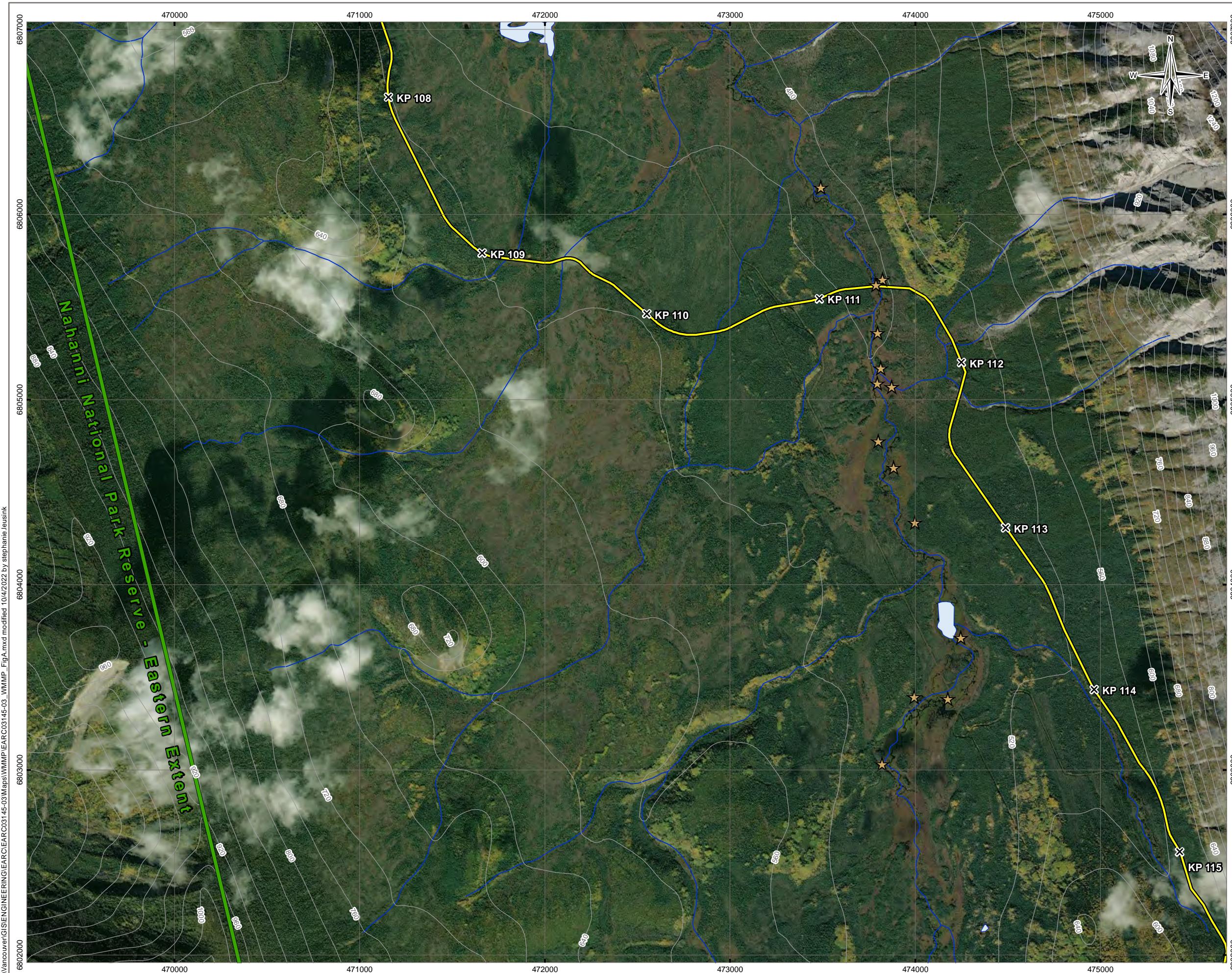
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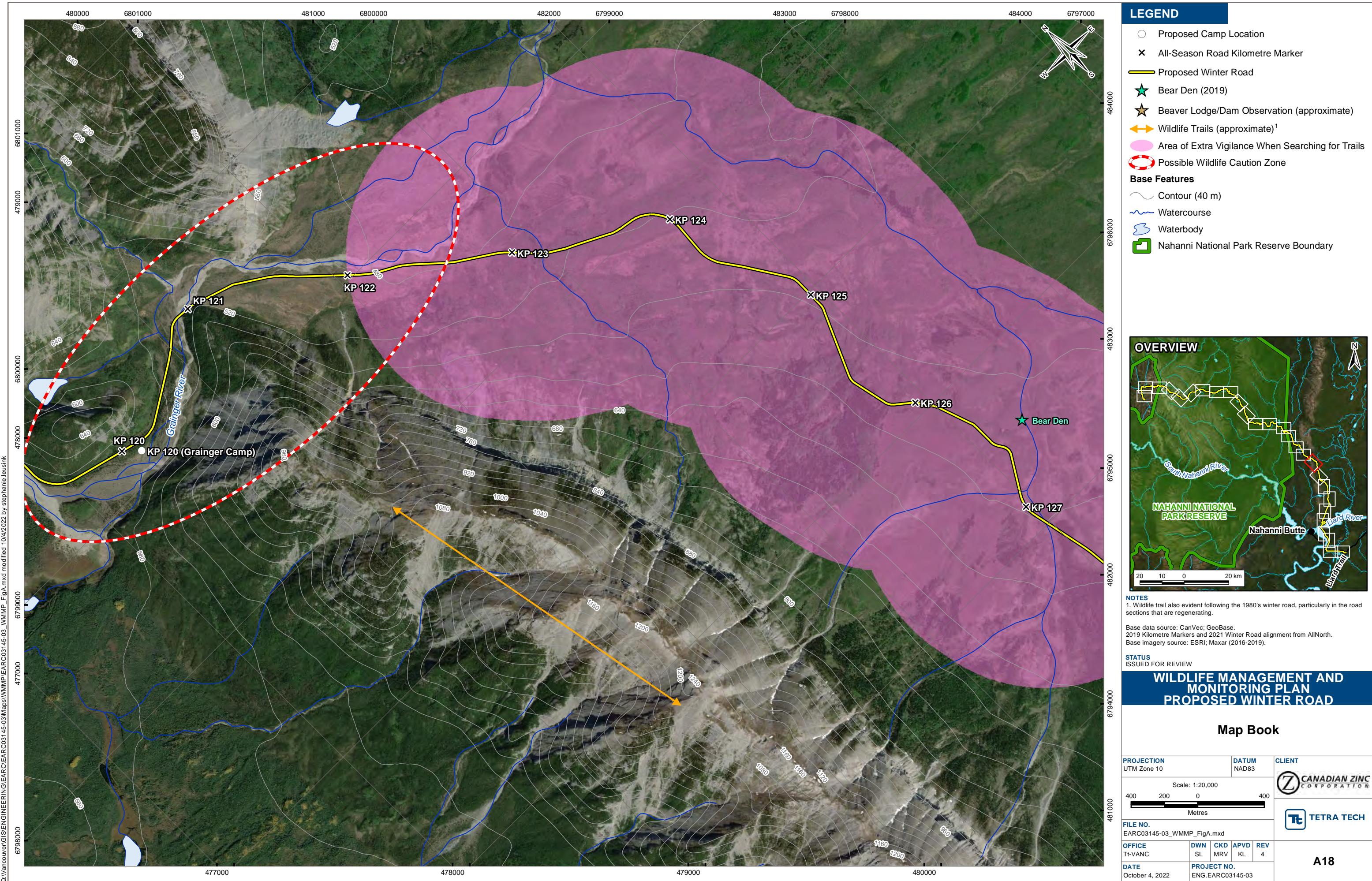


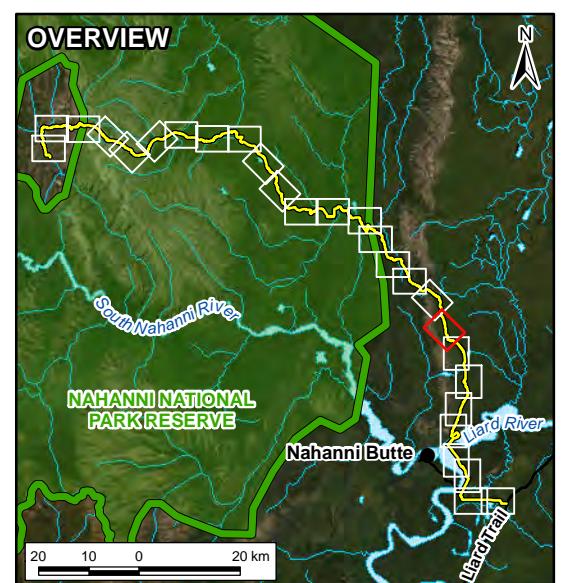












NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: ESRI; Maxar (2016-2019).

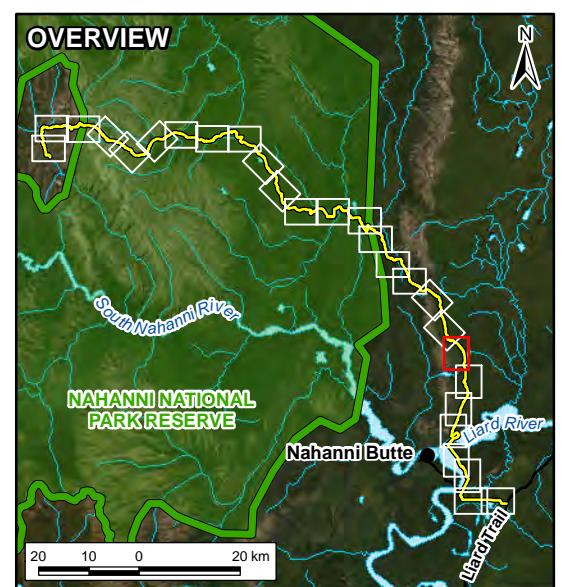
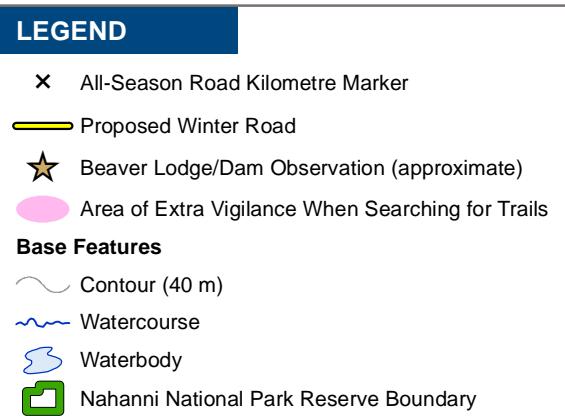
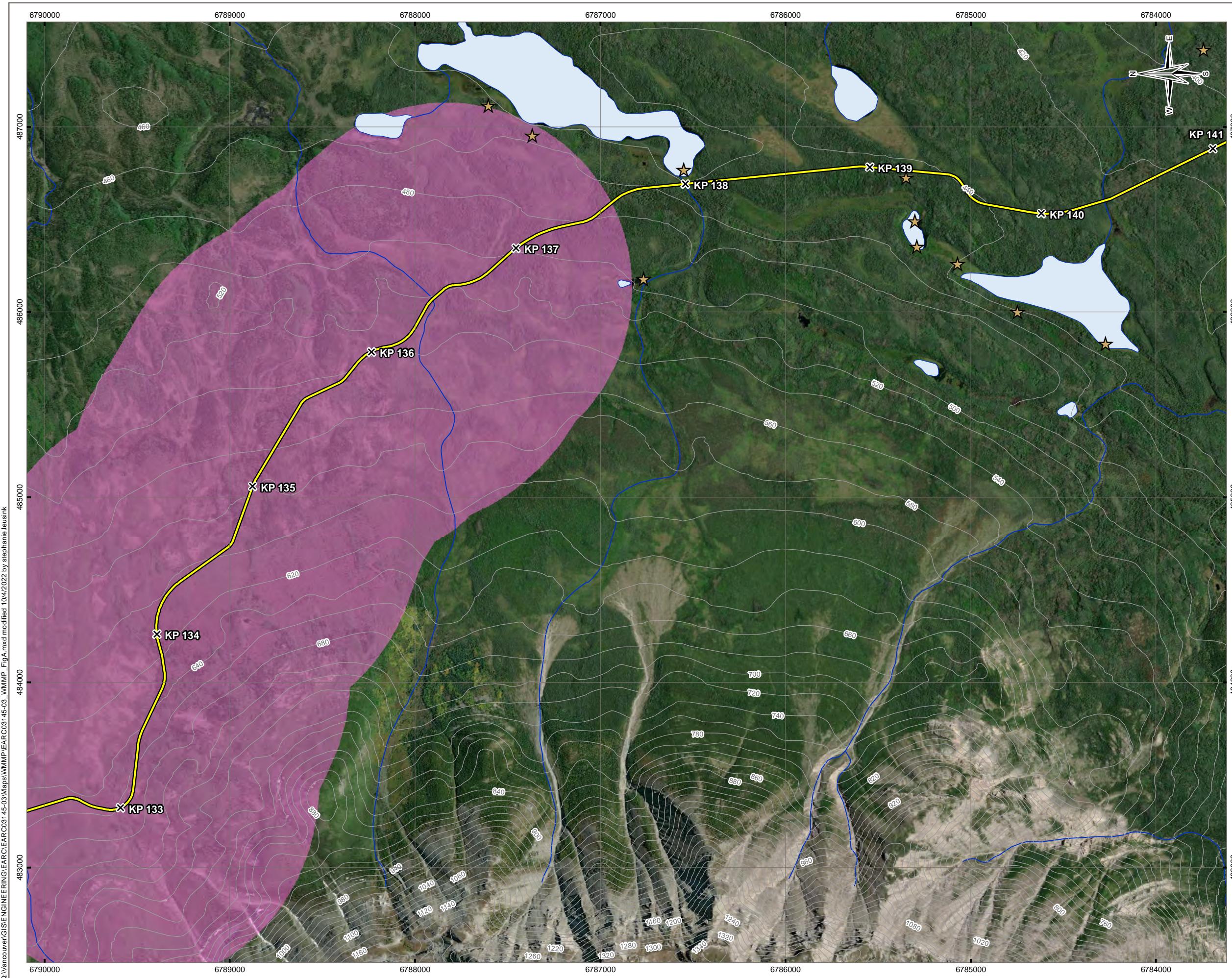
STATUS
ISSUED FOR REVIEW

WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

PROJECTION	DATUM	CLIENT
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Scale: 1:20,000		
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Metres		
FILE NO.	ENG.EARC03145-03	
OFFICE	DWN	CKD
Tt-VANC	SL	MRV
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	REV	4
DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

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NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: Esri; Maxar (2016-2019).

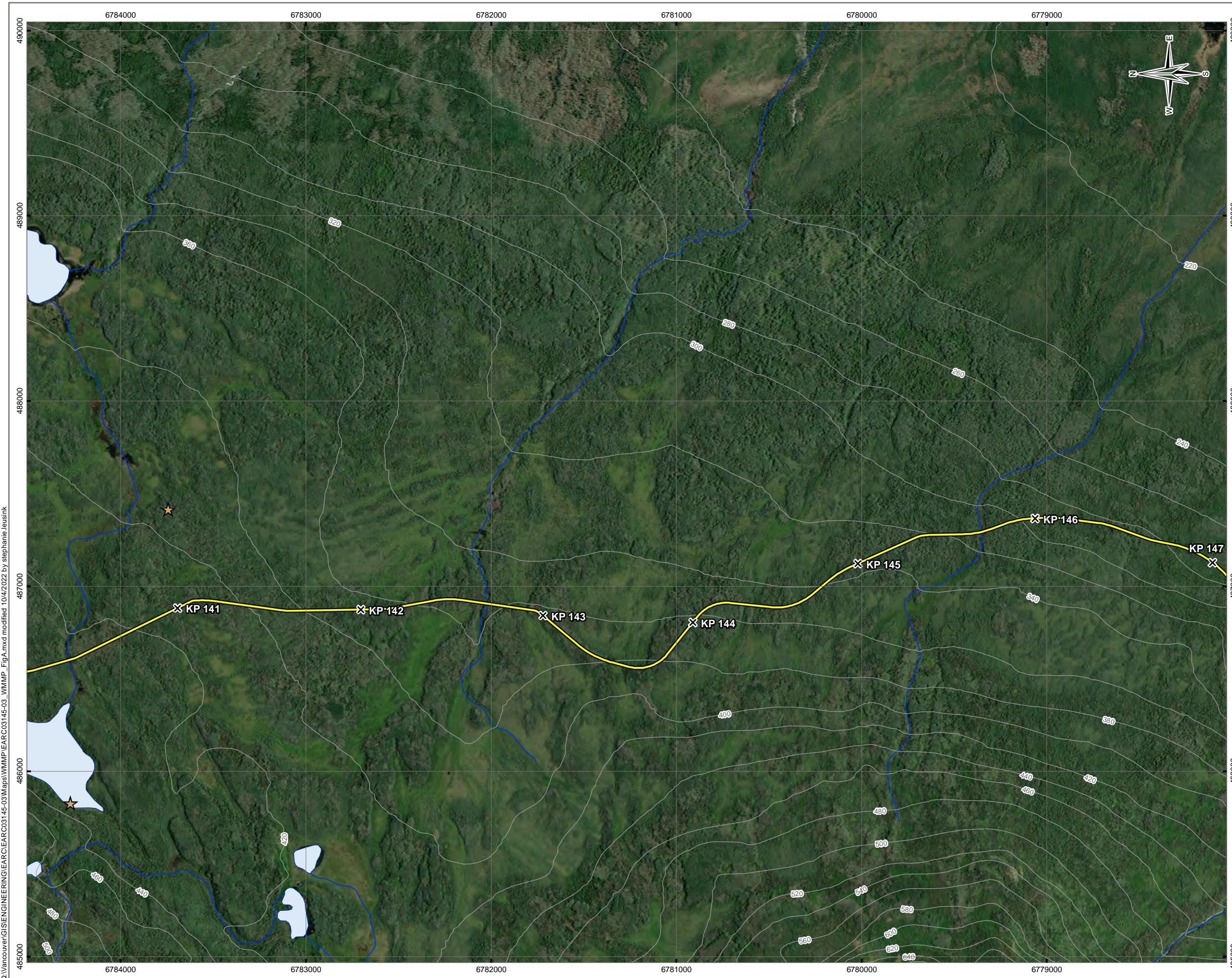
STATUS
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WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

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DATE	PROJECT NO.	
October 4, 2022	ENG.EARC03145-03	

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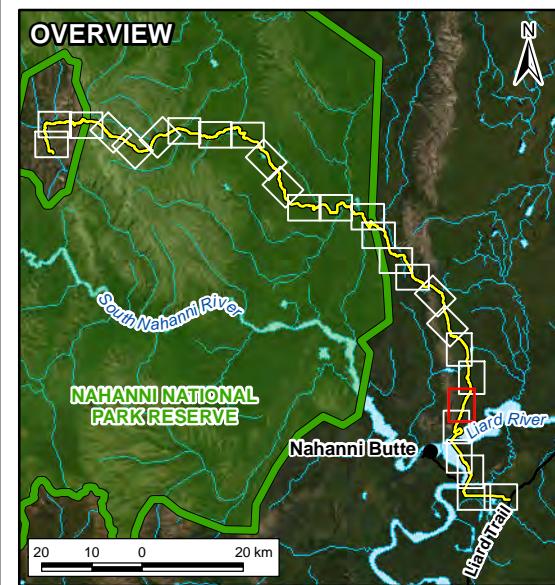
LEGEND

- ✗ All-Season Road Kilometre Marker
- Proposed Winter Road

Base Features

- ~~~~ Contour (40 m)
- ~~~~ Watercourse
- ~~~~ Waterbody
- ~~~~ Nahanni National Park Reserve Boundary

OVERVIEW



NOTES
1. Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

Base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
Base imagery source: Esri; Meyer (2012-2016).

STATUS
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WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

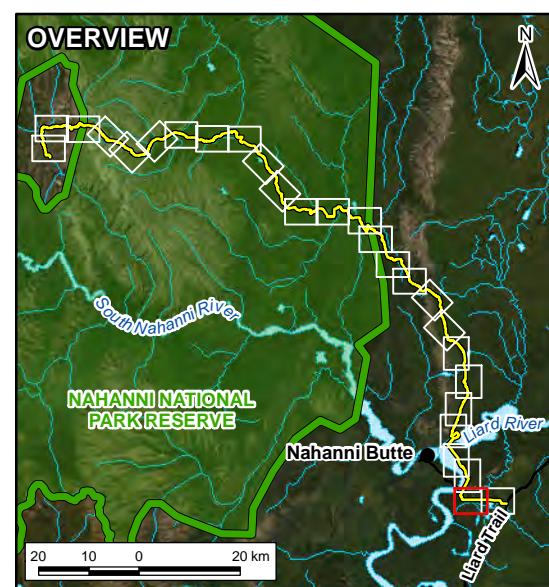
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DATE October 4, 2022	PROJECT NO. ENG-EARC03145-03			
 				
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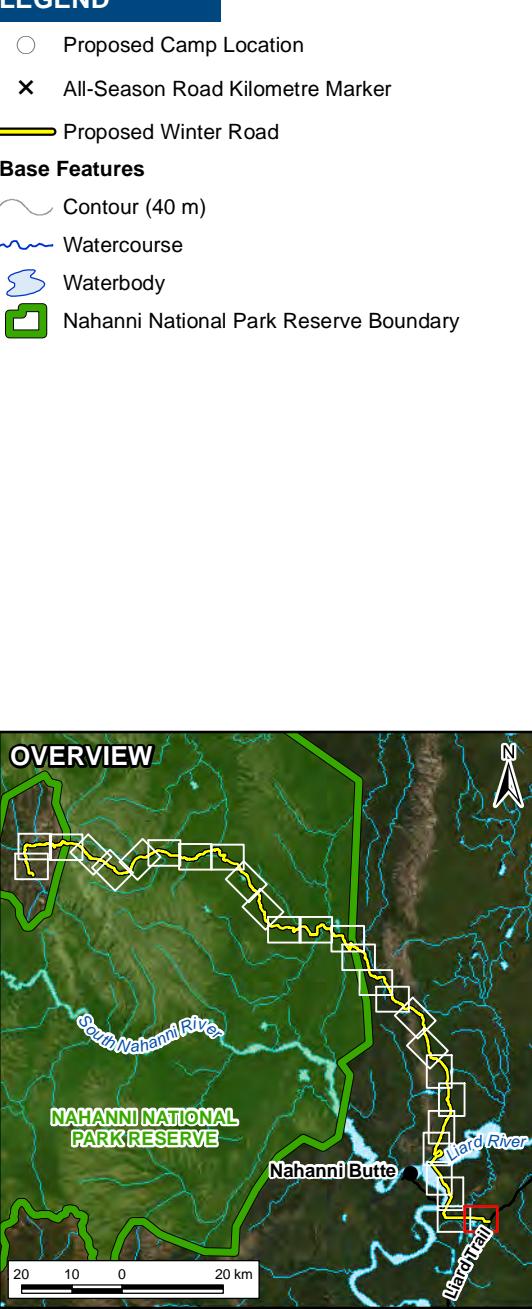
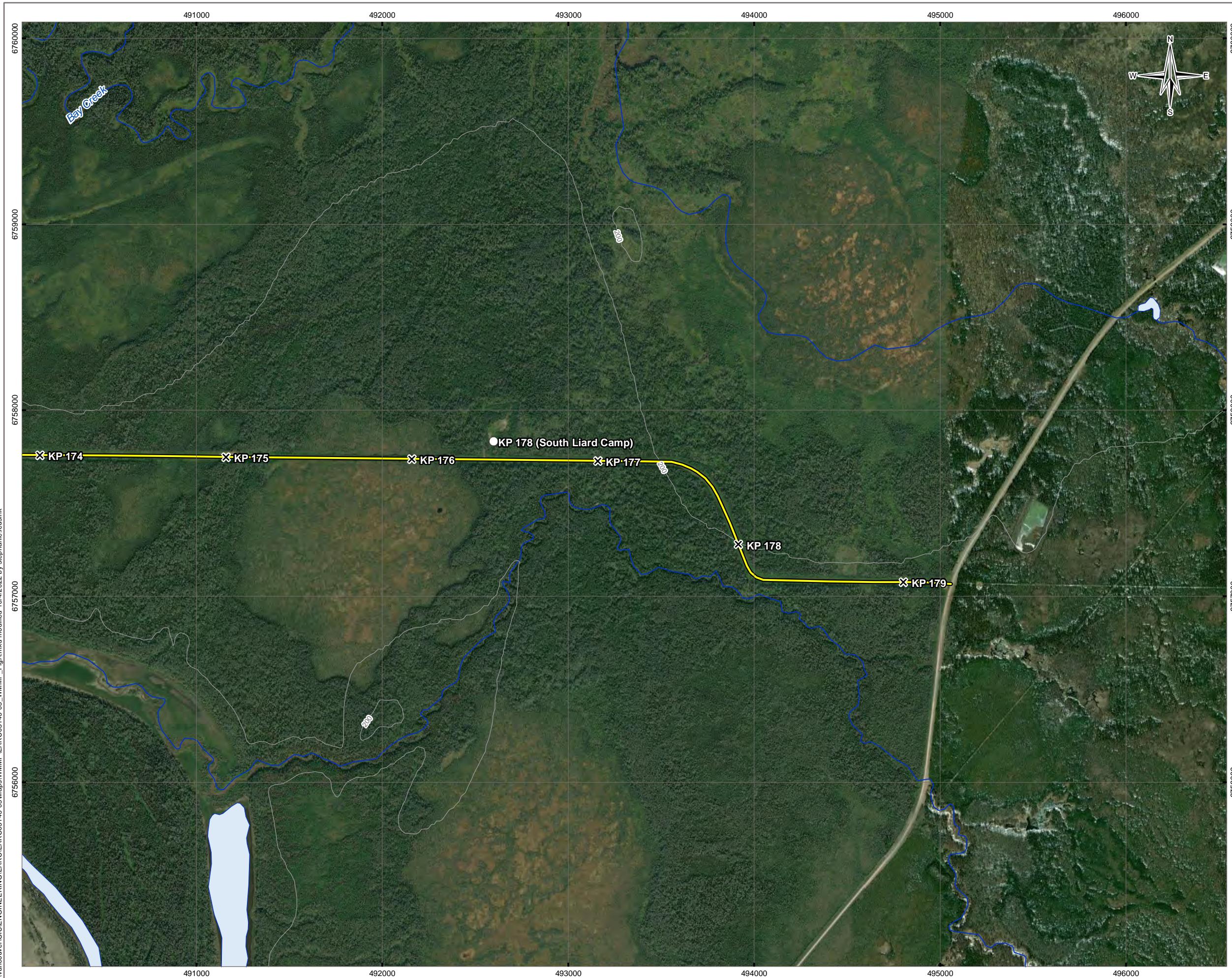
STATUS
ISSUED FOR REVIEW

**WILDLIFE MANAGEMENT AND MONITORING PLAN
PROPOSED WINTER ROAD**

Map Book

PROJECTION	DATUM	CLIENT
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Scale: 1:20,000		
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Metres		
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APVd	CKD	MRV
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REV	DATE	PROJECT NO.
4	ENG.EARC03145-03	

A26



OTES Wildlife trail also evident following the 1980's winter road, particularly in the road sections that are regenerating.

base data source: CanVec; GeoBase.
2019 Kilometre Markers and 2021 Winter Road alignment from AllNorth.
base imagery source: ESRI; Maxar (2016-2019).

STATUS ISSUED FOR REVIEW

WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Map Book

PROJECTION TM Zone 10			DATUM NAD83	CLIENT	
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DATE October 4, 2022		PROJECT NO. ENG.EARC03145-03			
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 CANADIAN ZINC CORPORATION					
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APPENDIX B

STANDARD OPERATING PROCEDURES

SOP 1 Reporting, Responding to, and Deterring Wildlife
SOP 2 Reducing Wildlife Attractants

STANDARD OPERATING PROCEDURE

SOP #1 REPORTING, RESPONDING TO, AND DETERRING WILDLIFE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 11 + attachments
SUBCATEGORY:	WR Activities	REVISION DATE:	October 2022	APPROVED DATE:	

1.0 PURPOSE

This procedure is intended to provide Canadian Zinc's (CZN) employees and contractors with a Standard Operating Procedure (SOP) to report wildlife and wildlife signs, safely respond to various wildlife sightings, use deterrents (including herding), and report actions taken.

This procedure applies to all areas of the Winter Road (WR; the Project) including the road skid-camps, work areas, and wherever workers are present.

2.0 DEFINITIONS

Many of the definitions below were reproduced/adapted with permission from the Nahanni National Park Reserve (NNPR) Bear Management Plan (Parks Canada 2018¹).

Aggressive Animal: threatening animal behaviour that could result in actual or potential harm to people (e.g., animal does not flee when deterrents are used, flattened ears, charge or bluff-charge, attack).

Attractant: a substance or item that could be reasonably expected to attract an animal, including, but not limited to garbage, food products, and road salts. Natural food sources, such as a carcass, as well as unnatural sources, including motor oil, anti-freeze, and fertilizers are also attractants.

Big Game: any big game species listed in Schedule A of the Wildlife General Regulations of the NWT *Wildlife Act* with the potential to occur in the Project area. Refers to bison, wolf, coyote, wolverine, Dall's sheep, mountain goat, moose, caribou, grizzly and black bear.

Deterrent: aversive agents (negative stimuli) administered to wildlife to cause pain, avoidance, or irritation, including soft contact deterrents (e.g., air horns, bangers, herding, screamers) and physical (hard contact) deterrents (e.g., bear spray).

Encounter: Observing wildlife at a range that is comfortable for the observer. The animal and the observer are mutually aware of each other, and the interaction is non-threatening.

Food Conditioned: wildlife that has learned to associate people, waste storage areas, and Project activities as potential food sources. Wildlife can become food conditioned after obtaining a food item, even once, and can become an aggressive animal.

¹ Parks Canada Agency. 2018. Nahanni National Park Reserve (NNPR) Bear Management Plan - Version 3.02.

Habituated: wildlife can become habituated to people and Project activities after repeated exposure without negative consequence. Habituated wildlife respond to people and or the Project with little fear (responds weakly or not at all) and can become a potentially dangerous or aggressive animal.

Harassment: to unnecessarily chase, fatigue, disturb, or torment wildlife.

Herding: actively moving wildlife away, slowly and safely, from potentially hazardous sites, such as active worksites where there is risk of harming and or disturbing an animal.

Human-Wildlife Conflict: occurs when the activity and behaviour of wildlife negatively impacts the needs of a human, and vice versa.

Mineral Lick: a sensitive wildlife feature typically used by ungulates and other species to obtain macronutrients such as sodium and phosphorous essential for nutrition, digestion, and other biological functions. Mineral licks are especially important for females during lactation.

Monitoring: The process of observing, recording, and assessing Project activities and potential Project effects. Performed by the Dene Monitor and or Qualified Environmental Professional.

Potentially Dangerous Animal: any of the big game species (coyote, wolf, wolverine, grizzly and black bears, caribou, moose, bison, and Dall's sheep) have the potential to become dangerous to people, especially those that are habituated to people/Project and or are food conditioned.

Problem Animal: Any animal that is judged by its actions to be a threat to people or property.

Property Damage: any incident in which the property of Canadian Zinc, its employees and contractors is damaged by an animal and requires repair or replacement.

Responsible Designate: refers to the Construction Manager, Dene Monitor, and or Qualified Environmental Professional.

Wildlife Caution Zone: an area along the WR, identified by caution sign(s), where wildlife are known or suspected to occur nearby.

Wildlife Incident: all wildlife incidents are reported to the Dene Monitor and Qualified Environmental Professional (QEP) as well as ENR, Parks Canada, and or Environment and Climate Change Canada. A reportable wildlife incident includes:

- Big game species/Species at Risk mortality and or injury due to, or suspected from, Project activities;
- Accidental destruction of a wildlife residence (den, nest) and or finding a residence while clearing;
- Human-wildlife encounters that present a risk to either people or animals, including incidents of wildlife exhibiting aggressive behaviour or a large carnivore in camp;
- Big game/Species at Risk sighted within 1 km of a blast site during and or within a half hour after blasting;
- Wildlife-caused property damage;

- Big game species has, or potentially has, gained access to a man-made attractant as a result of the Project activities; and
- Any time deterrent action is taken.

Wildlife Residence: Birds, bats, and other wildlife may nest, roost, den, or take refuge in man-made buildings, in road debris, and any natural habitat along the WR. Residences include nests, dens, roosts, hibernacula, lodges, and pushups. Employees and contractors shall report and shall not disturb, destroy, or collect wildlife residences seen, or suspected.

Sighting: when the animal is seemingly unaware of the observer (i.e., not an encounter) and shows no observable stress-related response to the observer, or the animal immediately flees from the area.

Species At Risk: any species legally listed under the federal and territorial Species at Risk Acts or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the NWT Species at Risk Committee as Extinct, Extirpated, Endangered, Threatened, or Special Concern. Species at Risk that are likely to be encountered during WR activities include bison, wolverine, caribou, grizzly bear, and collared pika.

3.0 BACKGROUND

- CZN has an “observe, record, and report” policy for wildlife sighted by employees and contractors. Records of wildlife sightings and wildlife residences are used by CZN to apply mitigations and avoid/reduce the likelihood of adverse wildlife effects. All employees and contractors shall record wildlife sighted on the Wildlife Observation Form (see attached).
- Wildlife residences are protected by legislation (e.g., *Canadian National Parks Act*, *NWT Wildlife Act*, *federal Migratory Birds Convention Act*).
- When there is an imminent threat to people or property, deterrents must be used. Otherwise, in Nahanni National Park Reserve, authorization from Parks Canada is required to deter wildlife.
- Wildlife deterrents only work if there is an absence of food, shelter, and other rewards for animals at the Project. Refer to SOP #2 for procedures to reduce wildlife attractants.
- Section 56(4) of the *NWT Wildlife Act* indicates that killing wildlife for the defense of life or property isn’t defensible if because of human-related mismanagement such as storing attractants where available to wildlife.

4.0 RESPONSIBILITIES

4.1 Construction Manager (CM)

- Updates and implements this SOP.
- Communicates to all on-site employees and contractors.
- Provides appropriate training.
- Follows recommendations from the Dene Monitor and QEP.
- Resolves incidents and provides materials/training necessary to prevent future incidents.
- Reports observations of wildlife and residences on the Wildlife Observation Logs (attached) following procedure outlined in this SOP, including those seen by others when asked to do so.

- Records wildlife sightings when the Dene Monitor or Qualified Environmental Professional (QEP) are unavailable.
- Supports the Dene Monitor and or QEP when action for potentially dangerous and or aggressive animals is required, following procedures outlined in this SOP.
- Responds with wildlife deterrents, when required.

4.2 Dene Monitor (DM)

- Takes proper awareness and prevention training.
- Posts the Wildlife Observation Log forms (at camps, job sites, and checkpoint station), collects the logs, and replaces with new log forms when needed. A copy of the Wildlife Observation Log is attached.
- Updates the Wildlife Observation Log form, as is required, to suit the Project and workers, and to better collect Dene Knowledge.
- Records wildlife sightings and residences on the Wildlife Observation Logs following these procedures, including those seen by others when asked to do so.
- Communicates temporary stop-work and setback distances issued by the QEP, as appropriate with the employees and contractors.
- Communicates wildlife sightings and wildlife caution zones with the checkpoint station attendant and Construction Manager daily.
- Takes necessary action to avoid destruction of and disturbance to wildlife residences.
- Takes necessary action for potentially dangerous and or aggressive animals that are reported near worksites following procedures outlined in this SOP.
- Incorporates Dene Knowledge to learn from the wildlife sighting and or incorporates into mitigations, as appropriate.
- Responds with the least intrusive wildlife deterrent only when required (and as instructed by regulators).
- Participates in any investigation as to the cause of an incident and supports the implementation of corrective measures (as required).

4.3 Qualified Environmental Professional (QEP)

- Takes proper awareness and prevention training.
- Reports observations of wildlife and residences on the Wildlife Observation Logs (attached) following these procedures, including those seen by others when asked to do so.
- Prepares Wildlife Incident Reports.
- Enters the Wildlife Observation Logs into the database and tracks Wildlife Incident Reports.
- Supports the Dene monitor, when necessary, action for potentially dangerous and or aggressive animals is required and responds with the least intrusive wildlife deterrent when required (and as instructed by regulators).
- When no imminent risk to people or property, contacts Parks Canada for authorization and instruction to use deterrents in Nahanni National Park Reserve.

- Issues temporary stop-work (if necessary) and setback distances, as appropriate with the Dene Monitor, checkpoint station attendant, and Construction Manager.
- Initiates, and participates in, an investigation with all parties involved including the regulator(s) (as required) as to the cause of an incident, prepares the investigation report, and implements corrective action based on the results of the investigation.
- Takes necessary action to avoid destruction of and disturbance to wildlife residences following these procedures.
- Contacts and takes advice from ENR, Parks Canada, and or ECCC, as and when required.

4.4 Checkpoint Station Attendant

- Follows recommendations from the Dene Monitor and QEP.
- Provides the information for any wildlife caution zones and locations of wildlife sightings to only Project-related drivers prior to their transit along the winter road.
- Provides drivers the details of setback and speed limit requirements as required.

4.5 All Employees and Contractors

- Understands and follow this procedure.
- Checks with the Construction Manager and or the checkpoint station attendant, prior to accessing the winter road, for any wildlife caution zones and locations of wildlife sightings.
- Follows speed limits, including within restricted speed zones (e.g., wildlife caution zones).
- Travels with extra caution in wildlife caution zones.
- Reports wildlife sightings and residences in the Wildlife Observation Log daily.
- Takes reasonable precaution to avoid disturbing, or unnecessarily harassing, wildlife on the Project site.
- Asks the Dene Monitor or QEP for clarification of this procedure, if have questions.

5.0 STANDARD PROCEDURES

5.1 Wildlife Reporting and Response Guide

The following Wildlife Reporting and Response Guide (Table 1) provides a variety of procedures for how general employees and contractors (General) should report and respond to wildlife as well as the appropriate responses that qualified personnel (Responsible Designate) should undertake when wildlife are encountered on the Project site or along an NWT Highway.

Table 1: Wildlife Reporting and Response Guide for Employees and Contractors

Aggressive or Damaging Wildlife	Sick or Injured Wildlife	Wildlife Carcass or Attractant Found	Wildlife Residence	Wildlife Sighting or Encounter	Wildlife Sighting
<p>General Response:</p> <ul style="list-style-type: none"> Seek a secure location until the area is clear. Alert others of the animal's location. Report sighting to DM/QEP/CM immediately and describe incident. Enter in Wildlife Observation Log. Participate in the investigation. <p>Refer to Bear Management Plan for response procedures applicable to Big Game species in the event of an attack or other aggressive behaviours.</p> <p>Responsible Designate Response</p> <p>Initial Response:</p> <ul style="list-style-type: none"> Assess risk to people and to self. Shut-down applicable worksites. Gather response equipment. If no imminent threat to people/property, contact ENR/PCA for advice and decision. Two trained Responsible Designates respond with deterrents or per regulator advice. Deterrent action: <ul style="list-style-type: none"> Use least invasive deterrents as possible (Table 2). Ensure the animal has a safe exit. One responder use deterrent(s) while the other stands ready with bear spray. Stop deterrent when animal moving away. Monitor for at least 15 minutes to ensure it does not return. If it returns, use a more invasive deterrent until the animal leaves. If no deterrents are successful, contact ENR and or PCA for advice. Record incident details. Resume Project activities only when no further safety concern. <p>Lethal Control:</p> <ul style="list-style-type: none"> ONLY to be considered by Responsible Designate when there is imminent risk to people/property. <p>After Initial Response:</p> <ul style="list-style-type: none"> Confirm its recorded in the Wildlife Observation Log and entered in database. Monitor the animal/area for repeat sightings. Consider a minimum crew size of 4 people to minimize likelihood of attack while Project activities resume. File a Wildlife Incident Report and give a copy to regulator within 24 hours. Investigate incident. 	<p>General Response:</p> <ul style="list-style-type: none"> Seek a secure location until the area is clear. Report sighting to DM/QEP/CM immediately and describe incident. Enter in Wildlife Observation Log. Participate in the investigation. <p>Animal harmed by employee or contractor</p> <ul style="list-style-type: none"> Remain at the scene if location secure. Report sighting to DM/QEP/CM immediately, including collisions with wildlife along the WR or NWT highway. <p>Responsible Designate Response</p> <p>Initial Response:</p> <ul style="list-style-type: none"> Assess risk to people and to self. Shut-down applicable worksites, as required. Gather response equipment. QEP contacts ENR/PCA for advice and decision. Only remove the carcass of any species, with ENR/PCA approval. Remove Project-attractant. Follow carcass removal procedures below/remove Project attractants. Record incident details. Resume Project activities only when no further safety concern. <p>After Initial Response:</p> <ul style="list-style-type: none"> Confirm its recorded in the Wildlife Observation Log and entered in database. Monitor for repeat sightings. File a Wildlife Incident Report, if Project caused (including along a NWT highway) and give a copy to regulator within 24 hours. Investigate incident if Project caused. <p>Carcass Removal Procedures:</p> <ul style="list-style-type: none"> QEP contacts ENR/PCA for decision to remove carcass. Wear personal protective equipment (heavy gloves), wash hands after handling, remove and wash all clothing that contacted the carcass. Clean equipment and materials that were used to eliminate residual attractants. Remove blood-soaked snow and store in bear-proof containment for disposal off site (refer to <i>Waste Management Plan</i>). Offer fresh carcass to the Naha Dehé Dene Band for traditional use. If not accepted or suitable, bring carcass to a special waste facility to be buried with at least 2 m of cover material. Clean equipment and vehicle used to move carcass. <p>After Initial Response:</p> <ul style="list-style-type: none"> Confirm its recorded in the Wildlife Observation Log and entered in database. Monitor for repeat sightings. Investigate incident if it is Project caused. File a Wildlife Incident Report, if Project resulted in the injury or if euthanized for any reason along the WR or NWT highway. Give a copy to the regulator within 24 hours. Clean equipment and vehicle used to move carcass. 	<p>General Response:</p> <ul style="list-style-type: none"> Seek a secure location until the area is clear (predator potentially in area). Report sighting to DM/QEP/CM immediately and describe sighting of a wildlife carcass or possible attractant. Enter in Wildlife Observation Log. Participate in the investigation. <p>Responsible Designate Response</p> <p>Initial Response:</p> <ul style="list-style-type: none"> Assess risk to people and to self. Shut-down applicable worksites, as required. Gather response equipment. QEP contacts ENR/PCA for advice and decision. Only remove the carcass of any species, with ENR/PCA approval. Remove Project-attractant. Follow carcass removal procedures below/remove Project attractants. Record incident details. Resume Project activities only when no further safety concern. <p>After Initial Response:</p> <ul style="list-style-type: none"> Confirm its recorded in the Wildlife Observation Log and entered in database. Monitor for repeat sightings. File a Wildlife Incident Report, if Project caused (including along a NWT highway) and give a copy to regulator within 24 hours. Investigate incident if Project caused. <p>Carcass Removal Procedures:</p> <ul style="list-style-type: none"> QEP contacts ENR/PCA for decision to remove carcass. Wear personal protective equipment (heavy gloves), wash hands after handling, remove and wash all clothing that contacted the carcass. Clean equipment and materials that were used to eliminate residual attractants. Remove blood-soaked snow and store in bear-proof containment for disposal off site (refer to <i>Waste Management Plan</i>). Offer fresh carcass to the Naha Dehé Dene Band for traditional use. If not accepted or suitable, bring carcass to a special waste facility to be buried with at least 2 m of cover material. Clean equipment and vehicle used to move carcass. <p>After Initial Response:</p> <ul style="list-style-type: none"> Confirm its recorded in the Wildlife Observation Log and entered in database. Monitor for repeat sightings. Investigate incident if it is Project caused. File a Wildlife Incident Report, if Project resulted in the injury or if euthanized for any reason along the WR or NWT highway. Give a copy to the regulator within 24 hours. Clean equipment and vehicle used to move carcass. 	<p>General Response:</p> <ul style="list-style-type: none"> No person shall destroy a nest, den, roost, hibernacula, lodge, or pushup at any time, even if unoccupied. Keep away from the area. Report sighting to DM/QEP/CM immediately and describe sighting (e.g., location, Project-caused damage). Enter in Wildlife Observation Log. Participate in the investigation if residence is damaged or disturbed. <p>Responsible Designate Response</p> <p>Initial Response:</p> <ul style="list-style-type: none"> Confirm observation. Shut-down worksite, if any Project activity occurring within sensitive time and setback (see WMMP Table 4 in Section 7.2) until regulators are consulted. Confirm its recorded in the Wildlife Observation Log and entered in database. Consult with CM whether Project activities are planned during the sensitive time and setback. Avoid when possible. Refer to applicable Adaptive Management responses in WMMP. If Damage/Disturbance cannot be Avoided or has Already Occurred: <ul style="list-style-type: none"> QEP contacts ENR/PCA/ECCC for advice, permit requirements, and instruction to proceed if destruction or disturbance cannot be avoided. File a Wildlife Incident Report, if Project caused damage or disturbance, and give a copy to regulator within 24 hours. Acquire a permit, if required. Investigate incident (as required). <p>Refer to the Pre-Blast WMMP procedure when a den is known or suspected within the blasting setback.</p>	<p>Non-Aggressive Wildlife</p> <ul style="list-style-type: none"> Leave all wildlife undisturbed. Give all species the right-of-way. Big game or species at risk: <ul style="list-style-type: none"> Stop activity/vehicle if animal closer than 50 m, seek secure location or stay in vehicle, and wait for animal to move off on their own. Resume activity/travel once the animal is 50 m away/across road or 5 mins since last visual. Caribou specific: Stop activity/vehicle at least 500 m away when reported via radio (or when first seen). Resume when caribou at least 100 m away or 5 mins after last visual. Proceed with caution. If big game or species at risk not moving away: <ul style="list-style-type: none"> In NNPR: <ul style="list-style-type: none"> Allow the animal 2 hrs to move off on their own. Otherwise, ask the DM/QEP to contact PCA if animal not likely to move. Follow DM/QEP instructions relayed from PCA. On territorial land: <ul style="list-style-type: none"> Call DM/QEP/CM if animal unlikely to move. Follow DM/QEP instructions and or wait for DM/QEP to deter animal. Report all sightings of bears, wolverines, and wolves within 1 km of a camp or an active work site to DM/QEP/CM immediately and describe sighting (e.g., location). Enter in Wildlife Observation Log. <p>Refer to the Pre-Blast WMMP procedure when wildlife sighted within the blasting setback.</p> <p>Responsible Designate Response</p> <p>Non-Aggressive Wildlife</p> <ul style="list-style-type: none"> No action required when the animal is not a danger to people or property, not in danger of harm from the Project, and has not gained access to an attractant. If big game or species at risk not moving away: <ul style="list-style-type: none"> In NNPR: <ul style="list-style-type: none"> Call PCA if animal is unlikely to move and get authorization and instruction to deter wildlife. Do not deter without PCA authorization. On territorial land: <ul style="list-style-type: none"> Gather response equipment. Respond with or instruct use of deterrent. Monitor bears, wolverines, or wolves within 1 km of a camp or an active work site. <ul style="list-style-type: none"> Gather response equipment. Assess risk to people and to self. Record the animal's location, general behaviour/activity, direction of travel, and other Dene Knowledge. Treat animal as aggressive if it continues towards an active worksite or people. <p>Refer to the WMMP procedure specific to blasting when wildlife sighted within the setback.</p>	<p>General Response:</p> <ul style="list-style-type: none"> Leave all wildlife undisturbed. When a potentially dangerous animal is encountered, seek a secure location until the area is clear. Enter in Wildlife Observation Log. <p>Possible Mineral Lick:</p> <ul style="list-style-type: none"> Report sighting of a suspected mineral lick to DM/QEP/CM immediately. Take photos. Setback is 250 m for Project activities and 1 km for helicopters between April 1 to July 15 (WMMP Table 4 in Section 7.2). <p>Responsible Designate Response</p> <p>General:</p> <ul style="list-style-type: none"> Review Wildlife Observation Logs and database (repeat sightings, residences, mineral licks) to inform daily tailgate meeting. Track number of independent grizzly and wolverine sightings per Adaptive Management responses in WMMP Section 9.1.5. Issue Bear in Area alert, as appropriate following the Bear Management Plan Assess on-site for probable cause for repeat sightings of big game/Species at Risk within 1 km radius in the past 3 days e.g., wildlife residence, mineral lick, attractant. Refer to applicable Adaptive Management responses in WMMP. Contact ENR/PCA for further guidance. <p>Possible Mineral Lick:</p> <ul style="list-style-type: none"> Confirm observation. Shut-down worksite if any Project activity occurring within sensitive time and setback until regulators are consulted. Avoid overflights/landing (see WMMP Table 4 in Section 7.2). Confirm its recorded in the Wildlife Observation Log and entered in database. Consult with CM whether Project activities are planned during the sensitive time and setback. Avoid when possible. Refer to applicable Adaptive Management responses in WMMP. If Damage/Disturbance cannot be Avoided or has Already Occurred: <ul style="list-style-type: none"> QEP contacts ENR/PCA for advice and instruction. File a Wildlife Incident Report, if Project caused damage or disturbance, and give a copy to regulator within 24 hours.

5.1.1 Response Guide Descriptions

Euthanize critically injured or sick animals: the decision to euthanize will be made by ENR/PCA .

Firearms: only to be used in extremely rare circumstances. Use of firearms, if warranted, is almost always undertaken by PCA or ENR but may be performed by CZN personnel subject to CZN's firearms policy and the following requirements:

- Only designated individuals, with appropriate training, licenses (i.e., a Possession and Acquisition License [PAL]), and a firearms permit from PCA (for use in NNPR), have authority to carry and use a firearm.
- Refer to CZN's firearms policy for securing all firearms, ammunition, and related equipment in accordance with applicable laws and regulations.

Incident Details to Record: the DM/QEP/CM shall describe the incident in detail, including the date and time, location, cause, events leading up to the incident, condition of animal, staff involved, and photos.

Investigation: all parties involved will participate in an investigation (as appropriate) and may include the Dene Monitor, QEP, CM, road contractor, equipment operator, and appropriate regulators (ENR, PCA, ECCC). An investigation is required if the Project damages/disturbs a wildlife residence, harms a big game/Species at Risk, if deterrents are used, and if a big game/Species at Risk gains access to a Project-related attractant. The investigation should determine what happened, why, and how preventing the incident failed. The QEP shall prepare an investigation report and implement adaptive management based on the results of the investigation.

Lethal Control: should be conducted by the regulator or by the Responsible Designate (DM/QEP/CM) when directly authorized by PCA/ENR or when there is imminent risk to people/property. However, it is recognized there may be circumstances where risk to people is imminent (e.g., attacking bear) and lethal control of wildlife using a firearm may be necessary without prior authorization from regulators.

Mineral Lick Identification: can be identified by exposed white or colourful crystal deposits or less obvious seepage areas, rock faces, or clay exposures. Watch for heavy wildlife use as shown by well-established trails leading to/from the site, trampling, and or excavations as well as antler sheds².

Monitoring objectives: for the DMs or QEP to monitor large carnivores within 1 km of camp and 100 m of active worksite or investigate the underlying cause of wildlife activity/aggressive behaviour and mitigate before they escalate (e.g., to make sure that a suspect bear has moved on and no longer poses a safety threat). Monitoring will be conducted in a team of two Responsible Designates. It is important to monitor the activity of the large carnivore presently within 1 km of camp/100 m of active worksite until the carnivore moves out of the setback. For repeat sightings in the Wildlife Observation Logs or an aggressive animal, a site visit is important to look for fresh sign and underlying cause for the animal to be in the area (e.g., den, attractant). Repeat sightings of bear, wolf, or wolverine may indicate a problem animal.

Regulator: when within NNPR the regulator is PCA, but when on territorial land the regulator is ENR.

² B.C. Ministry of Environment and Climate Change Strategy. 2018. Wildlife Habitat Features Field Guide (Kootenay Boundary Region). Ecosystems Branch. 4 pp.

Response Equipment: the DM/QEP/CM will need the following equipment, at a minimum, when responding to a sighting/encounter: soft and hard contact deterrents, firearm, radio, satellite phone/InReach, GPS, notebook/incident report form, and camera.

Responsible Designate: specific CZN staff (i.e., Dene Monitor, QEP, Construction Manager) that are trained for a specific task (e.g., deterrent action).

Safe Distance: is dependent upon the species and distance from which the vehicle stopped from the animal (assuming various distances based on when the animal first observed) but refers to the distance beyond which an animal could not return to the roadway by the time the vehicle resumes driving and passes the point at which contact with the animal could be made. A safe distance for a caribou is 100 m from the road or 5 minutes since last visual.

Signs of rabies: unusual aggression or boldness, excess saliva or foaming around the mouth, drooping head, and partial paralysis.

Signs of sickness: sluggish, unusual behaviour, swelling/lumps, hair/fur loss, and or overall poor condition³.

Signs of predation: the surrounding area will often have broken and trampled vegetation, blood, and loose hair/fur indicating signs of a struggle. Animals killed by predators will typically be found on their side with their legs extended and may have claw marks on their head, back, and or neck⁴.

Wildlife Carcass/Attractant: once given approval by the regulator, large carcasses and or gut-piles should be removed promptly, to avoid attracting other wildlife and increasing risk of human-wildlife conflict and animal-vehicle collisions. Carcasses of a big game species, species at risk, or suspected of disease must follow disposal guidance from ENR and or PCA.

Wildlife Observation Log: posted at all camps and the checkpoint station. Best practice is to fill out the log promptly upon returning to camp or reaching the checkpoint station. Record the wildlife sighting only once.

5.2 Responding with Wildlife Deterrents

Often deterrent action is not required, and the animal moves away on their own accord once aware of human presence. All employees and contractors may make an animal aware of their presence by talking loudly or waving their arms.

Deterrent action may be required when:

- A bear, wolverine or wolf is in camp or an active work site;
- An animal is acting aggressively and or poses an imminent threat to people and property;
- The animal is in a potentially hazardous location and not moving off on their own accord; and
- The animal has, or has the potential to, gain access to a food reward.

³ Government of Northwest Territories. 2017. A Field Guide to Common Wildlife Diseases and Parasites in the Northwest Territories. 85 pp.

⁴ Alberta Agriculture and Rural Development. 2014. Methods of Investigating Predation of Livestock. Information Management Division. Edmonton, Alberta. 44 pp.

During a non-threatening encounter in Nahanni National Park Reserve, wildlife deterrents may only be used when directly authorized by Park Canada. Contact Parks Canada's 24-Hour Emergency Line for authorization use of deterrents. Authorization to use deterrents from Parks Canada is not required when there is an imminent risk to people or property.

Only trained, designated staff (Responsible Designates i.e., Dene Monitor, QEP, Construction Manager) are allowed to implement wildlife deterrents or may provide direct instruction to another person on a case-by-case basis. With exception, all CZN employees and contractors that are working away from camp, or the main work area may use air horns and or bangers to deter an animal, if not accompanied by a trained Responsible Designate. During an attack, all employees and contractors will use bear spray.

All deterrent actions will be performed by two Responsible Designate and will start with the method that is least invasive (Table 2), and then increase in intensity until the animal responds to the deterrents. The Responsible Designates may escalate the deterrent used after the animal has shown no response to the previously implemented deterrent for five minutes or the threat to people and property escalates.

Deterrent procedures are as follows:

- Assess the risk to people and to self.
- Prior to deterrent action, temporarily shut-down the worksite and alert others by radio to move to a safe location.
- Ensure the animal has a safe escape route and deterrent use does not push the animal toward yourself or others.
- One designate will respond with the least invasive deterrent required (Table 2) with the other designate standing at the ready with bear spray. Stop deterrent action when animal moving away.
- A firearm is only be used when physical contact (attack) is imminent or ongoing. Research indicates that human-wildlife conflicts that involve a firearm are more likely to result in a human injury as a result.
- Once the animal moves out of the area, both designates will monitor for at least 15 minutes to ensure it does not return.
- Increase deterrent level should the animal return to the area.
- If the animal continues to remain in the area, immediately contact ENR and or Parks Canada for advice.
- Once deterrent action has caused wildlife to move away, the deterrent action will stop. The Responsible Designate will communicate when the area is clear for other people.

Table 2: Wildlife Deterrents

Deterrent	Details on Use	Invasive Level
Soft Contact Deterrents		
Air Horn	Loud noise deterrent, and depending on the model of horn, it may have a range beyond 100 m. Consideration for hearing protection should be given if used within closed quarters.	1

Table 2: Wildlife Deterrents

Deterrent	Details on Use	Invasive Level
Bangers: Accuracy 25 m	Very loud noise deterrent and has a consistent range (23 – 27 m). Should aim in front of the animal so the animal will run away from you. Its disadvantages include slow reloading, could cause a fire in dry conditions, and difficult to load in low light conditions.	2
Herding	To be performed using a vehicle or helicopter. To be completed as outlined in Table 1 above or in Section 5.2.1 below.	3
Screamers	Loud screeching noise deterrent and in low light conditions will also provide a visual deterrent. The range is inconsistent and unpredictable and shares the same disadvantages of the bangers.	4
Physical Deterrents (Hard Contact) To be used when an attack is imminent. CZN prohibits the use of physical deterrents in non-conflict situations.		
Bear Spray	An aerosol spray that results in an immediate burning sensation when sprayed on the face. Although this is non-lethal, bear spray causes temporary but serious burning of the eyes and throat with the intent of stopping an animal attack. The range is inconsistent and unpredictable depending on wind direction and direction of the charging animal but begin spraying in short bursts to create a cloud in front of the animal, when the animal is approximately 10 m away.	5

5.2.1 Herding

Herding is used to move wildlife away slowly and safely from potentially hazardous sites, such as active worksites where there is risk of harming and or disturbing an animal. The herding method is to be employed when wildlife is reported or observed in a potentially hazardous area. Herding actions will always prioritize the safety of site personnel but must be conducted in a manner that minimizes the risk of injury to both wildlife and personnel and stress to the animal.

Herding may be performed by the trained Dene Monitor or other responsible designate (e.g., QEP, Construction Manager, pilot). Herding should be completed using a vehicle to ensure safety to people and the animal and should follow the procedures below:

- Assess risk to people and to self
- Ensure the safety of the wildlife and it has a safe exit route
- Alert others by radio that herding is to begin
- Slowly (walking pace) approach the wildlife
- Do not drive off the Project footprint
- Continue approach until wildlife begins moving
- Stop, if wildlife stops, resume approach
- Continue until wildlife leaves the active worksite
- Should the wildlife become alarmed or agitated, stop the vehicle and minimize stress, back off when wildlife begins moving in the desired direction
- Do not approach closer than 50 m with a vehicle

- Monitor area for at least 15 minutes after
- Prevent animal from re-entering. Herd or using least invasive deterrent.

A helicopter may also be used to herd wildlife away from an avalanche control area, but the following additional procedures apply:

- Advancement should not exceed closer than 100 m vertical and 100 m horizontal distance from the animal when using a helicopter; and
- Pilots must be careful not to over-stress the animal and back off when the animal begins moving in the desired location. Undue harassment is illegal and must be avoided.

6.0 REPORTING PUBLIC VEHICLES ON ACCESS ROAD

- All employees and contractors must report the location of any observed non-Project vehicles for traffic safety as well as any evidence of land use, such as hunting, fishing, or firewood harvesting along the road to the Dene Monitor or Construction Manager, or the checkpoint station attendant to record in the Wildlife Harvest form.
- The Construction Manager and or the checkpoint station attendant will record instances of non-Project vehicles and notify drivers of the potential traffic to take safety precautions.

7.0 INCIDENT REPORTING

A Wildlife Incident Report must be filled out by the QEP when:

- Big game species/species at risk mortality and or injury due to, or suspected from, the Project;
- Accidental destruction of a wildlife residence (den, nest) and or finding a residence while clearing;
- Human-wildlife interactions that present a risk to either people or animals, including incidents of wildlife exhibiting aggressive behaviour (e.g., animal does not flee when deterrents are used, flattened ears, charge or bluff-charge, attack) or a dangerous animal in camp;
- Big game/species at risk detected within 1 km of a blast site within a half hour after blasting;
- Wildlife caused property damage;
- Big game species has, or potentially has, gained access to a man-made attractant (food/shelter); and
- Anytime deterrent action is taken.

8.0 SUPPORTING DOCUMENTS

1. Appendix A: Regulator Contact Information
2. Wildlife Observation Log
3. Wildlife Incident Report

Appendix A: Regulator Contact Information

Name	Company/Agency	Title	Phone Number	Email
Wildlife Emergency Line	ENR (Dehcho Regional Office, Fort Simpson)	Emergency Line	1-867-695-7433	-
Wildlife General Inquiries	ENR	-	1-867-767-9055	-
24-Hour Spill Report Line	ENR	-	1-867-920-8130	-
Big Game Vehicle Collision Line	ENR	-	1-866-762-2437	-
Report a Wildland Fire	ENR	-	1-877-698-3473 or 1-877-NWT-FIRE	-
Report a Poacher	ENR	-	1-866-762-243	-
Report a Wildlife Observation	ENR (Dehcho Regional Office)	-	18676957450	-
Report a Species at Risk Observation	ENR	-	-	wildlifeobs@gov.nt.ca
Migratory bird information	Environment and Climate Change Canada Environmental Protection	-	1-800-668-6767	ec.eenordrpntno-eanorthpnrnwt.ec@canada.ca
Inquiries on migratory bird permits	Environment and Climate Change Canada	-	1-867-669-4754	ec.tnopermisscf-cwspermitnwt.ec@canada.ca
Eve Lamontagne	ENR (Dehcho Region, Fort Simpson)	Manager, Wildlife Research and Monitoring	1-867-695-7450, extension 1008	Eve_Lamontagne@gov.nt.ca
24-Hour Emergency Line	Parks Canada	Emergency Line	1-877-852-3100	-
Jonathan Tsetso	Parks Canada	Superintendent, Nahanni National Park Reserve	1-867-695-7753	jonathan.tsetso@canada.ca
Laurent Nikolaiczuk	Parks Canada	Park Warden, Nahanni National Park Reserve	1-867-695-6430	laurent.nikolaiczuk@canada.ca
Nahanni Duty Officer (June 15 to September 15 only)	Parks Canada	Nahanni National Park Reserve	1-867-695-6572	-

Worksite Posted (e.g., Mine camp, checkpoint station):

Location of Incident (e.g., GPS, KP, worksite name):

Date of Incident:	Time of Incident:	Incident Report No.:
Name(s) of Individual(s) Involved: Contact Number(s):		

Nature of Wildlife Incident:

Wildlife Mortality/Injury from Project; Euthanized? Yes; No

Wildlife Attack

Aggressive/Threatening Wildlife Behaviour

Deterrent Used

Property Damaged

Large Carnivore in Camp

Wildlife Has, or Potentially Has, Accessed an Attractant

Wildlife Detected While Blasting or a Half Hour After

Wildlife Residence Damaged

Wildlife Residence Found While Clearing, but not Damaged

Other: _____

Species: _____

of Animals Involved: _____

Cubs/Young Present? Yes; NoEvidence of Disease, Injury, or Malnourished? Yes; No. Explain: _____

Wildlife Behaviour: Predatory; Defensive; Curious/Approached; Foraging; Resting;
 Running/Traveling; Fled the Scene; Other: _____

Details of Incident (e.g., age and sex of wildlife, distinguishing features of the animal (colour, markings), the animal's direction of travel, aggressive behaviour, weather conditions, unsecured attractants, estimate how long the animal was dead, any other animals seen in the area, description of property damage, photographs):

Reason(s) for Deterrent Use (if applicable):

On Road at KP: _____

On or near Camp: _____

Endangering Human Safety

On or near Active Worksite (e.g., blast) at KP: _____

Destroying Property

Gained Access to a Food Reward

Involved in Previous Incident(s)

Other (Specify): _____

Deterrent(s) Used

Air Horn / Whistle

Bangers

Herding with: _____

Screamers

Bear Spray

Other: _____

Deterrent Success

(provide more info on back)

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Damage by Wildlife*

Human Injury

Human Mortality

Equipment/Supplies: _____
Damage \$ _____

Other: _____

*Describe the damage in the Details of Incident section

Report to a regulator anytime an animal is injured/harmed from the project, damaged property, deterred, obtained food reward, involved in a human-wildlife conflict (large carnivore in camp, within setback during/after the blast) when nest/den accidentally destroyed (or near miss). Report to a regulator within 24 hours.

ENR 24-hour Emergency Line: 1-867-695-7433 (Fort Simpson). Parks Canada 1-867-695-6483.

ENR

Date & Time Spoke to ENR: _____

Report Completed by: _____

ENR Contact: _____

Report Submitted to: ENR on Date: _____ Parks on Date: _____**Parks Canada**

Date & Time Spoke to Parks Canada: _____

Report Submitted by: _____

Parks Canada Contact: _____

Direction Provided by ENR/Parks Canada: (type of deterrent, carcass disposal, removal of attractant, reporting, etc.)

STANDARD OPERATING PROCEDURE

SOP #2 REDUCING WILDLIFE ATTRACTANTS

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 3
SUBCATEGORY:	All WR Activities	REVISION DATE:	October 2022	APPROVED DATE:	
				EXPIRY DATE:	

1.0 PURPOSE

This procedure is intended to provide Canadian Zinc employees and contractors with Standard Operating Procedures (SOPs) to reduce and manage wildlife attractants and thus minimize the risk of wildlife habituation, injury, and mortality.

The purpose of this procedure is to provide direction to all on-site workers on how to reduce wildlife attractants and restrict their access to wildlife.

2.0 DEFINITIONS

Aggressive Animal: threatening animal behaviour that could result in actual or potential harm to people (e.g., animal does not flee when deterrents are used, flattened ears, charge or bluff-charge, attack).

Deterrent: a noise, visual, or physical stimuli used towards/on an animal with the intent of repelling or causing pain.

Food Conditioned: wildlife that has learned to associate people, waste storage areas, and Project activities as potential food sources. Wildlife can become food conditioned after obtaining a food item even the once and can become an aggressive animal.

Habituated: wildlife can become habituated to people and Project activities after repeated exposure without negative consequence. Habituated wildlife respond to people and or the Project with little fear (respond weakly or not at all) and can become an aggressive animal.

Potentially Dangerous Animal: any of the big game species (coyote, wolf, wolverine, grizzly and black bears, caribou, moose, bison, and Dall's sheep) have the potential to become aggressive to people, especially those that are habituated to people/Project and or are food conditioned.

Wildlife Attractant: A substance or item that could be reasonably expected to attract an animal, including, but not limited to garbage, food products, and road salts. Natural food sources, such as a carcass are also attractants.

3.0 BACKGROUND

Human-wildlife conflict is preventable. The proper storage, handling, and disposal of products that can attract wildlife is essential to reduce the risk of wildlife attraction, habituation to the Project, and it has been shown to reduce incidents at existing northern mines. Failure to properly contain wildlife attractants may result in food conditioning and aggressive animal behaviour.

Section 56(4) of the NWT *Wildlife Act* indicates that killing wildlife for the defense of life or property isn't defensible if because of human-related mismanagement such as storing attractants where available to wildlife.

4.0 RESPONSIBILITIES

4.1 Construction Manager

- Update, circulates, and implements this SOP.
- Takes proper awareness and prevention training.
- Provides awareness and prevention training.
- Communicates to all on-site employees and contractors.
- Resolves incidents and provides materials/training necessary to prevent future incidents.

4.2 Dene Monitor

- Takes proper awareness and prevention training.
- Completes regular Waste Audits.
- Responds to reports on litter, unsecured waste containers, leaks, and spills following this SOP.
- Reports observations of wildlife on site due to presence of attractants by following SOP #1 Reporting, *Responding to, and Deterring Wildlife*.
- Responds to carcasses and gut-piles following procedures in SOP #1.
- Reports incidents to the Qualified Environmental Professional (QEP).
- Implements wildlife deterrent actions, when required.

4.3 Qualified Environmental Professional

- Takes proper awareness and prevention training.
- Supports the Dene Monitor to complete the Waste Audits, manage attractants, and respond with deterrent action.
- Reports incidents of litter, unsecured waste containers, leaks, and spills following this SOP.
- Prepares Wildlife Incident Reports.

4.4 All Employees, Contractors, and Visitors

- Understands and follows this procedure.
- Manages the use, storage, and disposal of attractants properly.
- Reports observations of improperly stored attractants, leaks, and spills to the Dene Monitor.
- Reports to the Dene Monitor any observations of wildlife on site due to the presence of attractants by following SOP #1 Reporting, *Responding to, and Deterring Wildlife*.

5.0 STANDARD PROCEDURE

5.1 Waste Management

- All employees will follow the guidelines and recommendations in the *Wildlife Management and Monitoring Plan* and *Waste Management Plan* for the duration of the Project.
- Employees, contractors, and visitors will ensure that no litter, wildlife attractants, or hazardous materials are accessible to wildlife. This includes ensuring proper storage and use of any material that could be considered an attractant or hazard to wildlife.
- All personnel on site will collect litter or improperly stored attractants and misdirected waste, and if safe to do so properly dispose of them. All litter and improperly stored material, even material that was able to be disposed of, will be reported to the Dene Monitor.
- All personnel on site are prohibited from feeding wildlife or leaving food out for wildlife.
- All personnel who notice wildlife attracted to the worksite will report it to the Dene Monitor or QEP immediately.

5.2 Carcasses and Gut-Piles

- All personnel will report, upon discovery, any carcasses or gut-piles encountered to the Dene Monitor following procedures outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife*.
- The Dene Monitor (with support from either the QEP or Construction Manager) will respond to the wildlife carcass and or gut-pile and will record the GPS location and follow procedures outlined in SOP #1.
- The QEP will prepare a Wildlife Incident Report and will alert ENR and Parks Canada within 24 hours of carcasses resulting, or suspected, from the Project.
- The Dene Monitor will ensure the swift removal of carcasses and or gut-piles found along the Project to avoid attracting wildlife. Note, big game/species at risk carcasses resulting, or suspected, from the Project or an animal that is possibly diseased must not be moved until approved by ENR and or Parks Canada, as per SOP #1.

5.3 Camp Infrastructure

- Camp waste from the skid-camps will follow the Waste Management Plan to prevent attracting wildlife and will follow the guidelines and recommendations of BMP #2 *Guidelines for Industrial Activity in Bear Country* (2008) and BMP#3 *Camp Waste & Wildlife Attraction Guideline* (2013) that are applicable to the Project.

5.4 Animals Accessing Camp Facilities and Infrastructure, Attractants, or Worksites

- Animals that gain access to camp facilities and infrastructure, attractants, or worksites will be immediately deterred by way of non-lethal deterrent action following SOP #1.

APPENDIX C

BEST MANAGEMENT PRACTICES

- BMP 1 Bear Incident Response Guidelines, 2013
- BMP 2 Guidelines for Industrial Activity in Bear Country, 2008
- BMP 3 Camp Waste & Wildlife Attraction Guideline, 2013
- BMP 4 Flying Low? June 2007
- BMP 5 Flying in Caribou Country
- BMP 6 Flying in Sheep Country

BMP 1

Bear Incident Response Guidelines, 2013

2013

Bear Incident Response Guideline



Photo by Dean Cluff/ENR

North Slave Region
Environment & Natural Resources



ENR North Slave Region **Bear Incident Response Guideline**

Implementation of these guidelines will allow ENR North Slave Regional office 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 Regional Contacts listed below:

Wildlife Emergency (On Call Officer)	(867) 873-7181 (24 Hours)
North Slave Regional Office	(867) 873-7184 (8:30 am to 5:00 pm)
Tlicho Area Office	(867) 392-6511 (8:30 am to 5:00 pm)

The Department's *Safety in Grizzly and Black Bear Country* brochure contains basic precautions and safety tips to keep in mind while you are in bear country. ENR understands that there may be some variation due to geographic conditions which may limit the actions you are able to take.

http://www.enr.gov.nt.ca/live/documents/content/Bear_Safety.pdf

BEAR AWARENESS TRAINING

ENR North Slave Regional office 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 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 ENR North Slave Regional ***Camp Waste and Wildlife Attraction Guideline***. This resource will provide guidance on how to reduce or prevent attraction from bears to your camp, cabin or work site.

INCIDENT RESPONSE

Small scale exploration and tourism camps should prepare a Bear Response Standard Operating Procedure (SOP) that can be used in the field. The SOP will allow all members on site to have knowledge of how to reduce or prevent any loss of life or property if there is a bear within the vicinity of your camp area or work site. A SOP 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 the *Bear Incident Checklist* to record information regarding your observations.
2. Report the bear to the ENR North Slave Regional contacts listed above.
3. 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. Phone the ENR North Slave Regional contacts listed above for guidance on necessary next steps to ensure human/wildlife safety and protection of property.
4. 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. Report status of bear encounter to the ENR North Slave Regional contacts listed above when safe to do so.

3. *Bear 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 North Slave Regional contact listed above.
2. Use the *Bear Incident Checklist* to record observations and any events that may have lead up to the injury and any other actions taken.

4. *Bear Mortality*

1. A bear may be destroyed if human life is in danger or destruction of property is imminent.

2. Mortalities must be reported to the appropriate ENR North Slave Regional contact listed above immediately. Under the NWT Wildlife Act, the responsible party is required 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 North Slave office or to an ENR Renewable Resource Officer.

If possible, the attached *Bear Incident Checklist* should be completed prior to calling ENR. It is critical that as much information as possible be provided at this point 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 North Slave 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 North Slave 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.



ENR North Slave Region Bear Incident Checklist

Office Use Only
File#: _____
Date reported: _____
Name: _____

- 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 Incident Details			
Date/Time:		Location: <i>(coordinates, lake or property name)</i>	
Type of bear incident:	<input type="checkbox"/> sighting	<input type="checkbox"/> encounter	<input type="checkbox"/> injury
	<input type="checkbox"/> Other, explain:		
Number of bears:		# of cubs	
Type:	<input type="checkbox"/> black	<input type="checkbox"/> grizzly	<input type="checkbox"/> unknown
Sex :	<input type="checkbox"/> male	<input type="checkbox"/> female	<input type="checkbox"/> unknown
Age Class:	<input type="checkbox"/> cub (<1)	<input type="checkbox"/> juvenile	<input type="checkbox"/> adult
Behaviour:	<input type="checkbox"/> fearful	<input type="checkbox"/> not fearful	<input type="checkbox"/> aggressive
General Observations	<input type="checkbox"/> moving toward site	<input type="checkbox"/> moving away from site	<input type="checkbox"/> 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:	<input type="checkbox"/> No	If yes, explain:	
Did the bear obtain a reward	<input type="checkbox"/> No	If yes, explain:	
Any property damage or loss of life:	<input type="checkbox"/> No	If yes, explain:	
	<input type="checkbox"/> Yes		

BMP 2

Guidelines for Industrial Activity in Bear Country, 2008

Guidelines for Industrial Activity in Bear Country

For the mineral exploration, placer mining and oil & gas industries



Yukon
Environment



© 2008 Mining and Petroleum Environmental Research Group (MPERG)

MPERG is a co-operative working group formed to promote research into mining, oil and gas and environmental issues in Yukon. Members represent the federal and Yukon governments, Yukon First Nations, mining companies and non-governmental organizations.

Thank you to EDI Environmental Dynamics Inc., plus all the individuals from the mineral exploration, tourism, and mining

industries, regulatory agencies, and Environment Yukon for collaborating in the development of these guidelines.

For additional copies,
contact MPERG at:

Box 2703
Whitehorse, Yukon Y1A 2C6
Located at 2099 – 2nd Avenue
Phone: (867) 456-3808
Fax: (867) 393-6232
mperg@gov.yk.ca

Photo credits:

Cover(Bear) – Gerry Perrier; all others Yukon government unless otherwise noted.
SIBCS = Safety in Bear Country Society

A Clear Need for Guidelines

Mineral and oil & gas exploration and development, as well as placer mining, have increased in Yukon in the past few years. Wilderness tourism and outfitted hunts are popular too. Increased activity in the backcountry can affect bear behaviour as well as increase the likelihood of negative bear-human encounters.

The Mining and Petroleum Environmental Research Group (MPERG) saw the need to develop guidelines to minimize the impacts of increased human activity on bears and bear habitat.

These guidelines provide best practices for minimizing the disturbance to bears and bear habitat and for preventing and handling bear encounters.

Information on bear biology, foods and behaviour is also

provided to aid understanding and guide decisions about camp set-up and field activities. Additional resources are listed at the back of this booklet.

These guidelines are intended for:

- Hard rock and placer miners
- Mineral exploration companies
- Oil & gas exploration and development companies
- Hunting outfitters
- Wilderness tourism companies and others using backcountry camps

In the workplace, employers and supervisors are required to take all reasonable precautions to prevent injuries to workers.

Remember that bears are not the only factor in planning for a safe and successful season. Land use, water, public health and other permits may be required depending on the size and location of the camp.



Industrial Activity and Bears

Bears have an intrinsic value and are important to the proper functioning of ecosystems. Mineral exploration, oil and gas development and placer mining are important to the Yukon economy. It is possible to have a successful camp operation that can safely share the landscape with bears.

Bears are important

Visitors and Yukoners alike consider bear viewing a special experience. In fact, viewing wildlife is the most common answer when visitors are asked what they want from their Yukon trip. Guided bear viewing and hunting trips generate economic benefits for nearby communities.

Bears, particularly grizzlies, are extremely vulnerable to extinction as the population cannot recover quickly if too many animals are killed. Female bears reproduce

at a late age, produce few young over their lifetimes and cubs have low survival rates. Removing bears – or driving them out of prime breeding, feeding and denning habitat – affects bear populations and the health of ecosystems in the long-term.

Conflict is preventable

Industrial activity can affect bear populations in several ways:

- ▶ alienation from important habitats,
- ▶ increased energy expenditure,
- ▶ injury or death.

By ensuring that your camp is properly located, designed, and maintained, and your activities take bear habitat and bear behaviour into account, you can reduce the likelihood of your camp or crew harming – or being harmed by – the bears in the vicinity.



Preventing Human-Bear Encounters

Overall 30–40 black bears and 10–15 grizzly bears are reported killed each year due to conflicts with humans in Yukon.

The simplest and best way to prevent human-bear encounters is not to attract bears in the first place.

The responsible handling of food and garbage is key to eliminating bear problems. Approximately 70% of all reported human-bear conflicts are due to garbage odour attraction.

Bears in pursuit of improperly stored food and garbage can seriously damage property and may affect camp operations.

Habituating bears to human food or garbage ("spoiling") can lead to human-bear conflicts, and injury or death of bears, crew members or future users of the area.

Avoid bear habitat when possible.

Do not locate camps or work in areas that may be frequented by bears. While home ranges for black and especially grizzly bears are large, riparian habitat (streams, riverbanks and lakeshores) and subalpine areas are especially important as feeding and travel corridors.

Figures on the number of operational days lost and expenses incurred in dealing with habituated



bears and property destruction are not officially collected, but anecdotally are significant. Take the necessary precautions to limit your impact on bears – and theirs on you – anywhere within your operating area.

Provide information, training and equipment to protect employees.

In bear country, this means providing bear awareness training and bear spray, in addition to developing safe work procedures such as those described in this booklet. Other procedures may be implemented where hazard assessments warrant and as far as reasonably practicable.

All camp and field personnel should be familiar with preventative measures and dealing with close range bear-human encounters. These are outlined in the videos *Staying Safe in Bear Country* and *Working in Bear Country*, and in the booklet *How you can stay safe in bear country*.

Encountering Each Other

Bears can respond in a number of ways to the presence of humans:

- ▶ Intolerant bears avoid humans and can be easily displaced from important habitat they need for survival and reproduction.
- ▶ Tolerant bears accept varying degrees of human presence and are less easily displaced. They may be attracted to the presence of food and/or garbage, and are more likely to become in conflict with humans.

When to call for help

If a bear repeatedly visits your camp, or exhibits curious or aggressive behaviour towards your crew members, contact the district Conservation Officer (CO) immediately. (See page 20 for contact numbers.)

Decisions regarding the appropriate action should be left up to the CO. Options include deterrence, removal of attractants, and/or relocation or destruction of the bear, depending on the circumstances.

Best Practices

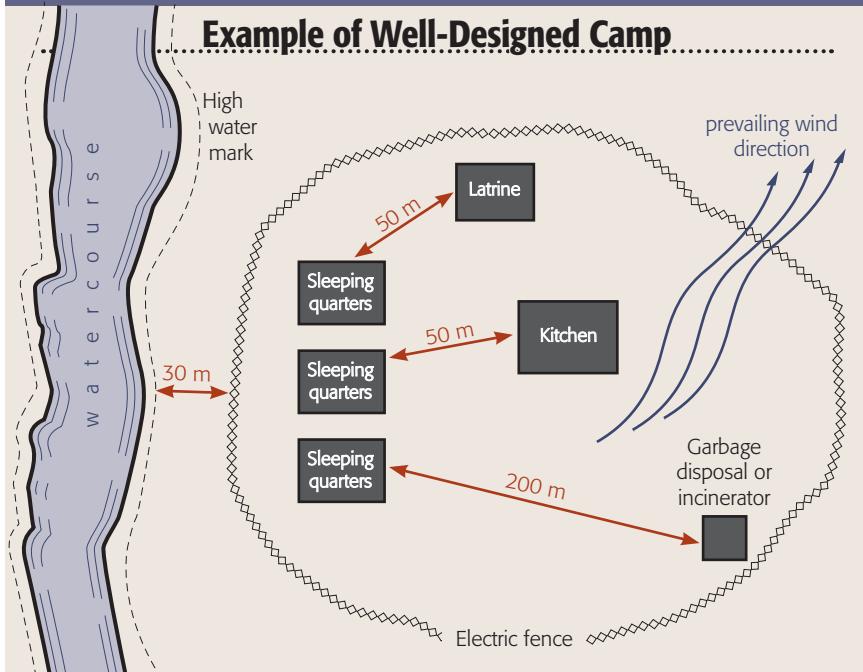
Camp Location

Consult with the district Conservation Officer about possible camp locations before establishing camp.

- ▶ Establish camps at least 30 m from the high water mark (avoid riparian areas).
- ▶ Do not set up camps near dumps or near camps/sites with previous bear problems because bears are known to return to sites on an annual basis.
- ▶ Avoid habitats rich in bear foods (horsetails, berry patches), and salmon spawning areas. See pages 16–17.

- ▶ Avoid areas with recent bear sign (scat, tracks, rub trees, diggings, game trails, feeding activity).
- ▶ Avoid noisy areas near rushing water. Bears can't hear you coming.
- ▶ Restrict all activities, including camp location, to at least 1 km from a suspected or confirmed bear den site. Bears tend to cluster denning activity in certain areas year after year and reuse denning sites approximately 25% of the time.

Example of Well-Designed Camp



Camp Design

Proper camp design is important because location and fencing aren't always fail-proof:

- ▶ Give adequate space for the camp within the electric fence.
- ▶ Arrange tents or trailers in a line rather than a circle. They should be well spaced, but not scattered.
- ▶ Install windows at entrances and exits of tents and trailers to increase visibility to the exterior.
- ▶ Clear brush from trails leading to and from buildings and tents to improve visibility and ensure line of sight.

- ▶ Locate the cook tent, food storage area and latrine in open spots, well away (~50 m or more) from sleeping quarters.
- ▶ Locate the cook tent down-wind (use the prevailing wind) from sleeping quarters if possible.
- ▶ Keep the garbage disposal area and burning vessel visible from a distance, downwind from camp and ~200 m from sleeping areas.
- ▶ Ensure all activity areas are well lit if possible.



Danielle Rechstein

Fencing

Electric fencing around all camp facilities is an effective method for keeping bears out of camps and is strongly recommended. A solar panel/battery storage system or generator is needed to power the fence. Recent improvements include:

- ▶ Low cost – \$500 - \$5000 depending on number of openings, corners, gates and overall length.
- ▶ Easy to install – light-weight, durable materials, relatively short set up time depending on size of camp (few hours to a few days).

The type of camp influences the type of fence:

- ▶ Portable electric fence – Ideal for short term camps. Uses medium gauge wire with 7/8" fiberglass posts, 6 wires.
- ▶ High tensile electric fence – Ideal for longer-term or permanent camps. Uses 12-gauge wire, 2 1/2" hollow fiberglass posts, 8 wires.

Food storage and cooking

It is unlawful under the Yukon *Wildlife Act* to encourage any wildlife to become a nuisance by leaving food or garbage in an area where wildlife can access it or be attracted by it.

Food storage methods vary depending on the amount of food involved:

- ▶ Large amount of food – use metal food storage lockers with latches, locking fridges or freezers, bear-proof garbage containers, bear-proof shed, steel shipping containers, and/or steel drums with locking lids.
- ▶ Small amount of food – use bear resistant canisters, hang food 3 m above ground and 1.5 m from vertical support.
- ▶ Lunches for field crews – pack food and drinks in airtight containers and ensure all garbage is packed back.

In all camps:

- ▶ Cook with adequate ventilation, and ensure kitchen areas are kept clean.

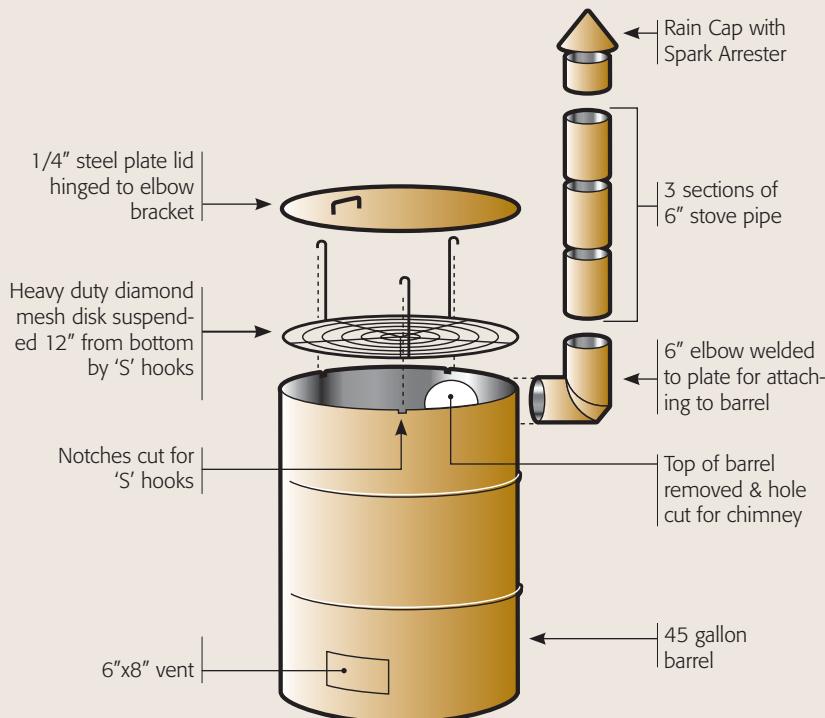
- ▶ Re-use or completely burn all grease and oils in a burning vessel or incinerator.
- ▶ Strain food particles from dishwater and dispose of with the garbage.
- ▶ Do not allow food or cooking in sleeping tents.
- ▶ Ensure crew members never feed bears or other wildlife. Often the presence of a bear or other scavengers (ravens, foxes, coyotes, marten, etc.) will attract other bears.

Waste disposal

Your permits will set out burning, incineration and garbage disposal requirements for your size of camp:

- ▶ Use of a Yukon Burn Barrel (a 45-gallon barrel with a suspended basket, lid, venting hole, and spark-arresting chimney) is sufficient for smaller camps.
- ▶ Use of a commercially-designed forced air, fuel-fired incinerator is required for larger operations.

Yukon Burn Barrel



- ▶ Do not bury food waste. This is ineffective as bears have a keen sense of smell and are known to dig pits up to 2 m deep to gain access to garbage.
- ▶ Do not burn food waste in open pits or drums as it produces hazardous emissions that may be harmful to people and the environment, and does not eliminate bear attractants.
- ▶ Use a burning vessel or incinerator to generate the high temperatures needed to reduce smoke emissions, contaminants and bear attractants.
- ▶ Incinerate all combustible and odorous kitchen waste after every meal. Do not temporarily store garbage outside.
- ▶ Remove incinerated residue from site using supply backhauls if possible.

Fuel Storage

- ▶ Store motor oil, diesel, gas and anti-freeze in airtight containers in a location that is inaccessible to bears such as a well-made shed, or steel locking container. Bears are often attracted to these types of synthetic materials.





Camp Maintenance

- ▶ Assign a full-time staff member to garbage management if your camp has more than three people in it. Their tasks should include incinerating, maintaining the incinerator, scheduling garbage pick-up, and maintaining a clean camp.
- ▶ Ensure that an inventory of spare parts for your burning vessel or incinerator is on hand so that equipment failure does not result in an accumulation of food waste.
- ▶ Practice regular maintenance and testing of your electric fence including removal of vegetation or other materials that might touch the wires and ground the fence's electrical charge.
- ▶ Treat latrine facilities with lime and cover with earth on a regular basis.
- ▶ Report all dead animals within close proximity to operating areas and remove or incinerate all carcasses within 1 km of camp.

Camp Shutdown

Seasonal shutdown – the focus is on minimizing animal interest in the camp site:

- ▶ Remove all wildlife attractants.
- ▶ If practical, back haul any solid waste to nearest maintained dump.
- ▶ Remove or safely store on-site any materials that may result in injury to wildlife (wire, steel, glass, plastic).
- ▶ Back haul or bury non-combustible garbage on-site with 1 metre of overburden.

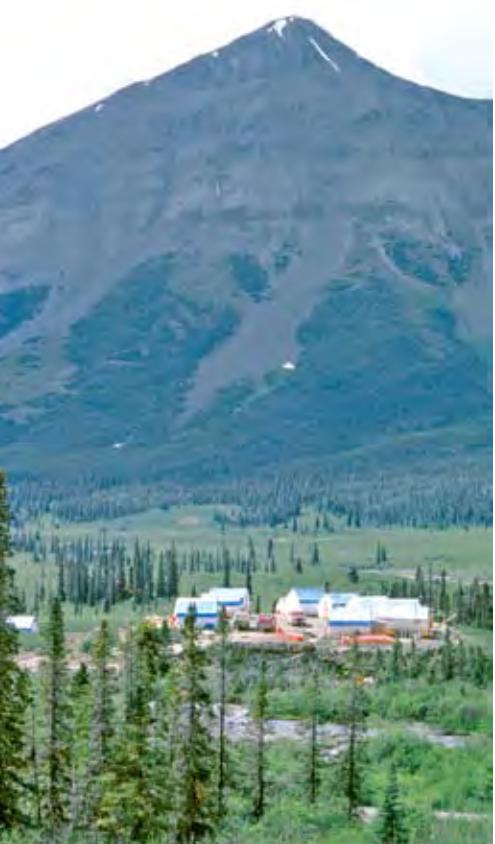
Final camp abandonment – the focus is on returning the site to its natural state, without any special attraction for bears:

- ▶ Remove all buildings, machines, materials, fuel drums, used hydro-carbons, unburied solid waste, and metal from site.
- ▶ Rip/loosen compacted soils to allow for natural revegetation.

Deterrence at Camp

Several options are available to deter a bear from entering or investigating a camp:

Noise deterrents include air horns, bear bangers, cracker shells, or firearm warning shots. Bear bangers should be aimed to discharge between you and the bear for the greatest chance that the bear runs away. There is a fire risk when using bear bangers.



Non-lethal firearm projectiles such as bean bags and rubber bullets may also be used with a 12-gauge shotgun. Crews should be trained and practiced in the proper use of noise and non-lethal deterrents and they should be accessible at all times.

Well-trained bear dogs are useful for detecting and deterring bears.

A **helicopter** may be used in limited circumstances to protect life and property. Improper use of helicopters to haze wildlife may be perceived as harassment under the *Wildlife Act*. Contact a Conservation Officer before using a helicopter to haze a bear away from camp.

If the bear is an immediate threat to life and all practical means of averting the threat have failed, killing the animal may be necessary. **Shooting** a bear is the **last resort** and should only be for the **immediate protection of life** and property. Ensure that at least one crew member has current firearms safety training including proficient use of firearms.

If a bear is killed in defense of life or property, you are legally required to report the incident to a Conservation Officer as soon as possible. The entire carcass must be left intact. (Do not remove any parts of the bear – claws, gall bladder etc.). The CO will provide further instructions.

Deterrence Up Close

Crews must receive **bear-awareness training**, including information on bear behaviour, how to avoid bear encounters in the field and how to respond to bears in the case of an encounter.

Ensure field staff have adequate and regular **communications procedures** in place to stay in touch with each other when in the field. They must be able to call for assistance in the event of an emergency.

Carry **bear spray**. It is an effective method for fending off aggressive, charging and attacking bears if used properly and under the right conditions. (Weather conditions such as wind, rain and cold may influence the effectiveness of the bear spray.) It should be easy to get at, not tucked away in a pack. Provide training to staff on the proper use, transport and storage of bear spray. Use full cannisters only, before their expiry date.

As a last resort, a **firearm** can be used to protect yourself in the event of a bear attack. Be aware, however, that few people have the skills required to deliver lethal shots to an attacking bear with



SIBCS

a firearm in the extremely short time available. Remember, if a bear is killed in self-defense, you are legally required to report the incident to a Conservation Officer as soon as possible.



SIBCS

Understanding Bears

Grizzly Bears

Grizzly bears are found throughout Yukon, from the B.C. border to the Arctic coast. There are approximately 6,000 – 7,000 grizzly bears, representing 30% of Canada's grizzly bear population.

Grizzly bears have a very low rate of reproduction. Compared to other species, females breed later in life (7-9 years), less often and cub survival is lower. As a result, the grizzly bear population is extremely vulnerable to extirpation (regional extinction) because they are not able to recover from overharvesting or excessive removal of adults from the breeding population.

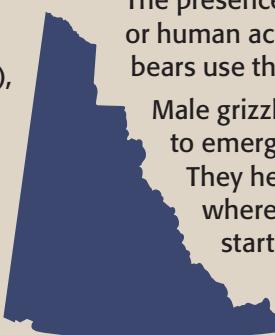
Grizzly bears are especially sensitive to the availability of food. Females have to accumulate

enough fat over the summer so that the eggs fertilized in the spring will implant and she will reproduce the next spring.

Grizzly bears require large undisturbed areas for feeding, denning, thermal cover, security cover, breeding and traveling. The presence of humans and/or human activity can affect how bears use these areas.

Male grizzly bears are the first to emerge from their dens. They head to valley bottoms where spring snow melt starts the growth of new vegetation. Females emerge from their den later and remain

at higher elevations where the over-wintered cranberries, crowberries, alpine sweet-vetch and winter-killed ungulates are important spring food sources for them.



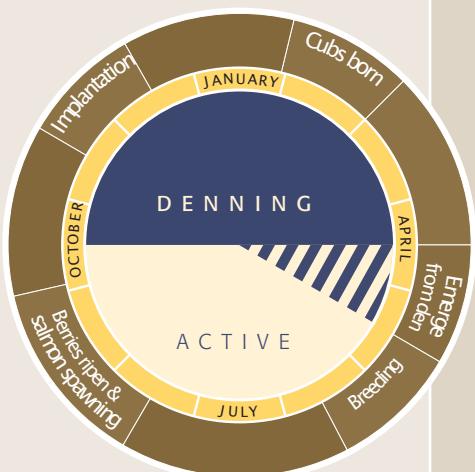
In the summer, riparian areas (streams, riverbanks and lakeshores) provide rich new growth in the form of horsetails and other vegetation. In the fall, alpine and subalpine regions provide a diet of grasses, horsetails, berries and ground squirrels required for the accumulation of weight before denning.

Spawning salmon along some Yukon rivers are also an important food source for grizzly bears in the fall. Meat protein sources also include insects (e.g. ants, moths, and wasps), rodents, caribou and moose calves, and carrion. Riparian areas are especially important to grizzly bears as travel corridors and bedding areas to escape the summer heat.



Periods of Activity

A bear's activity level and the likelihood of a bear-human encounter vary depending on many factors.



During the early and mid-summer before berries ripen, and during berry-poor years, bears are more likely to pursue human sources of food and odors.

Even while denning in winter, bears may periodically leave their dens as a result of disturbance, variations in temperature, deterioration of den conditions, and in search of food.

Black Bears

Black bears are distributed from the B.C. border to the northern tree line near Old Crow, concentrated along forested river valleys. There are approximately 10,000 black bears in Yukon.

Black bears in the north have a low rate of reproduction because females start breeding later in life (5–8 years) and few cubs survive. For example, a 20 year-old sow may only have 2–4 litters over her lifetime, with many failing to survive to adulthood.

Black bears may den for up to seven months, limiting the amount of time available to acquire sufficient food for growth and reproduction. Human activity may alter black bears' use of important habitats required for food, water, denning and cover.

After emerging from the den, black bears favour grassy south facing slopes and hillsides where they eat overwintered berries and grasses. Along rivers they feed on horsetails and fresh willow catkins. Newborn moose and caribou calves are an important food source in the spring in both the subalpine and valley bottoms.

In the early summer, black bears frequent openings in white spruce forests to feed on horsetails and other vegetation. Later they turn to ripe soapberries in aspen and cottonwood stands. As the nutritional

value of horsetails and grasses declines, black bears may eat fish, cottonwood catkins or become tempted by improperly stored garbage while waiting for berries to ripen.





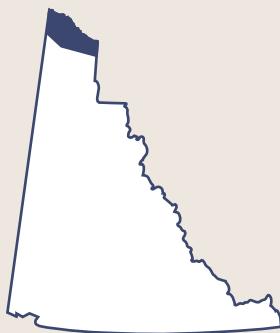
In the fall, black bears feed on blueberries in black spruce forests and may move to higher elevations to take advantage of other berry crops. Forest litter is consumed incidentally when they are searching for other foods.

Meat protein sources for black bears may include ants, wasps, rodents, ungulate calves, salmon, and carrion. Black bears are also known to use riparian areas of salmon spawning streams, although their use of riparian and subalpine areas may be influenced by the presence of grizzly bears.



Polar Bears

Polar bears inhabit the northern coastal regions of Yukon, mainly associated with multi-year pack ice and the availability of seals. Polar bears have been seen as far inland as 150 km, however.



Yukon's polar bears are part of the Southern Beaufort Sea population (approximately 1,500 individuals) that range along the coast from Alaska to the Baillie Islands, NWT.

Due to major differences in size, diet, habitat associations, behaviour, denning requirements and travelling patterns, workers and camp operators need to take additional precautions in areas frequented by polar bears. See the resources listed on page 18.

Avoid Areas of Common Bear Foods

Roots



BRUCE BENNETT

Alpine sweet-vetch
(*Hedysarum alpinum*)

Plants/Flowers*



BRIAN BELL

Horsetail
(*Equisetum arvense*)



BRUCE BENNETT

Locoweed
(*Oxytropis spp.*)



BRUCE BENNETT

Bearflower
(*Boykinia richardsonii*)

Berries



BRUCE BENNETT

**Crowberry or
mossberry**
(*Empetrum nigrum*)



RAMONA MARAJ

Bog Blueberries
(*Vaccinium uliginosum*)



RAMONA MARAJ

Soapberry
(*Shepherdia canadensis*)

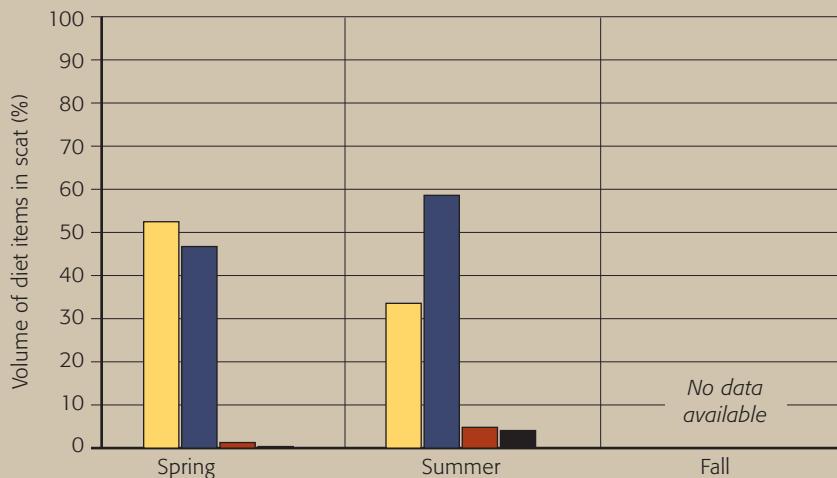


RAMONA MARAJ

Bearberry
(*Arctostaphylos uvi-ursi*)

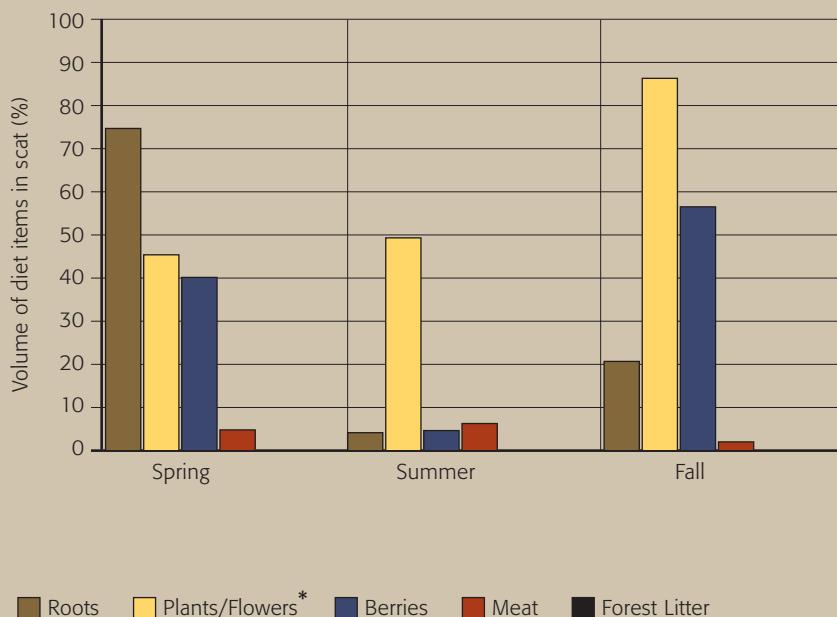
Black Bear Diet

(MacHutchon, 1989)



Grizzly Bear Diet

(MacHutchon and Wellwood, 2003)



* Black bears eat mostly horsetail. Grizzlies eat horsetail, grasses, and bearflower and locoweed flowers.

Resources

Mention in this document of commercial goods or services does not constitute an endorsement by the Government of Yukon.

Websites

Bear Biology

www.environmentyukon.gov.yk.ca/wildlifebiodiversity/mammals/blackbear.php
www.environmentyukon.gov.yk.ca/wildlifebiodiversity/mammals/grizzly.php
www.bearsmart.com/bearFacts
fwp.mt.gov/bearid/default.html
www.hww.ca/hww2.asp?id=90
www.hww.ca/hww2.asp?id=83

Bear Safety

www.environmentyukon.gov.yk.ca/camping/bearsafety.php
www.centerforwildlifeinformation.org/BeBearAware/BearSpray/bearspray.html
www.bearsmart.com
www.bearaware.bc.ca
www.igbconline.org/html/safety.html
www.canadianrockies.net/Grizzly/gbsafety.html
www.dec.state.ak.us/eh/fss/public/bearbroch.pdf

Bear Safe Containers

www.wildlife.alaska.gov/index.cfm?adfg=bears.containers



Electric Fencing

[www.bearsmart.com/bearSmartCommunities/ProtectingLivestock&Crops/
ElectricFencing.html](http://www.bearsmart.com/bearSmartCommunities/ProtectingLivestock&Crops/ElectricFencing.html)
www.margosupplies.com/canadian1/fencing.htm
www.electrobearguard.com/Product.html
www.waterstrider.com/bear-repellent-portable-electric-fence.htm

Incinerators and Burning Vessels

www.wildlife.alaska.gov/index.cfm?adfg=bears.incinerators
www.westlandincinerator.com/html/Home-page.html
www.wellcoenergy.com/products/drilling2.asp
www.ketek.ca
www.inproheat.com/solid_waste.htm

Firearms

www.cfc-cafc.gc.ca/factsheets/safety_training_e.asp
www.environmentyukon.gov.yk.ca/huntingtrapping/huntingregulations.php

Polar Bears

www.hww.ca/hww2p.asp?id=99&cid=0
www.nunavutparks.com/visitor-information/polar-bear-saftey.html
www.macecanada.com/downloads/polar_bear.pdf

Brochures

Environment Yukon

- How you can stay safe in bear country
- Bear Viewing Along Yukon Highways
- How to Keep Bears Out of Your Yard
- Be Bear Aware
- Into the Yukon Wilderness

Parks Canada

- You are in Bear Country
- Keep the Wild in Wildlife

Videos

- Staying Safe in Bear Country
- Working in Bear Country
- Polar Bears: A Guide to Safety

To order call: 1-888-440-4640 or
on-line at www.distributionaccess.com/new/index.cfm.

Contact Information

Environment Yukon

Box 2703, Whitehorse, Yukon Y1A 2C6
Located at 10 Burns Road

Phone: **(867) 667-5652**
Toll free (in Yukon): **1-800-661-0408, ext. 5652**
Fax: **(867) 393-6213**
Email: environmentyukon@gov.yk.ca

Conservation Officer Services Branch

Phone: **(867) 667-8005**
Toll free (in Yukon): **1-800-661-0408 ext. 8005**
Fax: **(867) 393-6206**
Email: environmentyukon@gov.yk.ca

District Conservation Officers

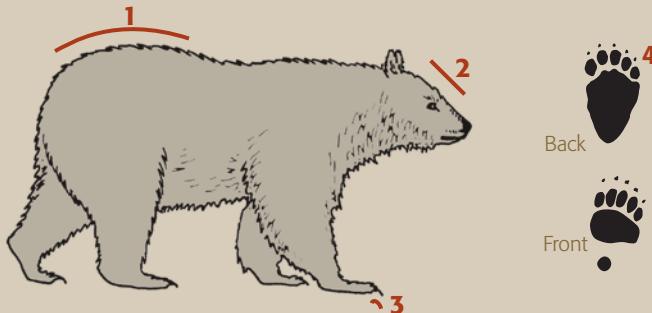
Whitehorse: 667-5221	Haines Junction: 634-2247
Watson Lake: 536-7363	Old Crow: 966-3040
Mayo: 996-2202	Faro: 994-2862
Ross River: 969-2202	
Teslin: 390-2685	
Dawson: 993-5492	

Turn in Poachers / Polluters

1-800-661-0525

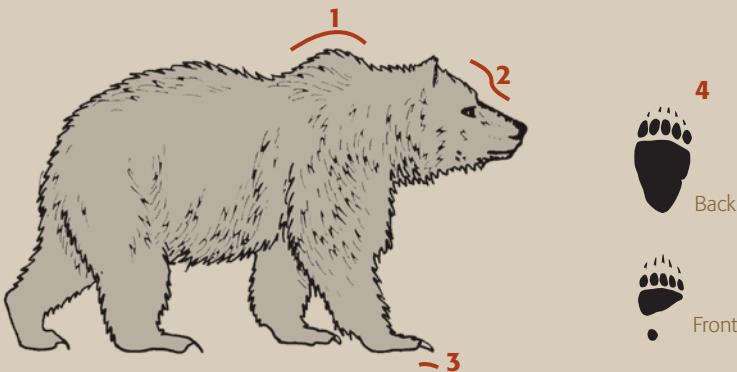


Black Bear



1. Highest point of back is over hind legs.
2. In profile, muzzle is straight and long.
3. Front claws are dark coloured, relatively short and well curved.
4. Tracks often do not include claw imprints. Toes imprint with space between.

Grizzly Bear



1. Highest point of back is over the shoulders.
2. In profile, brow gives face a dished or concave look.
3. Front claws are light coloured, 10 cm long or longer and slightly curved.
4. Tracks usually include claw imprints. Toes imprint very close to touching.



Yukon
Environment



BMP 3

Camp Waste & Wildlife Attraction Guideline, 2013



Camp Waste & Wildlife Attraction Guideline

To prevent or reduce attracting wildlife and to discourage wildlife habituation ENR North Slave Regional Office (NSR) strongly encourages that the recommendations listed below be implemented to ensure human safety and to protect our natural environment, including wildlife at a camp or cabin. This guideline is intended for small scale campsites and recreational cabins including:

- Exploration camps
- Tourism outfitters & commercial companies
- Residential & recreational cabin owners

Camp Design

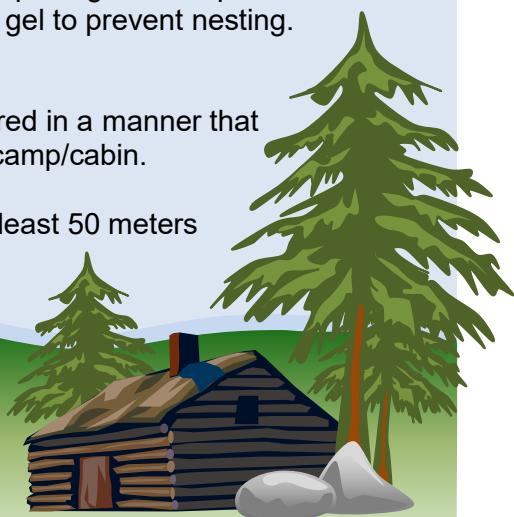
To prevent wildlife from accessing a camp/cabin and discourage habituation, a camp/cabin should be situated away from known or possible bear activity (previous camp/cabin, berry patches, dens, etc.) and designed in a manner that eliminates or reduces the potential for human and wildlife interaction.

- Clear brush to increase visibility and eliminate blind spots.
- Kitchen, latrine, food/waste storage, incinerator, composting site and garden should be at least 50 meters from sleeping area.
- Temporary cooking areas (kitchen, fire pits, BBQs) should be located down-wind from the sleeping area.
- All structures should be well spaced and the sleep tents or trailers arranged in a line rather than circular with doors facing the kitchen.
- There should be no food or cooking in the sleeping area.
- Properly install and maintain an electric fence around the camp or at minimum around incinerator, composting site and garden.
- Skirting around infrastructure that extends approx. 1m+ underground to prevent wildlife tunnelling.
- Whenever possible, keep doors and windows closed, cover openings/crawl spaces, seal cracks, screen chimney caps and place spikes or tacky gel to prevent nesting.

Food Storage

Amount of food at each camp/cabin will vary but food should be stored in a manner that will eliminate any food rewards if wildlife was to gain access to the camp/cabin.

- Store all food in the kitchen or in a central location that is at least 50 meters away from the sleeping area.
- Cooking and eating area(s) should be thoroughly cleaned after every meal.
- If the camp is to become vacant for more than a week, food should be stored in sealed animal proof container.



Domestic Waste

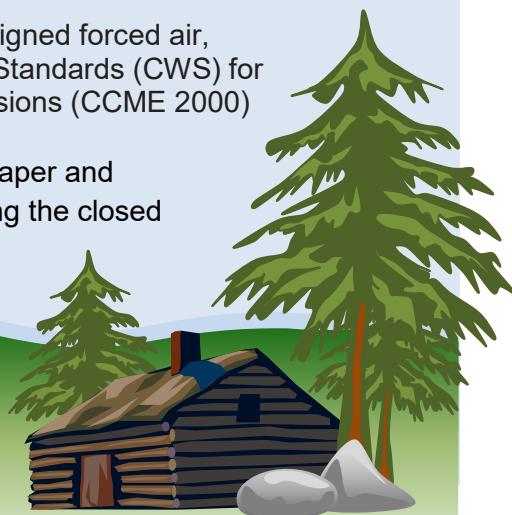
Inadequate storage, lack of onsite treatment and/or improper disposal of domestic waste (food & food contaminated waste) are the most common activities that contribute to the release of odours which may result in human/wildlife conflicts.

- Purchase bulk products to reduce amount of domestic waste produced.
- Implement a camp waste segregation system (recyclables, combustible, non-combustible and hazardous wastes) appropriate to the volume of waste produced.
- Domestic waste should not be stored in plywood boxes or in sheds as odours tend to permeate the wood and linger. Waste should be stored in a central area in a sealed animal proof container until final disposal.
- The sealed animal proof containers should be cleaned daily with bleach.
- Non-combustibles such as metal, glass and plastic should be cleaned with bleach and stored in a manner not to attract wildlife until transported back to an approved facility.
- Burying domestic waste is ineffective; the preferred method of disposal is backhauling domestic waste to an approved facility such as an approved landfill or bottle depot in a timely manner.

Burning/Incineration

An alternative method of camp waste disposal but it should be considered when no other options are available. There are additional hazards associated with this method that may still result in wildlife attraction, forest fires and air contamination.

- Designate a person or trained staff member to be responsible for the daily duties involved with burning/incineration.
- Burning in a “modified burn barrel” is recommended as an alternative only to open burning for timely disposal for cabin/camp waste.
 - To ensure a high temperature and complete burn, NSR suggests that there be approx. 1/3 wet with 2/3 dry waste per bag;
 - Burn a maximum of two bags per day; and
 - Install a fine screen on the chimney for reducing sparks.
- Larger scale exploration camps require a commercially-designed forced air, fuel-fired incinerator capable of meeting the Canada-Wide Standards (CWS) for Dioxins and Furans. (CCME 2001), CWS for Mercury Emissions (CCME 2000) and the NWT Ambient Air Quality Guidelines.
- Camp waste suitable for open burning is untreated wood, paper and cardboard. A permit to burn will be required if burning during the closed season (May 1 - Sept 30).
- Residual waste such as ash needs to be collected, stored in a sealed animal proof container and transported back to an approved facility site for disposal.



Grey Water (dishes, showers, laundry, etc.)

- Bleach should be added to dish water and/or a grease trap installed.
- Disposed of in a natural depression/sump/pit a minimum of 30 meters from the high water mark.
- Disposal site should be covered and treated with lime or crystal lye daily.

Black Water (Sewage)

- Honey bags are stored in a manner that is inaccessible to wildlife and transferred to an approved facility for disposal in a timely fashion.
- Ensure that pits have sufficient depth and treated with lime or crystal lye daily.

Animal/Fish Parts

- Clean away from camp and dispose of entrails a minimum of 3km away from camp area and on an island, if possible.
- In the NWT, fish entrails can be disposed of in water as an alternative to moving them away from the camp area.
- Any surface used for cutting or cleaning should be cleaned immediately with bleach.
- Do not leave smoking/drying fish or meat unattended.

Other Attractants

- Both the cooking (kitchen, fire pits, BBQs) and eating area(s) should be thoroughly cleaned after every meal.
- Do not leave bloody hunting clothes or items that smell like fish near the sleeping area.
- Pet food should be stored indoors in a sealed animal proof container and pets fed indoors, if possible.
- Any oils, gas or grease should be stored in a manner that is inaccessible to wildlife.

Reporting Wildlife Incidences (sightings, encounters, injuries, mortalities)

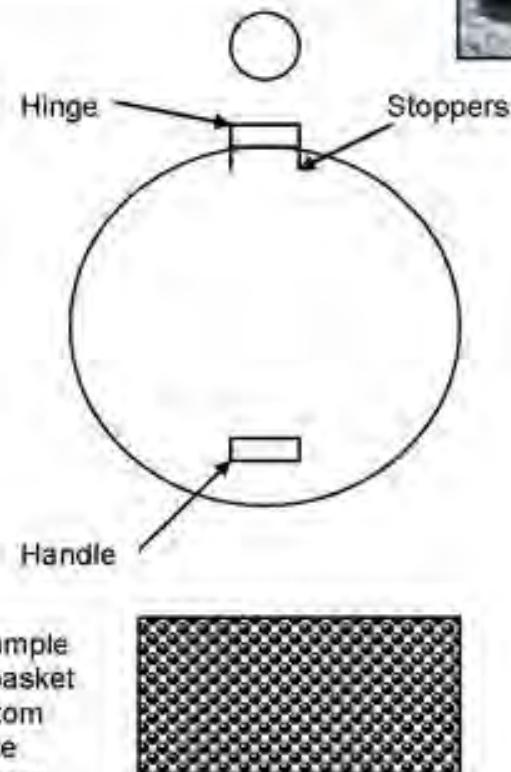
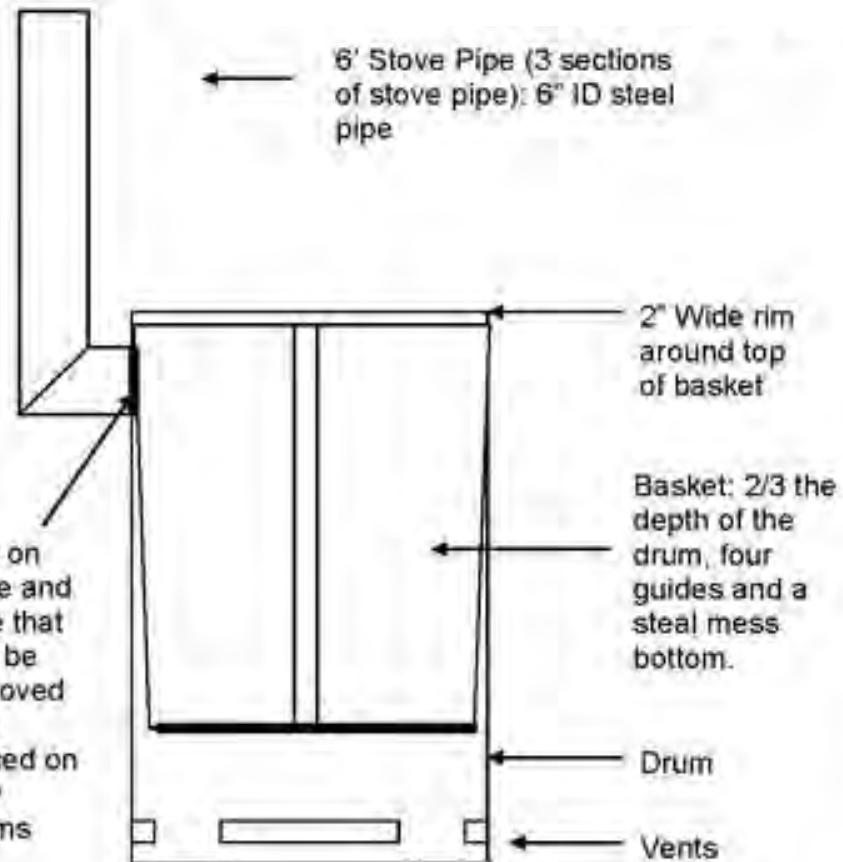
- Incidences should be reported at your earliest opportunity.
- Timely reporting allows ENR to provide advice and assistance in deterring nuisance wildlife before they become habituated and must be destroyed.
- Any defence of life and property kills must be reported immediately.

If you have additional questions, a report to file, or an emergency, please contact:

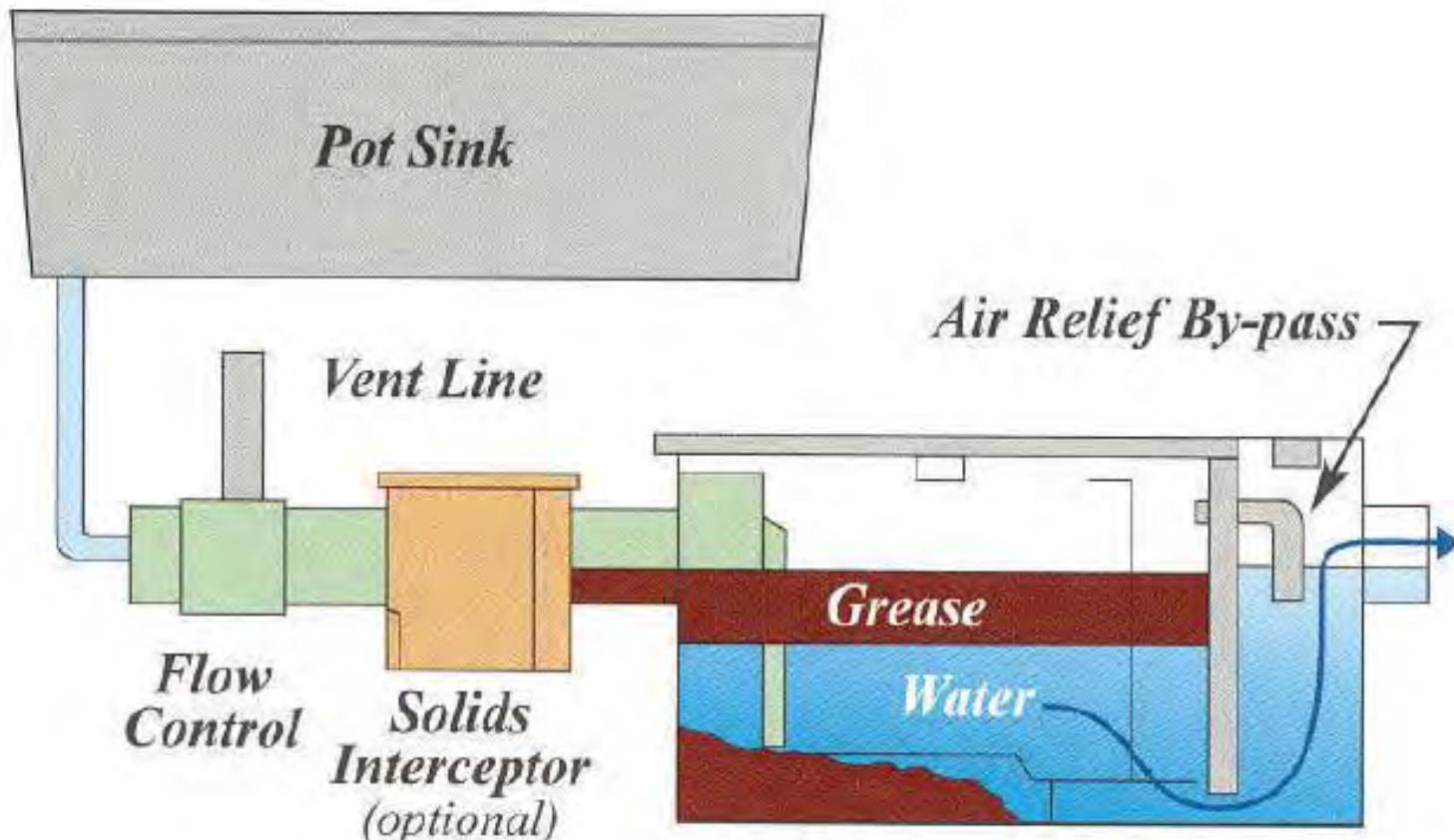
- 24hr Wildlife Emergency number at **(867) 873-7181**
- North Slave Regional ENR Office at **(867) 873-7184** (8:30am – 5:00pm)
- ENR Tlicho Area Office in Behchoko at **(867) 392-6511** (8:30am – 5:00pm)



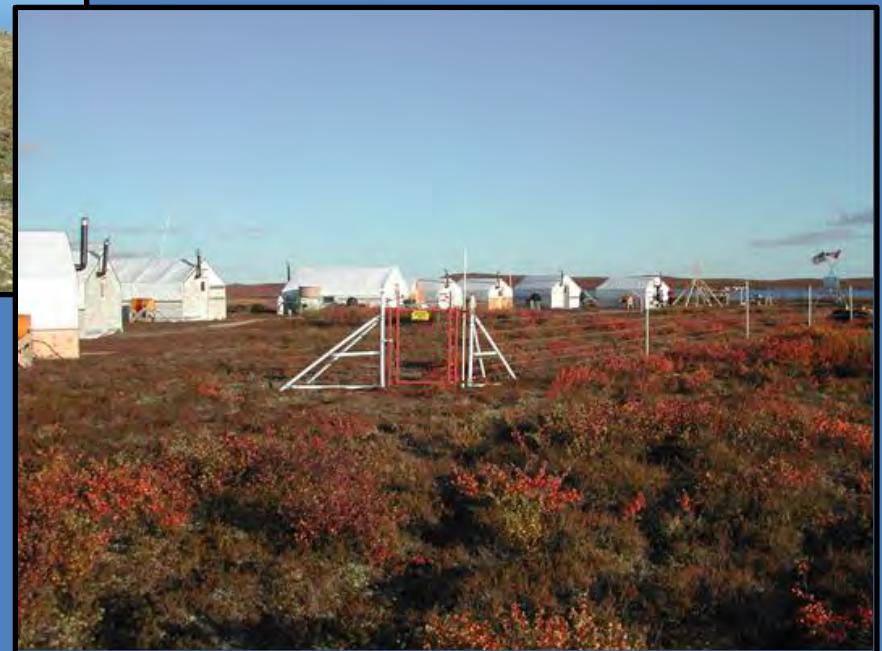
MODIFIED BURN BARREL



GREASE TRAP



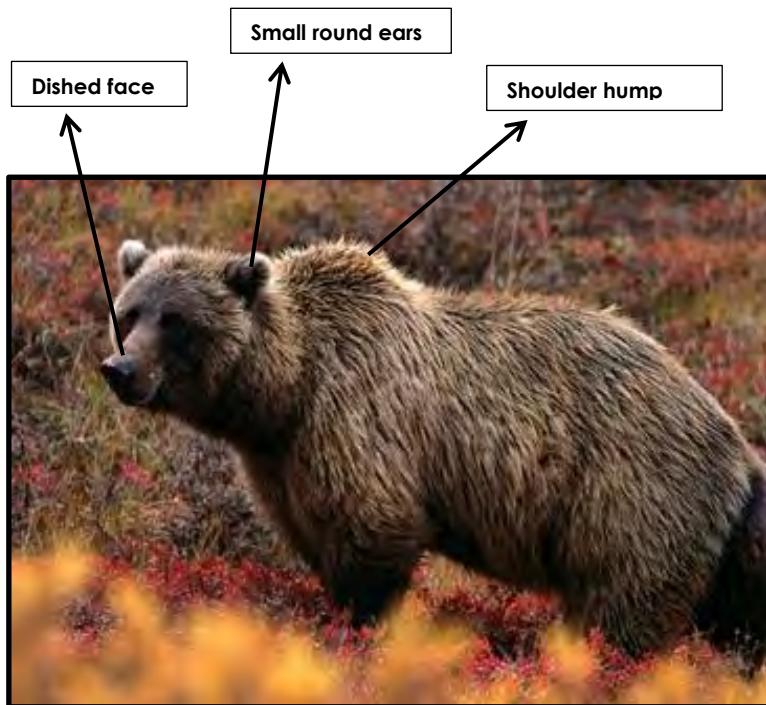
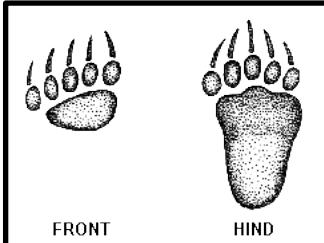
ELECTRIC FENCE



GRIZZLY BEAR



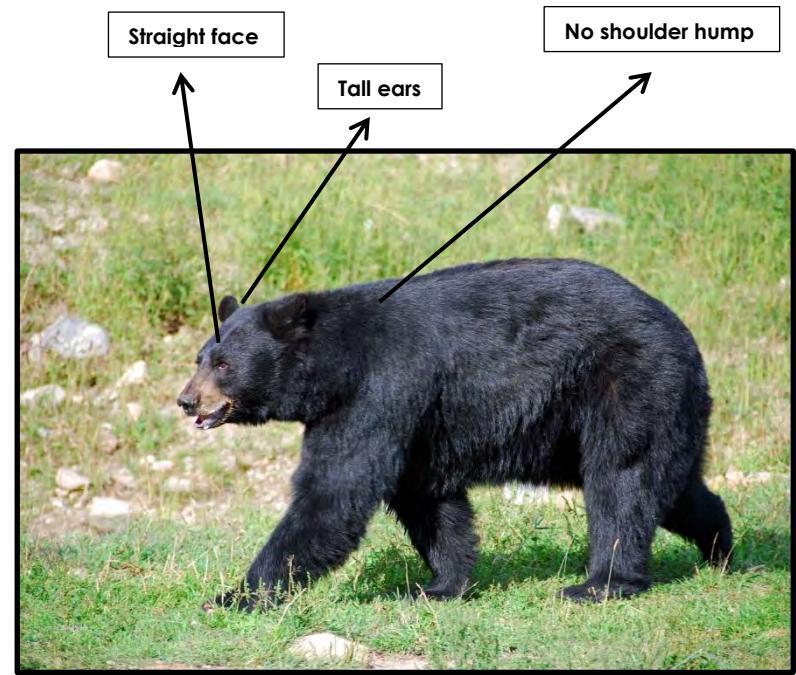
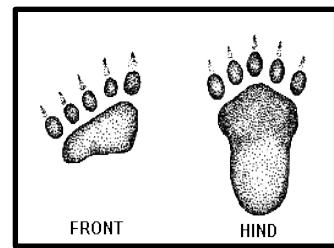
2 - 4" long, light claws



BLACK BEAR



1 1/2" short, dark claws



BMP 4
Flying Low? July 2018

PLEASE:

- Do not fly below 1,000 feet.
- Obey Transport Canada regulations.
- Find out where outfitter camps are located and avoid them during hunting season.
- Avoid barren-ground caribou calving grounds during calving season.
- Do not take-off or land in a calving area during calving season.
- Do not chase or harass wildlife by flying too close.
- Respect our wildlife – keep to a safe altitude.

Remember, flying close enough to an animal so that it runs away is too close!

If aerial survey or exploration work is planned at any time, but especially during outfitting or calving seasons, please contact the regional ENR office for information before flying.

Mackenzie Mountains and Mackenzie Valley

Sahtu Region (867) 587-3500
Dehcho Region (867) 695-7433
South Slave Region (867) 872-6400

Tundra

Inuvik Region (867) 678-6650
North Slave Region (867) 767-9238
South Slave Region (867) 872-6400

Visit the Department of Environment and Natural Resources website at www.enr.gov.nt.ca

Flying Low? Think Again...



Flying Low? Think Again...

A variety of wildlife, quality guides and outfitters, spectacular scenery and solitude that only a location away from human habitation can offer...

The Northwest Territories (NWT) is a popular destination for big game hunters and eco-tourists alike. But the experience can easily be ruined by low-flying aircraft that disturb wildlife.

Increased exploration and development throughout the NWT means increased air traffic. Increased interest in wildlife viewing and tourism also means increased air traffic. If you are a fixed wing or rotary pilot, please respect our wildlife and keep to an elevation that does not disturb them.



Wildlife are Protected Under NWT Law

Section 52 of the NWT *Wildlife Act* protects wildlife by making it illegal to disturb or harass game and can result in a penalty of up to \$100,000 and/or one year in jail. Flying close enough to an animal so that it runs away is too close!

Please keep your aircraft at a safe elevation so animals are not disturbed.

In the Mackenzie Mountains

Big game hunters pay sizable fees for the chance to take home a trophy animal from the Mackenzie Mountains. Much of the hunting in this area is done on foot or on horseback and it is a time consuming process. Sound is amplified by the mountains and low flyovers can frighten an animal into flight, causing hours, or even days, of stalking to be wasted.

Wildlife that are affected by low level flyovers in the Mackenzie Mountains include Dall's sheep, mountain goat, mountain caribou and moose.

During the mid-July to end of September hunting season, please be cautious and avoid outfitter areas.

In the Mackenzie Valley

Boreal caribou are a threatened species found throughout the boreal forest. Unlike barren-ground caribou, during the May calving period boreal caribou can go into hiding to have their calves. Low flying is especially harmful, stressing the female, which can cause separation from calves and lead to calf death. If low-level flights are going to be conducted in April or May, please contact the regional ENR office for information.

On the Tundra

During calving season

Caribou are a valuable resource to the people of the NWT. From the end of May to the end of June, female barren-ground caribou come together at herd-specific locations on the tundra to give birth to their calves. Low flyovers, take-offs and landings in these areas are especially harmful as they can stress the females, which can cause separation from calves and increased calf mortality.

Avoid barren-ground caribou calving grounds from mid-May to early July. This is especially important during times of low barren-ground caribou numbers. Please contact the regional ENR office in your area for more information.

Wildlife Viewing and Filming

View wildlife from a safe distance to minimize disturbing and stressing the animal. If the animal changes its behaviour, you are too close. Limit your time in the area and avoid surprising (e.g. sneaking up on) wildlife.

For commercial activities (i.e., expeditions, safaris, or cruises) involving big game or birds of prey viewing, including filming, a permit is required.

Other Wildlife

Grizzly bears, pelicans, whooping cranes, polar bears, muskoxen, black bears, eagles and other wildlife are also disturbed by low flying aircraft. Please respect our wildlife and keep to a safe altitude.



BMP 5

Flying in Caribou Country

FLYING IN CARIBOU COUNTRY

How to minimize disturbance from aircraft



Yukon
Environment

MPERG Report 2008-1





FLYING IN CARIBOU COUNTRY

How to minimize disturbance from aircraft

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(First published 2008)

Thank you to all the individuals from the aircraft, mineral exploration, government, mining industries and regulatory agencies for taking the time to review and comment on these guidelines.

Thanks also to EDI Environmental Dynamics Inc. for their work on the first edition.

The Mining and Petroleum Environment Research Group (MPERG) promotes research into mining and environmental issues in Yukon. It is a co-operative working group with members drawn from the Government of Yukon, Government of Canada, Yukon First Nations, mining companies and non-governmental organizations.

Contact MPERG at:

Box 2703 (K-10)
Whitehorse, Yukon Y1A 2C6
Located at 2099-2nd Avenue
Phone: (867) 456-3808
mperg@gov.yk.ca

All photos: Government of Yukon

ISBN 978-1-55362-470-7

 Printed on 100% post-consumer recycled paper

WHY ARE CARIBOU IMPORTANT?

People rely on caribou.

Caribou provide food for many Yukoners. Aboriginal communities in particular rely on caribou for cultural ceremonies, clothing, traditional crafts and artwork.

Caribou help the economy.

Outfitters can charge up to \$12,000 for a 10-day-long caribou hunt. Hunters, photographers, naturalists and people viewing wildlife purchase goods and services in communities.

People value caribou.

Wildlife viewing is the second-most popular activity for visitors to Yukon, after walking/hiking. Visitors coming to Yukon most want to experience “wildlife.” Residents and visitors alike value the viewing of caribou and other wildlife.

Herds are at risk.

Some of Yukon’s caribou herds are in decline. The Porcupine caribou herd now has 90,000-100,000 animals, down from 178,000 in 1989. Woodland caribou are also in decline and are considered a species of “special concern” under the federal *Species at Risk Act*. Efforts to help herds recover can be expensive, intrusive and not always successful.

Caribou disturb easily.

Studies show that caribou are sensitive to low-altitude overhead flights. Caribou are naturally curious, which makes them more susceptible to disturbance at certain times of year.

Caribou shape the ecosystem.

Caribou are an integral part of Yukon’s ecosystems. They are an important prey species for grizzly bears, black bears, wolves and wolverines. Their grazing modifies the landscape.



CARIBOU & DISTURBANCE

The Mining and Petroleum Environmental Research Group (MPERG) encourages industry to operate in an environmentally responsible manner when flying in caribou country.

Many industries rely on helicopters and fixed-wing aircraft to carry out their activities in remote regions of Yukon, where barren ground and woodland caribou are found.

By carefully choosing when and where to fly, industry can minimize its impacts on caribou while still delivering workers, collecting samples, and providing services.

Disturbance

Disturbance is any activity that interrupts the regular behaviour and routines of animals. For example, in response to a disturbance a caribou might stop eating and remain alert, or break into a run, or possibly leave an area. Even a small disturbance, with a small impact, can cause significant effects over time if it occurs frequently.



Caribou can be affected in many ways by aircraft disturbance, including:

- Direct injury or death,
- Increased energy expenditures, and
- Alienation from important habitat(s).

Key Steps

Flying in Caribou Country provides guidelines for industry to follow to minimize the impacts from overhead aircraft flights on caribou as well as the rationale for doing so. Staff with mineral exploration companies and pilots of helicopters and fixed-wing aircraft have a major role in carrying out these guidelines, given the prevalence of these activities in remote Yukon.

Here's what you can do:

- Become informed about caribou distribution and natural history in your operating area,
- Train your staff on how to minimize disturbance of caribou,
- Use the Flight Guidelines in this booklet as much as possible, and
- Enjoy caribou from distance.

Other people who should know about these guidelines are wilderness tourism operators, sightseeing operators, staff with aviation, forestry, oil and gas companies, resource management boards and councils, and people interested in caribou.



How disturbance affects caribou

Studies have shown that overhead aircraft flights may affect caribou by causing long term behavioural changes or by increased energy expenditures. In some cases, physical injury or death may occur.

Disturbance from overhead flights, ATVs, snow-machines, predators, hikers, insects or hunters can have a cumulative effect on the health of caribou, especially calves.

Studies show that a caribou's response to aircraft disturbance will vary by season, sex, group size, group compositions, frequency of the disturbance, type of aircraft, previous experience, and flight patterns.

Physical injury or death

The 'startle reflex' in response to a disturbance can range from simply flinching and remaining in place to running away. Running over steep or uneven terrain may cause injury or even death.

Pregnant caribou may also abort while running, or displace the fetus in a way that results in a difficult calving. During the calving season, a disturbance can affect calf survival if newborns are abandoned, trampled, or left vulnerable to predators.

Energy expenditures

Different behaviours have different energy costs. Caribou that spend more time running, walking and being on the alert sacrifice time that could be spent eating and digesting food. These behaviours also may increase an animal's metabolism by up to 25 per cent above normal.

Prolonged or cumulative exposure to disturbance may cause animals to lose weight, become weak and become more susceptible to disease and predation. And if disturbance interrupts nursing, calf growth and survival may be adversely affected.

Long term behaviour change

Repeated disturbance may cause caribou to abandon high-quality habitat for quieter locations with low quality food. Impaired growth, reproduction and survival may result.

Displacement due to repeated disturbance will interrupt the imprinting of traditional home ranges on calves. A shift from traditional "safe" habitat will put animals at greater risk of predation.

FLIGHT GUIDELINES

By carefully choosing when and where to fly, industry can minimize its impacts on woodland and barrenground caribou. MPERG recommends the following guidelines to reduce disturbance. Please use them unless weather or safety considerations dictate otherwise.

- 1. Use fixed-wing aircraft rather than helicopters whenever possible.**
- 2. At all times of year, maintain over-flight altitudes at least 300 m (1,000 ft) above ground level (AGL).**
- 3. During sensitive times of the year, maintain over-flight altitudes at least 600 m (2,000 ft) AGL.**
 - Woodland caribou – calving, post-calving and rutting
 - Barrenground caribou – calving and post-calving
- 4. Avoid flying over areas where you have seen caribou in the past.**
- 5. Avoid flying or alter your flight path to avoid areas important to caribou, especially during sensitive times of the year.**
 - Woodland caribou – aggregate near snow patches post-calving to avoid heat, insects and predators.
 - Barrenground caribou – concentrate in core calving areas and are especially sensitive to overhead flights.





- 6. Avoid mineral licks by 1 km (2/3 mile) during the spring.**
- 7. If/when you spot caribou, do not fly towards, follow, hover or circle them.**
- 8. Minimize cumulative effects of disturbance by minimizing your flying in a given area.**
- 9. Ascend to a higher flight path or veer away if you observe running, panic or other startle responses in caribou below.**
- 10. Contact the Regional Biologist with Environment Yukon for information about caribou in your operating area.**

These guidelines do not apply when the benefits for conservation clearly outweigh the risks posed by disturbance (e.g. wildlife surveys).

Factor	Response of Caribou to Aircraft Disturbance
Group Size	Large groups (>10 animals) visibly more reactive than small groups.
Group Composition	Cows with calves visibly more sensitive than bulls.
Life History Stage	Winter, rutting, calving, insect harassment period and post-calving are when caribou may exhibit heightened sensitivity to disturbance (depending on ecotype).
Flight Elevation	Response to aircraft declines with increasing elevation of the aircraft above ground level.
Aircraft Type	Helicopters may cause greater disturbance than fixed wing because of greater noise, maneuverability and nature of work.
Flight Pattern	Following behind moving caribou results in most disturbance.
Previous Experience	Animals more likely to respond if previously exposed to similar disturbance and repeated exposure can result in cumulative effects.

CARIBOU BIOLOGY

Caribou biology

Woodland and barrenground caribou species are found in Yukon. There are about 30,000-35,000 woodland caribou in 25 herds, and about 165,000 barrenground caribou in two herds.

In winter, woodland caribou eat ground lichen mostly and some arboreal lichens. They live in small herds. Most herds migrate from alpine and subalpine ranges in the summer to coniferous forest in lower subalpine habitat in the winter, but some herds remain in alpine ranges year round.

Barrenground caribou migrate in large herds, ranging over great distances between their summer and winter ranges and calving areas. They feed mainly on ground lichens in the winter.

Caribou response to disturbance depends on where and when the disturbance occurs. Sensitive times are those periods in the annual cycle that are most important for the long term survival of the herd.

While it's important to minimize disturbance near caribou, it's critical when the herd is in decline or recovering from past declines. Disturbance of these herds may affect their long-term survival.

Information sources

For additional information about caribou and their activities, you can turn to people and the internet.

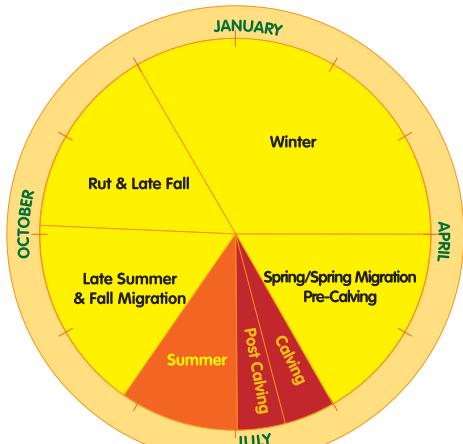
First Nations members, especially Elders, are excellent sources of information about wildlife in your operating area. Contact local First Nations, or trapping, hunting and outfitting associations, for names.

Environment Yukon's Regional Biologists are also an excellent resource. It's good practice to contact the Regional Biologist early in the planning stages for your project to get the latest information as well as identify potential impacts and mitigation measures in your operating area.



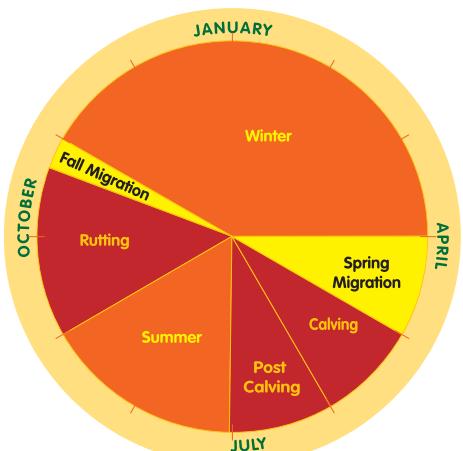


Sensitivity to disturbance



Barrenground caribou

- High (red triangle)
- Moderate (orange triangle)
- Low (yellow triangle)



Woodland caribou

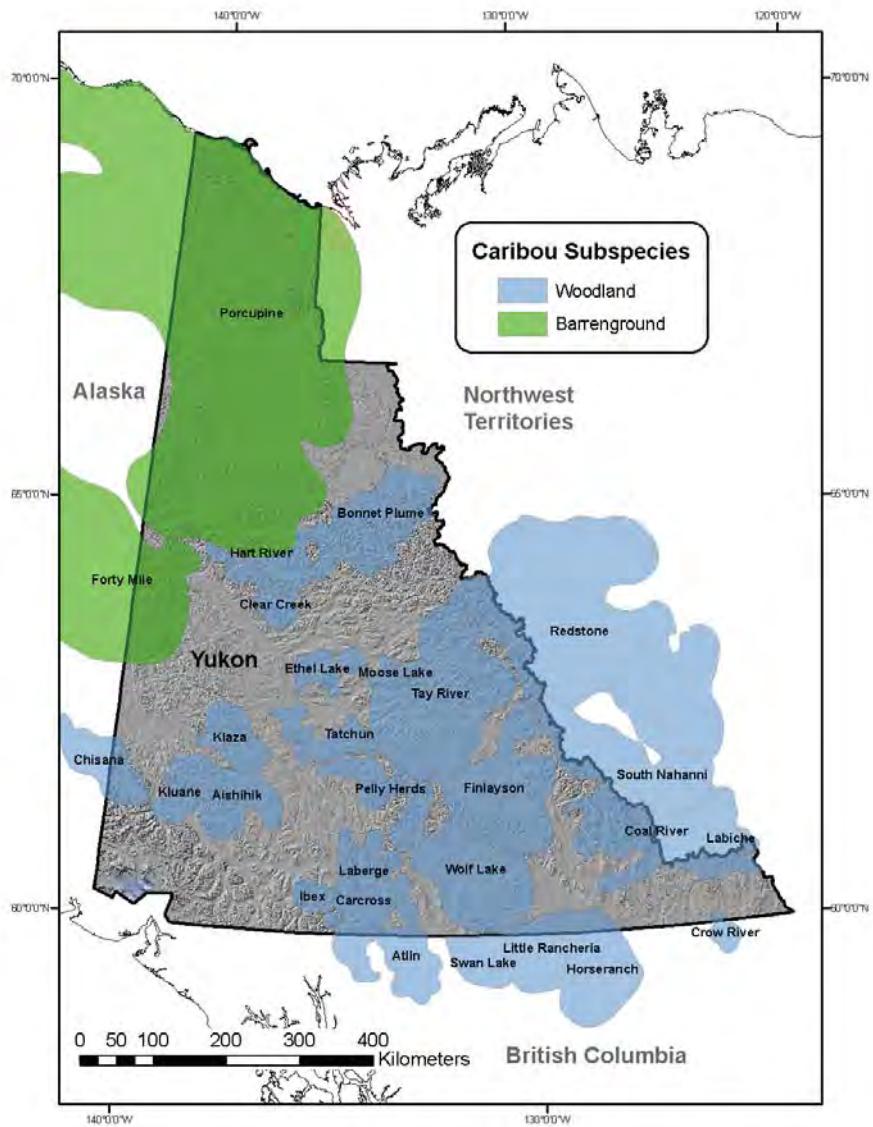


CARIBOU HERD POPULATION TRENDS

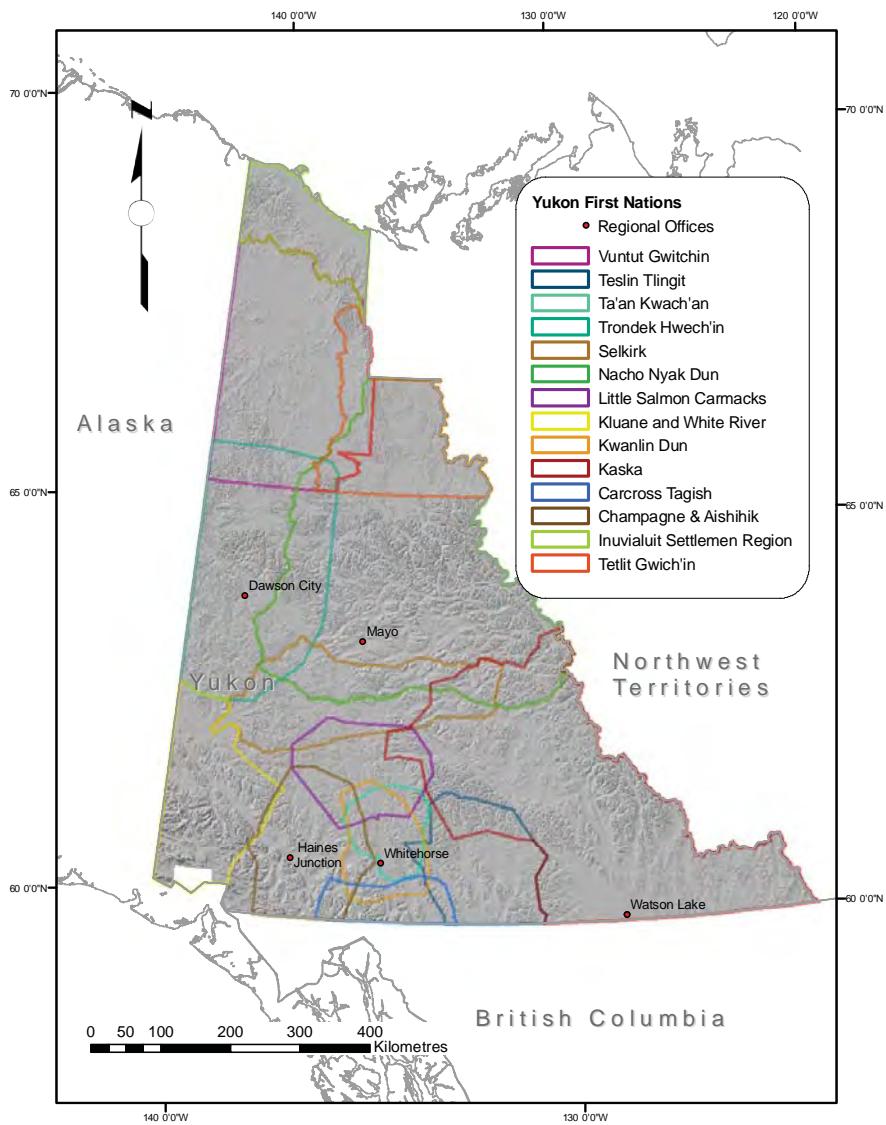
Herd	Population Estimate	Last Surveyed	Trend
Woodland Caribou			
Laberge	200	2003	Unknown
Coal River	450	1997	Unknown
La Biche	400	1993	Unknown
Swan Lake	400	2005	Unknown
Hart River	2,130	2006	Unknown
Clear Creek	900	2001	Unknown
Bonnet Plume	5,000	1982	Unknown
Ethel Lake	300	1993	Stable
Moose Lake	200	1991	Stable
Tay River	3,750	1996	Unknown
Redstone	5 - 10,000	1982	Unknown
Finlayson	3,100	2007	Declining
South Nahanni	950 - 1,150	2001	Unknown
Little Rancheria	1,000 - 1,200	1999	Stable
Wolf Lake	1,400	1998	Stable
Atlin	800	2007	Stable
Carcross	775	2008	Stable
Ibex	850	2008	Increasing
Pelly Herds	1,000	2002	Unknown
Tatchun	500	2000	Stable
Klaza	650	2000	Increasing
Aishihik	2,030	2009	Increasing
Kluane	180	2009	Declining
Chisana	760	2007	Stable
Crow River	150	2005	Unknown
Horseranch	600 - 800	1999	Unknown
Barrenground Caribou			
Fortymile	46,500	2009	Increasing
Porcupine	123,000	2001	Declining



Barrenground and Woodland caribou home ranges



First Nations Traditional Territories and Environment Yukon regional biologist offices



FOR MORE INFORMATION

Environment Yukon

Caribou Biologist

Phone: (867) 667-5465

Toll free (in Yukon): 1-800-661-0408

Fax: (867) 393-6263

Email: environmentyukon@gov.yk.ca

Website: www.environmentyukon.gov.yk.ca

Regional Biologists

Southern Lakes (Whitehorse): (867) 667-8640

Northern Region (Dawson): (867) 994-6461

Liard Region (Watson Lake): (867) 536-7365

Kluane Region (Haines Junction): (867) 536-7365

Northern Tutchone Region (Mayo): (867) 996-2162

Environmental Assessment Program

Phone: (867) 667-5683

Toll free (in Yukon): (1-800) 661-0408, local 5683

Fax: (867) 393-6213

Email: envprot@gov.yk.ca

Website: www.environmentyukon.gov.yk.ca/monitoringenvironment/aboutassessment.php

Wildlife Key Area Inventory Program

Phone: (867) 667-3739

Fax: (867) 393-6405

Email: wka@gov.yk.ca

Website: environmentyukon.gov.yk.ca/wka

Wilderness Tourism Association

Phone: (867) 668-3369

Website: www.wtay.com



Yukon First Nation Governments

Carcross/Tagish First Nation (Carcross):

(867) 821-4251

Champagne & Aishihik First Nations

(Haines Junction): (867) 634-4200

First Nation of Na-Cho Nyák Dun (Mayo):

(867) 996-2265

Kluane First Nation (Burwash Landing):

(867) 841-4274

Kwanlin Dun First Nation (Whitehorse):

(867) 633-7800

Liard First Nation (Watson Lake):

(867) 536-5200

Little Salmon/Carmacks First Nation (Carmacks):

(867) 863-5576

Ross River Dena Council (Pelly Crossing):

(867) 969-2278

Selkirk First Nation (Pelly Crossing): (867) 537-3331

Ta'an Kwäch'än Council (Whitehorse):

(867) 668-3613

Teslin Tlingit Council (Teslin):

(867) 390-2532

Tr'ondëk Hwëch'in (Dawson City):

(867) 993-7100

Vuntut Gwitchin First Nation (Old Crow):

(867) 966-3261

White River First Nation (Beaver Creek):

(867) 862-7802

Yukon Outfitters' Association

Phone: (867) 668-4118

Fax: (867) 668-4120

Email: info@yukonoutfitters.net

Website: www.yukonoutfitters.net

More information on caribou biology:

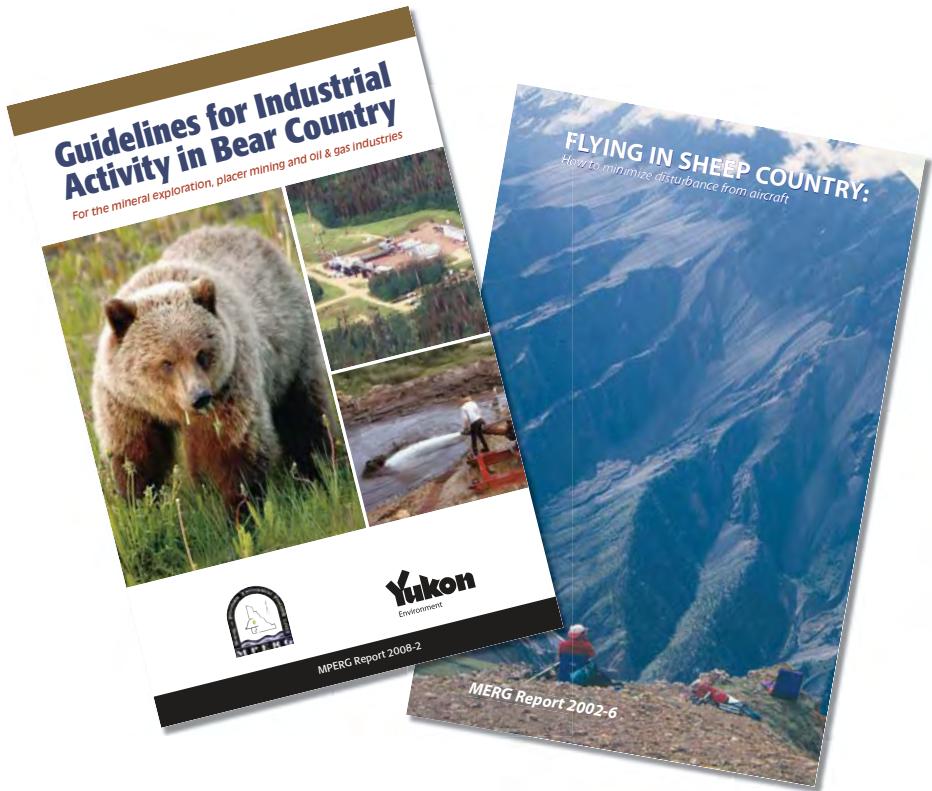
www.rangifer.net/rangifer/index.cfm

www.taiga.net/pcmb/

www.environmentyukon.gov.yk.ca/wildlifebiodiversity/mammals/caribou.php

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Yukon
Environment



BMP 6
Flying in Sheep Country

FLYING IN SHEEP COUNTRY:

How to minimize disturbance from aircraft

MERG Report 2002-6

Alejandro Frid did the research that is summarized here; RumKee Productions compiled his information and data to produce an earlier draft. Thank you to individuals of the aircraft, exploration, and mining industries for generously taking the time to review and provide suggestions for this version.

Prepared by: Laberge Environmental Services
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Revised edition - 2nd printing 2006
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MERG is a co-operative working group made up of the Federal and Yukon Governments, Yukon First Nations, mining companies, and non-government organizations for the promotion of research into mining and environmental issues in Yukon.

MERG (Mining Environment Research Group)
reports are available at
Geoscience Information and Sales,
Yukon Government Room 102, Elijah Smith Building,
Whitehorse, Yukon.

Mailing Address:
102-300 Main Street
Whitehorse, Yukon Y1A 2B5
Phone: (867) 667-5200
Fax: (867) 667-5150

For more information about the research reports, contact:

Jean Carey, Sheep Biologist,
Yukon Department of Environment
Fish and Wildlife Branch,
Box 2703,
Whitehorse, Yukon
Y1A 2C6

Phone: (867) 667-5849
E-mail: jean.carey@gov.yk.ca

Printed by Integraphics Ltd.



photo credit: S. Kraseman

Concern about aircraft disturbance of Dall sheep and other wildlife continues to grow in the Yukon. Aircraft-based tourism, both sightseeing and outdoor adventures in remote areas, has steadily increased in recent years. Mineral exploration often occurs in remote mountainous regions that can only be accessed by aircraft. These areas, or the access to them, are often in sheep range.

The Yukon Department of Environment has funded several research projects looking at how aircraft disturbance can affect Dall sheep. We found that fixed-wing aircraft cause less disturbance than helicopters, but landing requirements often don't allow their use. Both the Branch and the researchers realize that the fieldwork was limited, but feel that we learned ways to minimize the effects of aircraft on Dall sheep.



photo credit: S. Kraseman

This booklet is intended for:

- pilots of rotary and fixed-wing aircraft
- wilderness and ecotourism operators
- mineral exploration companies
- mining companies
- outfitters
- owners of remote lodges
- management boards and councils
- anyone interested in sheep

Our research has focussed on sheep, but these guidelines could also apply to other animals in the alpine, like mountain goats and caribou.

What is Disturbance?

Disturbance is any activity that interrupts the regular behaviour and routine of animals.



photo credit: S. Kraseman

When disturbed, a sheep will:

Become vigilant: The animal interrupts its activity, such as foraging, stands with its head above its shoulders, and scans the surroundings.

Stop eating: The animal will stop eating and usually become vigilant.

Un-bed: The animal will get up from a lying position. It is usually ruminating (chewing its cud) when it is bedded.

Flee: The animal will walk and/or run a distance from its pre-disturbance position. The distance can range from a few steps to over a kilometer, depending on the degree of disturbance.

Each of these reactions costs the animal energy.



Research results

After a disturbance had passed, sheep tended to remain vigilant. Depending on what they were doing, it took up to 45 minutes to resume their pre-disturbance activity. Even if an aircraft was in sound range for less than 5 minutes, sheep displayed disrupted behaviour for up to 10 minutes following. If the disturbance happened while they were bedded, it took up to three times longer to re-bed or to begin eating than if they were already standing or eating.

Frequent disturbances could eventually affect body weight and reproductive success. Sheep may spend too much time being vigilant and not enough time eating to maintain good body condition. As well, if sheep stand up while they are ruminating the digestion process may stop, which would limit the amount of energy and nutrition that they would absorb.

Disturbances may also affect nutrition by causing sheep to move to areas of poorer quality food. These shifts may be short term, but if the disturbance persists they could become long term.

The number of sheep in a group appeared to affect how individuals reacted. As the group size increased, there was a greater chance that one animal detected a disturbance from a greater distance. When this alert sheep reacted, the rest of the group took the cue, even if they weren't aware of the actual disturbance.



photo credit: S. Kraseman

Habituation is the term used when animals become so used to an activity that they no longer appear bothered. However, there was no strong evidence that sheep become habituated to helicopter overflights. There may have been some short-term habituation if several flights were done in the same day. During the research observations, sheep reacted to every overflight but their responses were greatest to the first flight of the day. The first flight of each following day seemed to create as great a disturbance as the first flight of the first day.



GUIDELINES

To minimize the disturbance to sheep:

Whenever possible, fly more than 3.5 km from known sheep ranges.

If sheep cannot see or hear the aircraft they obviously will not be disturbed. The closer the aircraft gets to the sheep, the greater the disturbance and the faster and farther the sheep will flee.

Plan your route to avoid sensitive areas.

If you must fly near a sheep range, avoid known lambing cliffs and mineral licks from May 1 to June 15.

Plan a route that places a ridge between you and the sheep.

If you must fly near a sheep range, ridges can act as visual and sound barriers. But be careful: if the aircraft suddenly appears over a ridge without warning sheep will be strongly disturbed.

Fly below the sheep.

If you must fly near sheep range, fly below the level of the sheep. Sheep naturally seek safety by fleeing upslope. If they are forced to flee downslope, they are more likely to fall and hurt themselves.

Concentrate your total flying time.

Sheep tend to be less affected if flights are concentrated into a single session, rather than spaced out over several days. In some cases it may be best to have two aircraft, rather than one, operating over a shorter time.

Fly when sheep are active.

Morning flights may disturb sheep less than flights in the afternoon, when sheep are usually bedded and ruminating. If scheduling allows, avoid flying between 11 a.m. and 3 p.m.



Fly at an angle when approaching sheep areas

Try to avoid flying directly toward sheep. Sheep perceive the aircraft as an avian predator and so flee to escape. Approaches on an angle, especially from below, will seem less threatening.

Proceed on course.

It is tempting to take a closer look, but good wildlife viewing is observing animals without interrupting their normal activities. The best practice is to proceed with no detours and disrupt the animals as little as possible. Pictures of fleeing animals are permanent evidence of being too close to them.

Use binoculars or a telephoto lens to get a better view. Better yet, take the time to land where sheep won't be disturbed and view them from there.



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APPENDIX D

MONITORING PROCEDURES

WMMP #1
Den and Nest Pre-Clearing Procedure

DEN AND NEST PRE-CLEARING

ISSUED FOR USE

WMMP #1 DEN AND NEST PRE-CLEARING PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	01	PAGE:	1 of 6 + attachments
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	Pre-Construction			EXPIRY DATE:	

1.0 INTRODUCTION

The objective of this procedure is to identify how to locate dens, lodges/dams, pushups, raptor nests, roosts and hibernacula (herein collectively referred to as dens and raptor nests) per the Den and Nest Pre-Clearing monitoring program (Section 8.1.1).

2.0 BACKGROUND

- Dens (e.g., bear, wolf, beaver, bat, muskrat) and raptor nests (occupied and unoccupied) are protected from destruction, or both, destruction and disturbance.
- Bat species, such as the Little Brown Myotis and Northern Myotis are protected as Endangered under SARA Schedule 1, and damage to or destruction of their residences is prohibited.
- Black Bears den from approximately early October to May which overlaps with the proposed timing of WR activities. WR activities have the potential to destroy dens and/or disturb denning bears, potentially leading to den abandonment.
- Grizzly Bears den from approximately late October to June which overlaps with the proposed timing of WR activities. WR activities have the potential to destroy dens and/or disturb denning bears, potentially leading to den abandonment.
- Wolverine natal denning extends from late February and to May which overlaps with the proposed timing of WR activities. WR activities have the potential to destroy dens and/or disturb wolverine natal dens, potentially leading to den abandonment.
- Beaver lodges and dams and muskrat pushups are occupied during WR activities and have the potential to be destroyed and disturbed.
- Raptor nests are unoccupied when proposed WR activities are to occur. Clearing activities have the potential to destroy raptor nests that may be re-used in subsequent years.
- Parks Canada has requested that the WR pre-clearing survey also include the search for bat roosts and hibernacula (i.e., winter dens).

3.0 RESPONSIBILITIES

Late Fall

The den and nest pre-clearing survey, conducted in the late fall, is led by a professional biologist and supported by Dene Monitors. The professional biologist is responsible for notifying Canadian Zinc (CZN) of any results that may require modification of WR activities or implementation of adaptive management procedures, and for notifying ENR and/or Parks Canada of all occupied and unoccupied den and nest locations.

While Clearing (Clearing Scan)

A Dene Monitor is always a dedicated member of a clearing crew. The Dene Monitor, with support from the Qualified Environmental Professional (QEP), will survey for dens and nests while clearing is underway. If a den or raptor nest is found within the WR footprint, the surveyor is responsible for immediately notifying the Construction Manager (CM), via radio. Once notified, the CM will halt all clearing beyond the Project setback. The QEP will report the location of dens and raptor nests to ENR and/or Parks Canada.

4.0 SURVEY LOCATIONS

Locations of the den and nest pre-clearing surveys will be completed as follows:

1. **Late Fall:** Areas within 800 m of WR alignment and 1.5 km from potential avalanche control sites (survey excludes areas on the opposite side of the ridgeline; Figure D1) and known locations of dens/nests.
2. **While Clearing (Clearing Scan):** Within the WR project footprint.

Areas predicted as suitable grizzly bear denning habitat are available in Figure D1 for reference when conducting the bear den pre-clearing survey.

5.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **Late Fall:** is to be completed between mid-October/early November when bears are beginning to den (or are near the den site) and when a light snow cover is present to detect fresh bear sign more easily (e.g., tracks and den entrances) but should not sufficiently hinder raptor nest visibility. This survey is repeated annually if winter vegetation clearing continues over multiple years. Local Parks Canada and/or ENR staff will be consulted to help plan the field survey at a time when local snow conditions are favourable.
 - **Within one Week of Survey:** report the locations of an occupied, unoccupied, or suspected den or raptor nest to ENR and/or Parks Canada.
- **While Clearing:** The Clearing Scan is a separate survey from the Late Fall survey. This survey is conducted when clearing occurs during the restricted activity periods outlined in Section 7.2.
 - **Within 24 Hours of Survey:** submit a Wildlife Incident Report to ENR and/or Parks Canada when an occupied, unoccupied, or suspected den or raptor nest is detected.

Exact bear and wolverine den locations are to be kept confidential between CZN, ENR, and Parks Canada until the dens are naturally vacated.

6.0 EQUIPMENT AND MATERIALS

- Helicopter, snowmobile, and snowshoes
- GPS with pre-determined aerial survey transects, helicopter landing locations, and previous den/nest locations
- Radio
- Bear spray and air horn
- Digital camera
- Aqua-Vu® camera (late fall survey only)
- Remote camera and associated setup equipment
- Flagging tape
- Flashlight
- Field datasheets/notebook

7.0 METHODS

7.1 Late Fall

The objective of the fall survey is to find bear dens, beaver dams/lodges, and raptor nests within 800 m of proposed winter clearing and within 1.5 km of potential avalanche control sites, and if found, to respond with adaptive management. This survey is primarily conducted with a helicopter; however, ground-truthing may be required on a case-by-case basis.

Aerial Component for the Late Fall Survey

- Non-mountain areas: Follow pre-determined parallel transects within the survey area outlined above in Section 4.0. Flight altitude should be approximately 100 m above ground level. Visibility trials in spring 2022 suggest that transect spacing at 200 – 500 m is appropriate to survey different habitat types along the portion of the road inside Nahanni National Park Reserve (NNPR) (Table A). Travel speeds range between 80 km/hr. in dense forests to 100 km/hr. in open landscapes. A similar visibility trial is planned for territorial lands, although transects currently remain 250 m apart as agreed with ENR in 2021 (Table A).
- Mountain areas: Follow parallel mountain contour-based transects around mountain blocks as well as along the proposed WR alignment. Survey altitude should be approximately 100 m above ground level and survey speed at 80 to 100 km/hr.

Table A: Transect Spacing and Survey Speeds based on Habitat Types

Land	Territorial	NNPR				Territorial
Broad Habitat	Dense/Open Forest & Shrubland Mix	Low Elevation Closed Spruce Forest	Fire Regen	High Elevation Open Spruce Forest	Alpine	Alpine & High Elevation Open Spruce Forest
Kilometer Point (estimate)	170 to 101	101 to 73	73 to 48	48 to 36	36 to 17	17 to 0
Transect Spacing (m)	250*	200	500	250	500	250*
Survey Speed(s) (km/hr.)	80*	80	100	100	100	80*

* May vary once visibility testing is conducted in the different habitat types.

- Allow the flight path to be diverted to investigate 1) possible dens/raptor nests including areas where previously identified, 2) site-specific features (e.g., hillsides, uprooted tree root mats) with the potential for denning, 3) densely treed areas that may require a more thorough search, or 4) as required for helicopter safety.
- Upon observation of a bear or bear tracks, the survey crew will intensify the search for a den within that area.
- Bear dens are considered occupied if fresh sign is detected (e.g., nearby tracks, freshly turned soil) and/or a bear is observed near the den.
- Raptor nests are expected to be unoccupied at the time of the field survey.
- Upon observation of a den or nest, the survey crew will:
 - attempt to identify if the den is occupied or unoccupied from the air by searching for fresh tracks and/or the animal;
 - photograph the den/nest for quality control, record the GPS location immediately above the den/nest, and describe the surrounding habitat; and
 - if the den is suspected to be unoccupied (or if unknown), intensify the aerial search within the defined setback distance to locate any additional dens that may be occupied (if any).
- Ground-truth possible unoccupied and/or suspected bear dens within the defined setback distance following the ground-truth methods described below. Confirmed observations of an occupied bear den should not be ground-truthed for the protection of the surveyors and the bear.
- Report all dens (occupied, unoccupied, suspected) and nests to CZN within 24 hours of observation and to regulators within one week of the survey.

Ground-truth Component for the Late Fall Survey

- Ground-truth to confirm unoccupied and suspected bear dens identified during the aerial survey when den locations are safely accessible to the surveyors. Den locations may be inaccessible when the helicopter cannot land within 1 km, or the den is on a steep slope. The den is considered active until proven otherwise;

- Walk slowly to intensively search the ground for a den entrance and fresh signs of bear (i.e., scat, diggings, tracks, claw marks, beds), paying close attention to uprooted tree root mats, areas of topographic relief (hillsides), windfall identified during the aerial survey;
- Bear dens are considered occupied if fresh bear sign is detected nearby (e.g., scat, tracks, freshly turned soil, beds) or if a bear is observed near the den. The ground crew will immediately leave the area once a den is determined to be occupied;
- Upon observation of a den where the activity status is unknown, the survey crew will attempt to determine occupancy using a pole-mounted video recording device (e.g., Aqua-Vu® micro camera) with an infrared light source to peer into the den. If no bear is observed inside the den and no fresh sign of a bear is nearby, the den will be determined to be unoccupied;
- If for some reason the activity status of a den cannot be determined, the ground crew may temporarily install a remote camera with a view of the den to monitor den site activity. Prior to clearing, the Dene Monitor will return to view the remote camera images and the QEP and Dene Monitor will determine if the den is occupied or unoccupied. The den is considered active until proven otherwise with the remote camera; and
- Report all dens and raptor nests to CZN within 24 hours of observation and to regulators within one week of the survey.

7.2 While Clearing (Clearing Scan)

The objective of the Clearing Scan is to find bear and wolverine dens, beaver dams/lodges, muskrat pushups, raptor nests, and bat hibernacula within the WR footprint while clearing, and if found, to respond with adaptive management.

- One to two surveyors search for dens, raptor nests, and hibernacula within the Project footprint actively being cleared:
 - Bear dens: possibly an excavation, at the base of standing trees or stumps, under fallen logs, on slopes, in caves, and other areas identified by Dene Knowledge;
 - Wolverine natal dens: possibly in areas of large boulders, downed logs, beaver lodges, old bear dens, caves, and snow banks that would remain into late spring such as in ravines and on leeward slopes. Watch for wolverine tracks/trails leading to/from the den;
 - Beaver dams/lodges and muskrat pushups: stream and wetland crossings and shorelines;
 - Raptor nests: mature trees (both live and dead coniferous or deciduous trees) usually against the trunk or in a fork of the tree; and
 - Bat hibernacula: deep caves. While overwintering, bats are not sensitive to disturbances except if occurring directly at or within the hibernacula (COSEWIC 2013). To avoid disturbing possible hibernating bats, avoid directly entering the cave. Search for possible hibernating bats in cracks and crevices inside the cave while standing outside the cave entrance. A flashlight may be used, from the cave entrance, to search for guano and urine stains that may be visible on the cave floor and along the walls. Deep caves with evidence of bat use (e.g., guano, urine staining) would be considered bat hibernacula until proven otherwise.
- Snowshoe/snowmobile ahead of the clearing equipment.

- May occur several days ahead of the clearing equipment depending on the weather and clearing progress;
- If a den, nest, pushup, or bat hibernaculum are found, or suspected, the surveyor(s) will immediately notify the Construction Manager via radio;
- The Construction Manager will stop the Project activity;
- The surveyor(s) will record the den/nest/cave location, take photos, and add Dene Knowledge to further describe the observation;
- The QEP will prepare and submit a Wildlife Incident Report to ENR and/or Parks Canada within 24 hours when the clearing equipment was within the nest/den setback distances (refer to Section 7.2) and if Project activities are suspected to have disturbed a bear from its den; and
- Respond with adaptive management to avoid the destruction/disturbance of dens/nests before Project activities resume (refer to Section 9.1.1).

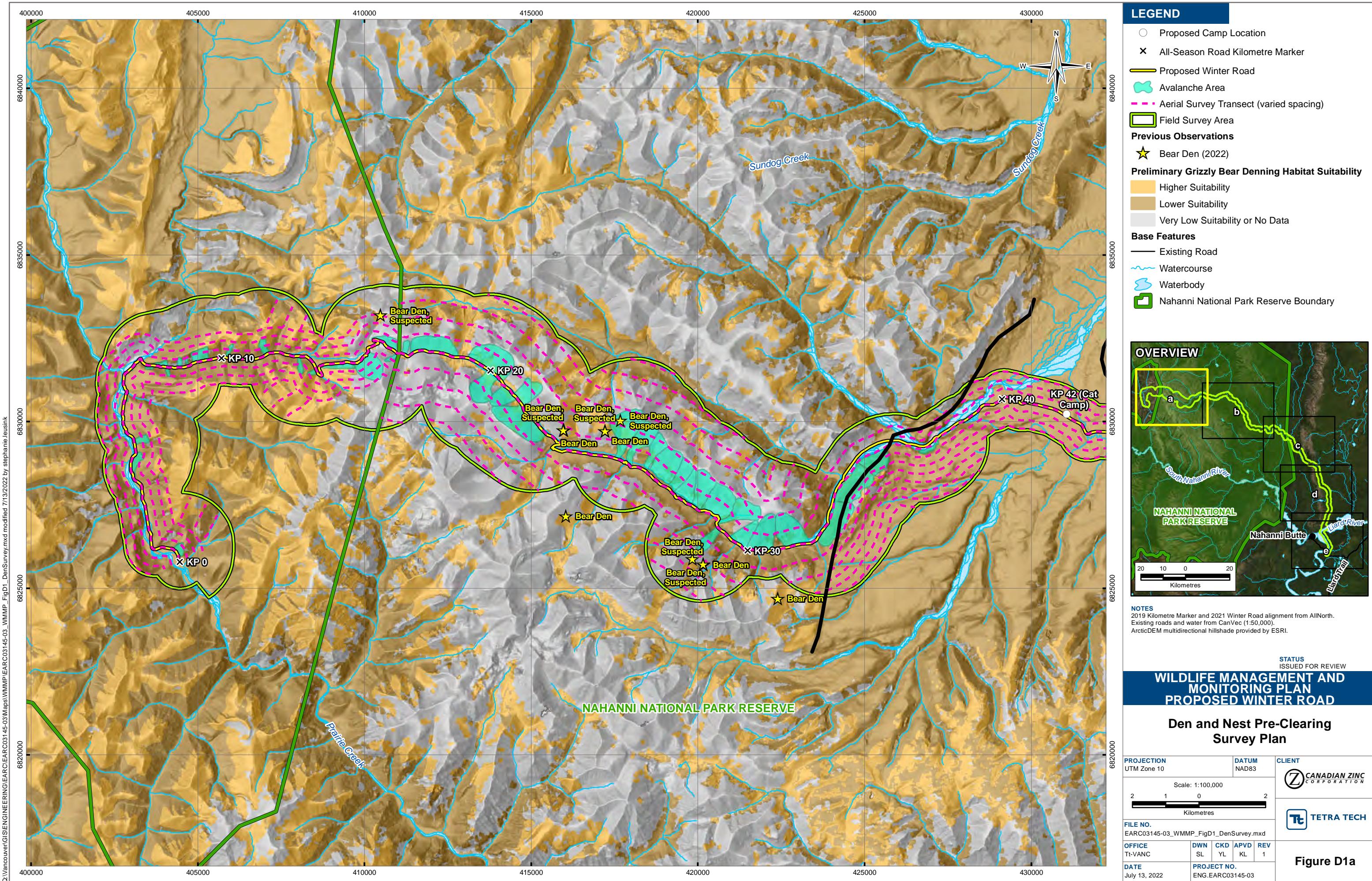
8.0 SUPPORTING DOCUMENTS ATTACHED

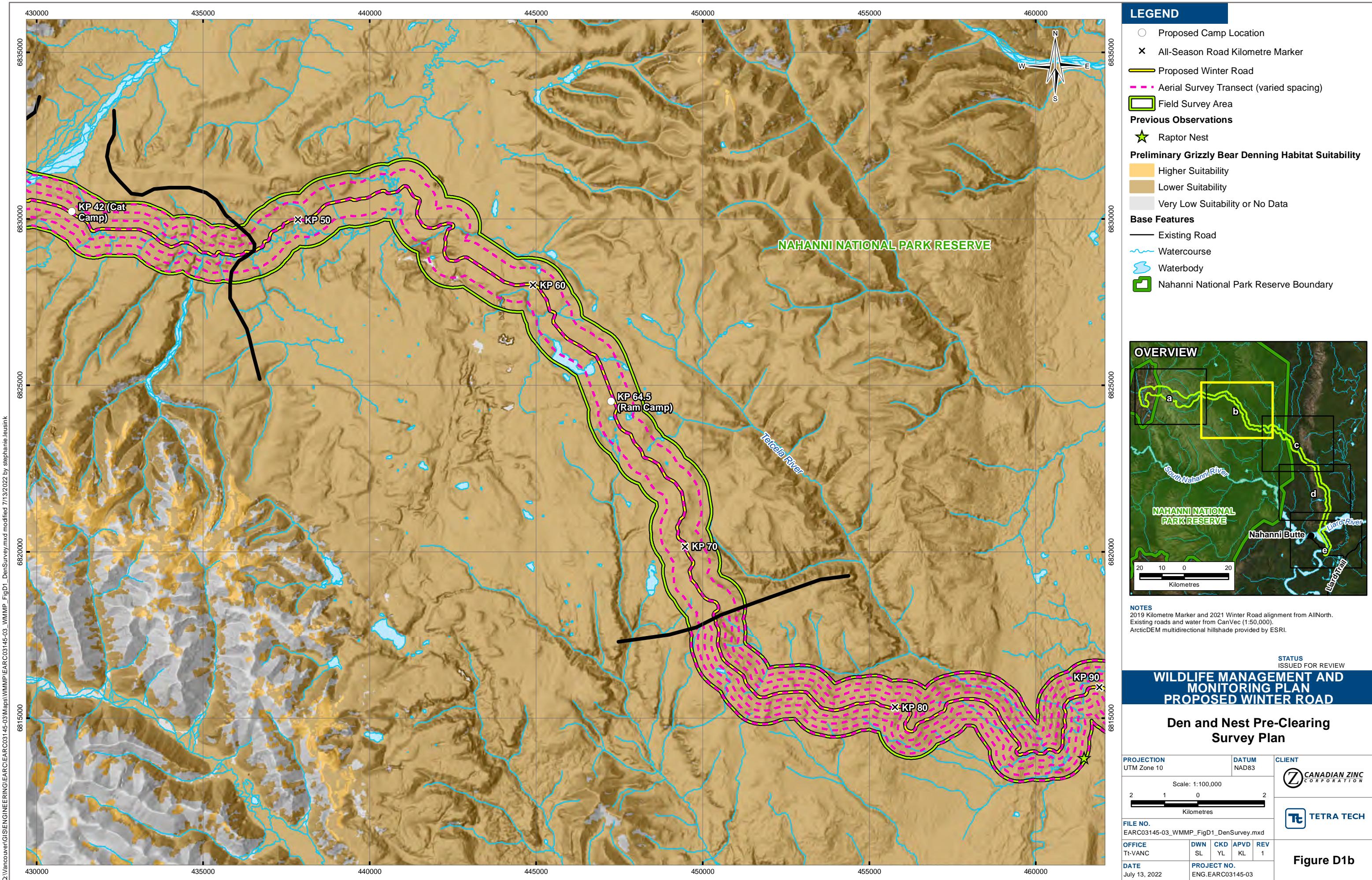
Figure D1: Den and Nest Pre-Clearing Survey Plan

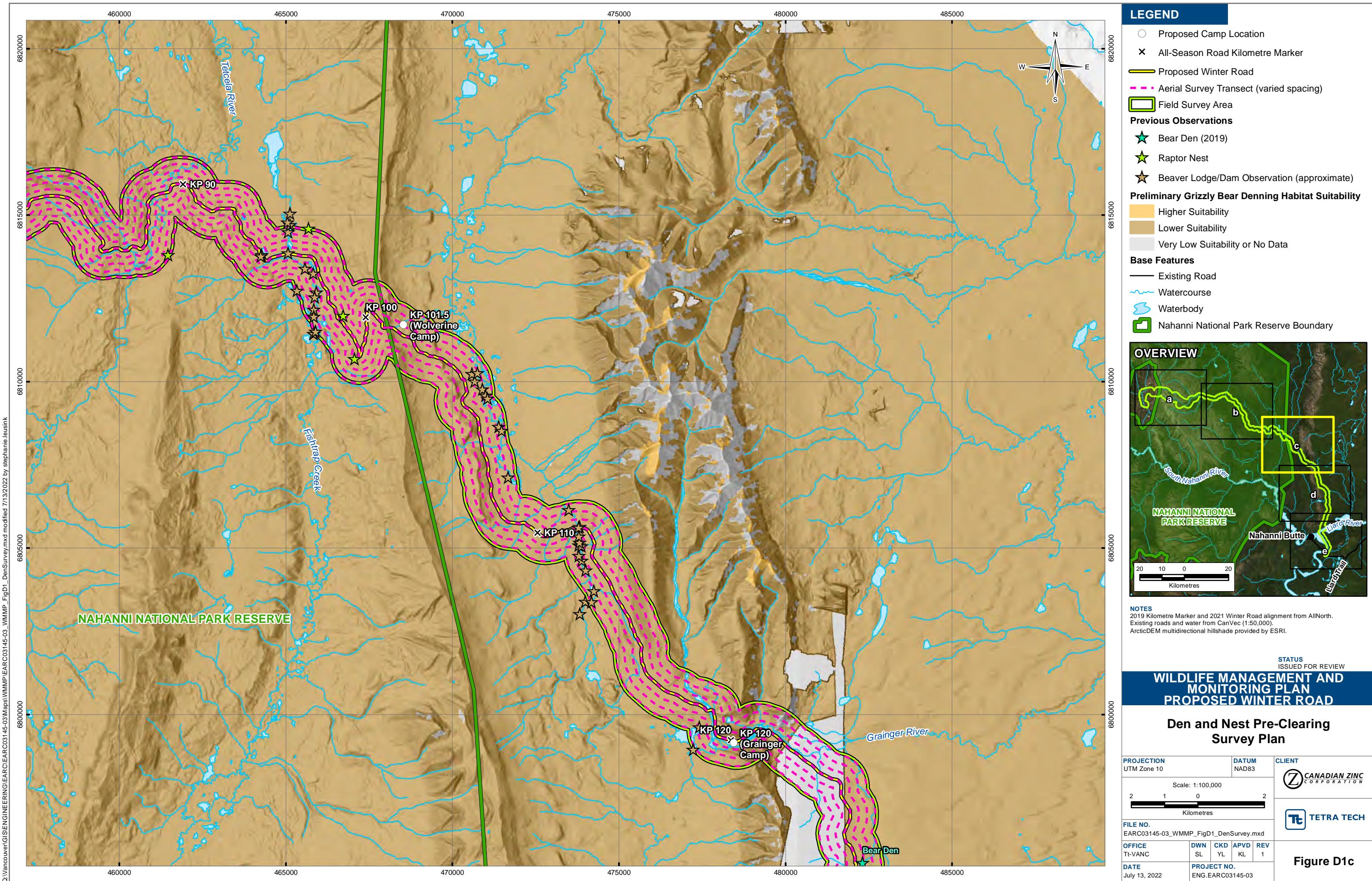
Clearing Scan Datasheet

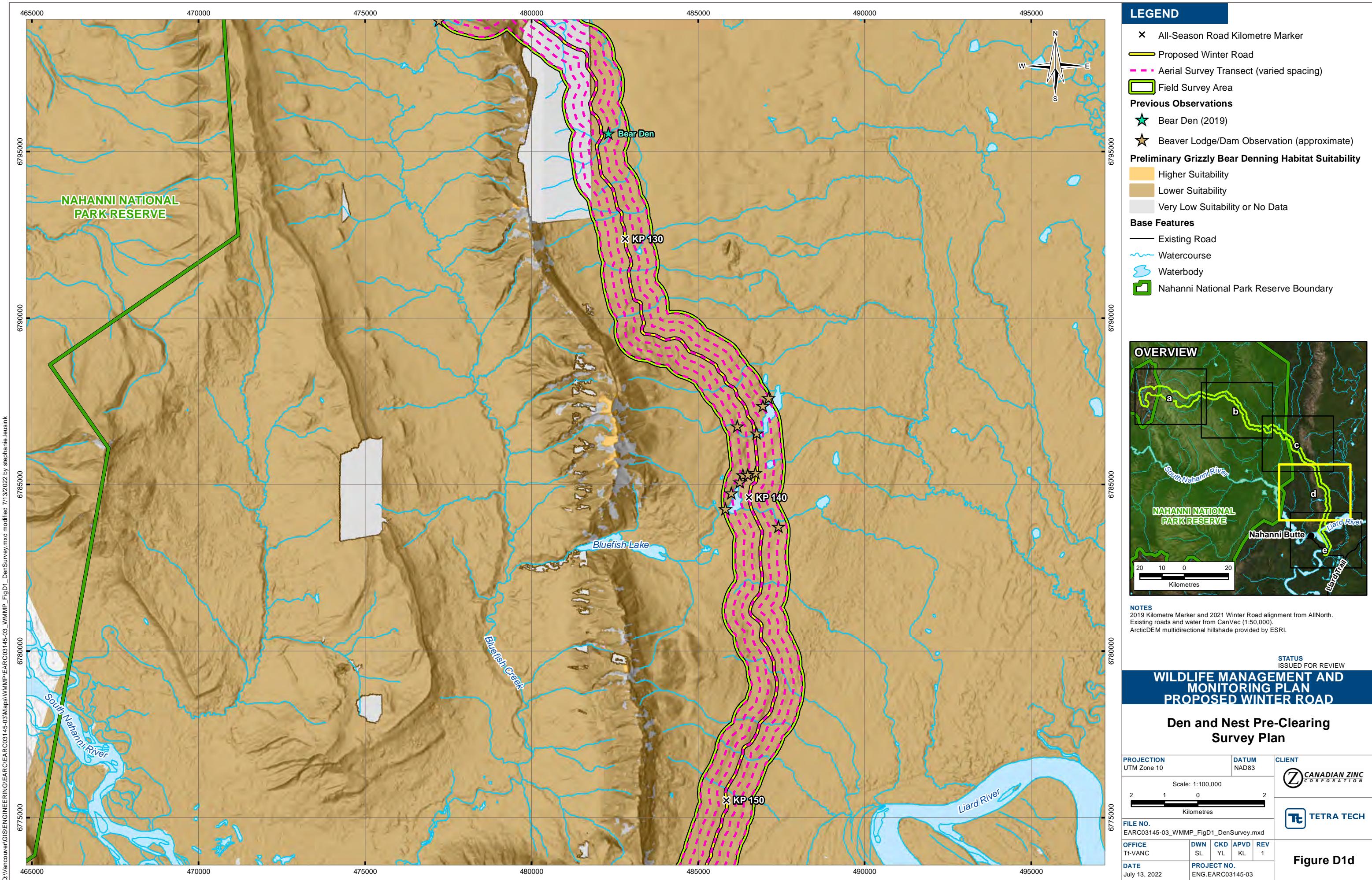
9.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

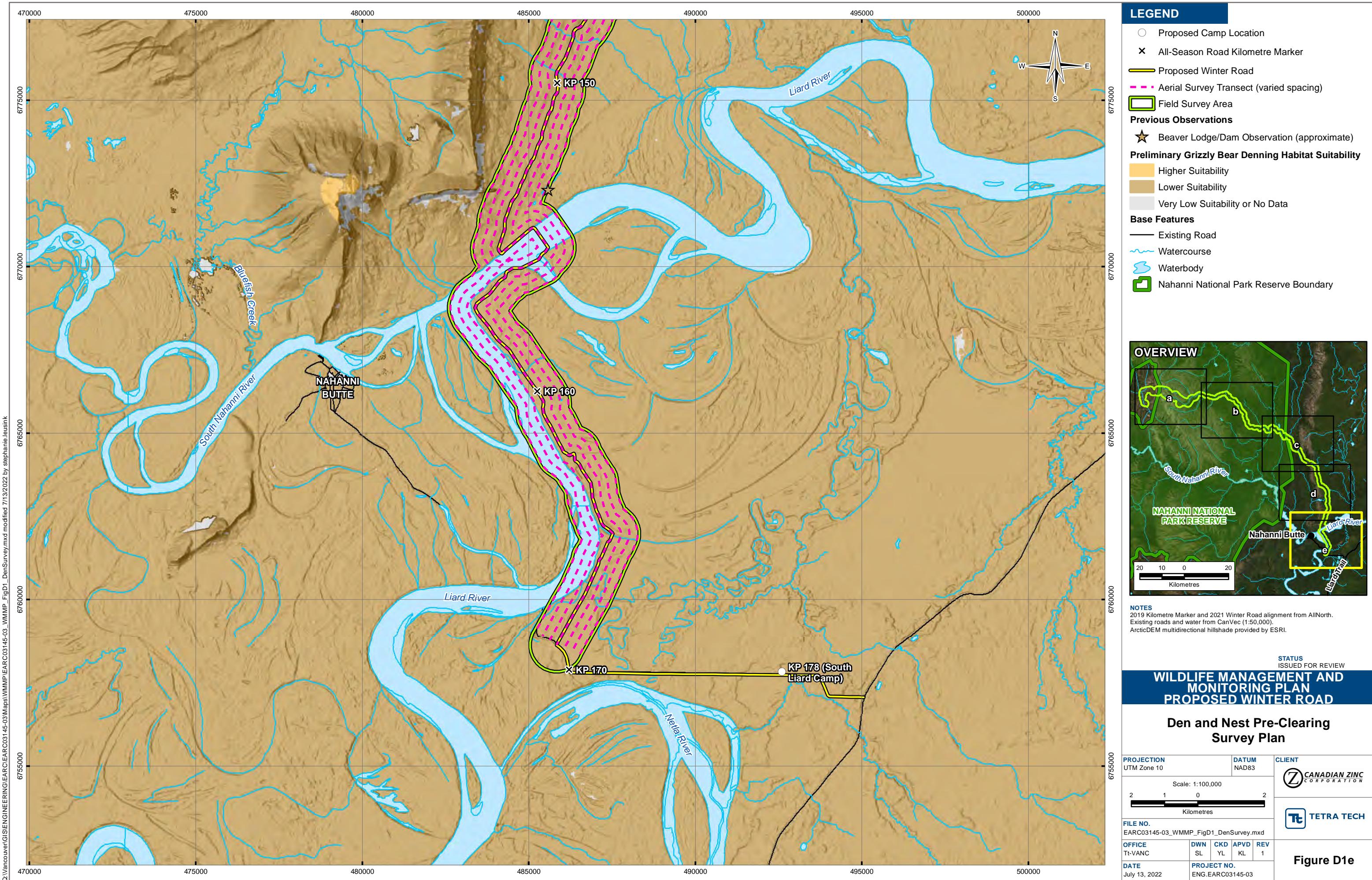
1. Design and Construction Plan
2. Traffic Control Mitigation and Road Operations and Maintenance Plan
3. Avalanche Hazard Management Plan
4. Explosives Management Plan











WMMP #2
Collared Pika Construction Procedure

COLLARED PIKA CONSTRUCTION

WMMP #2 COLLARED PIKA CONSTRUCTION PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 3 + attachments
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	Pre- and Post Construction			EXPIRY DATE:	

1.0 INTRODUCTION

The objectives of this procedure are to detect pika and determine if pika talus sites and meadow exist within the Winter Road (WR) footprint prior to, and after, construction, and if so, to inform adaptive management action to avoid habitat destruction and/or mortality of overwintering pika.

2.0 BACKGROUND

- Pikas are listed as Special Concern (Schedule 1; SARA);
- A talus site is defined as a distinct patch of talus (located at least 30 m from another patch of talus) that meets the criteria of pika habitat (as described during baseline studies) irrespective of whether pika or pika sign was detected. The location of talus sites is mapped in Figure D2;
- Pikas are least sensitive to disturbance in the winter from approximately early October to mid-April, which overlaps with the WR activities; and
- Pika mortality may occur if the WR disturbs talus sites occupied by overwintering pika.

3.0 RESPONSIBILITIES

The pika construction survey will be led by a professional biologist and supported by a Dene Monitor. The professional biologist is responsible for notifying CZN of any results that may require modification of the WR activities plan or implementation of adaptive management actions, and for notifying ENR and/or Parks Canada when adaptive management action is triggered.

4.0 SURVEY LOCATIONS

The construction survey will be completed at all talus sites that were identified during the baseline surveys and are within 25 m of the WR (Figure D2). Based on the current WR alignment, as shown on Figure D2, four talus sites are included in the construction survey: CZN-15-PK-1 and -2, CZN-16-PK-3, and CZN-32-PK-4.

5.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **Before and After Construction:** August is an appropriate time to complete the construction survey. At this time, individual pikas will be on territory (including juveniles) and will have begun haymaking for approximately one month. Pika haypiles are larger and more conspicuous as the fall progresses; thus, increasing the likelihood of detecting active haypiles;
- **Within 24 hours after the Survey:** notify CZN of any results that may require modification of the WR construction plan or implementation of adaptive management actions; and
- **One Week After the Survey:** notify ENR and/or Parks Canada if adaptive management action is triggered and begin consultation with regulators if the WR cannot be re-aligned to avoid direct loss to talus sites/meadow or the Project may have affected pika occupancy.

6.0 EQUIPMENT AND MATERIALS

- Helicopter and all-terrain vehicles (ATVs) to access talus sites
- Field tablet, orthophotography maps, and GPS with the WR footprint, talus sites, and known haypile locations (e.g., Figure D2)
- Radio
- Bear spray and air horn
- Digital camera
- Field datasheets
- Personal protective equipment (e.g., leather gloves) while walking across talus

7.0 METHODS

This procedure outlines the construction survey within 25 m of the WR and is applied before and after construction. It is not intended as a baseline survey.

The crew includes two surveyors (a professional biologist and a Dene Monitor); each person walking transects across the talus. Transects begin at the edge of pika habitat nearest to the road and spaced every 5 m.

All pika observations (i.e., haypiles, latrines, visual/vocal) will be recorded. Surveyors will also search for haypiles near where pika(s) were observed/heard off transect and will record these observations as incidental.

Ground-based surveys follow the methods below:

- Delineate the spatial boundaries of talus sites and meadow within the planned WR footprint using a GPS and orthophoto map (if not already done so in earlier baseline work or construction surveys);
- Complete the walking transects (4 m wide transects, i.e., 2 m on either side of a centreline) across talus sites that are within 25 m of the WR footprint to detect pika and pika sign (Figure D2). Transects are spaced approximately 5 m apart until the talus site within the survey area is completely surveyed or it becomes unsafe for the surveyors to continue;
- Slowly walk across the talus site while investigating under large overhanging rocks and openings within the rock matrix for signs of pika;

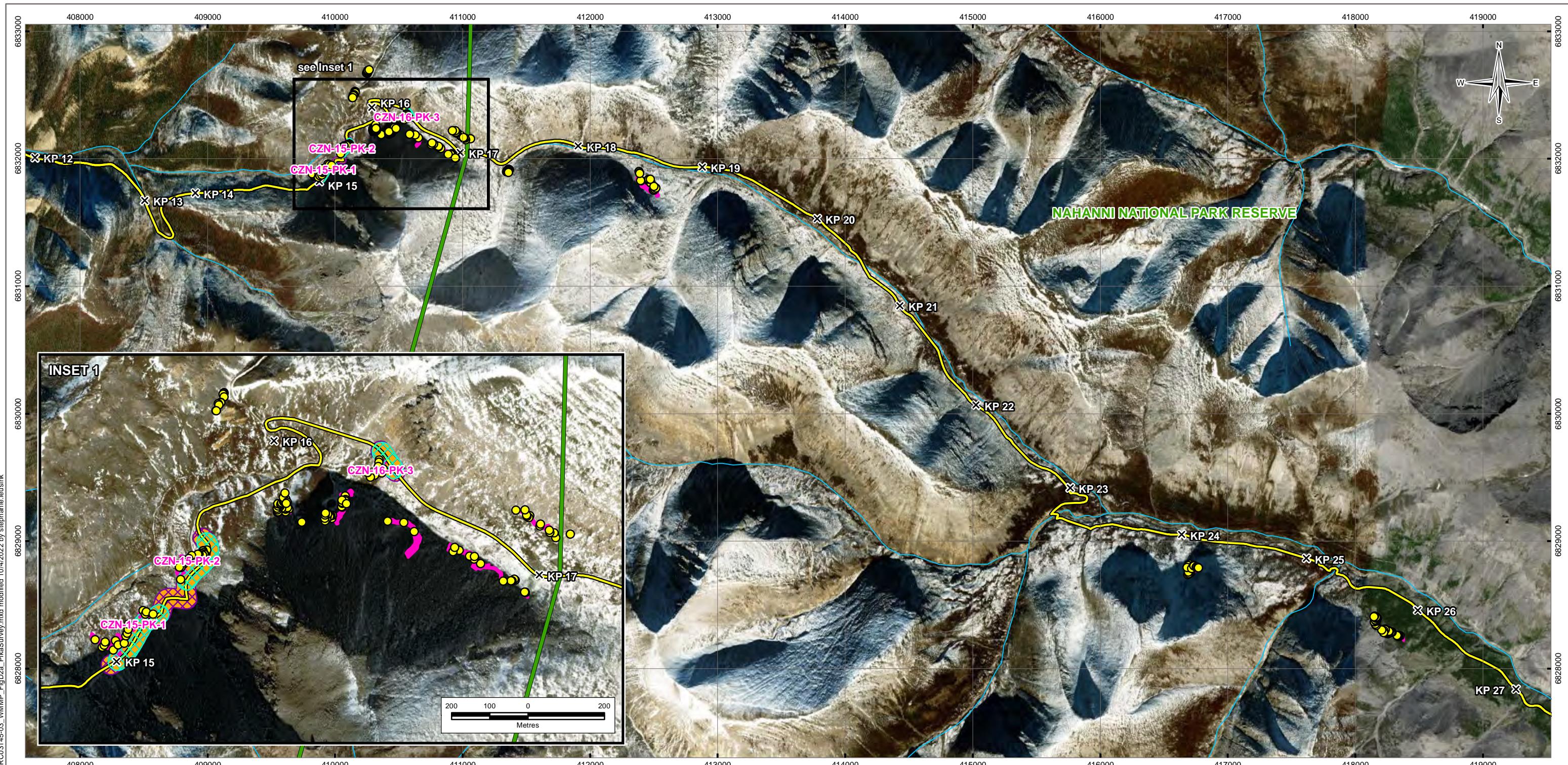
- Surveyors may deviate off transect to investigate nearby boulders and if a pika is seen or heard off transect;
- Stop roughly every 10 minutes, or at least once per talus site, to look and listen for pika;
- Search for signs that indicate pika currently occupy or have once occupied the site (e.g., haypiles, visual/vocal individual, and urine/pellets);
- Record and georeference all observed pika and pika sign, and build small rock cairns near each haypile (both active and inactive haypiles) for easier relocation of haypiles in subsequent years;
- Return to previously active and inactive haypiles identified in previous baseline and construction surveys to record their current activity status; and
- Talus sites are considered active when at least one individual pika (visual, auditory), fresh haypile, and/or fresh pellets are detected.

8.0 SUPPORTING DOCUMENTS ATTACHED

Figure D2: Collared Pika Construction Survey Plan

9.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

1. Design and Construction Plan
2. Traffic Control Mitigation and Road Operations and Maintenance Plan



Q:\Vancouver\GIS\ENGINEERING\EARC03145-03\Maps\WMMP_FigD2a_PikaSurvey.mxd modified 10/4/2022 by stephanie.lau@nrcan.gc.ca

LEGEND

- Pika Haypile
- Pika Talus Site
- Pre-Construction Survey
- Snow/Construction Debris Exclusion Zone (Pika Talus)
- Nahanni National Park Reserve Boundary

- All-Season Road Kilometre Marker
- Proposed Winter Road
- Watercourse

NOTES
Winter Road alignment provided by AllNorth (June 2021).
Base data source: Parks Canada; CanVec; GeoBase.



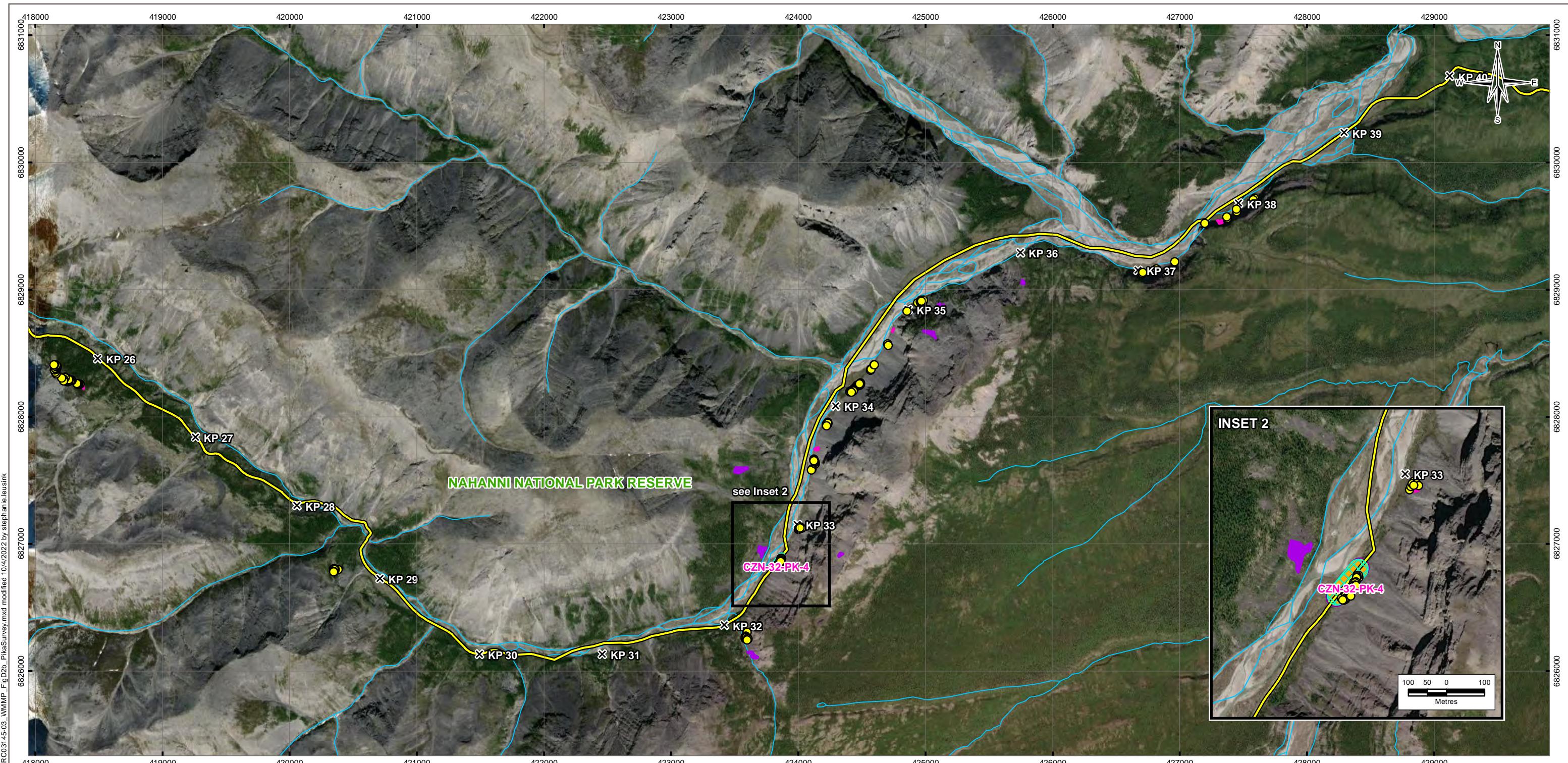
STATUS
ISSUED FOR REVIEW

WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Collared Pika Construction Survey Plan

PROJECTION	DATUM	CLIENT
UTM Zone 10	NAD83	
Scale: 1:30,000		
500	250	0
Metres		
FILE NO.		
EARC03145-03_WMMP_FigD2a_PikaSurvey.mxd		
OFFICE	DWN	CKD
Tt-VANC	SL	YL
	APVD	KL
	REV	0
DATE		PROJECT NO.
October 4, 2022		ENG.EARC03145-03

Figure D2a

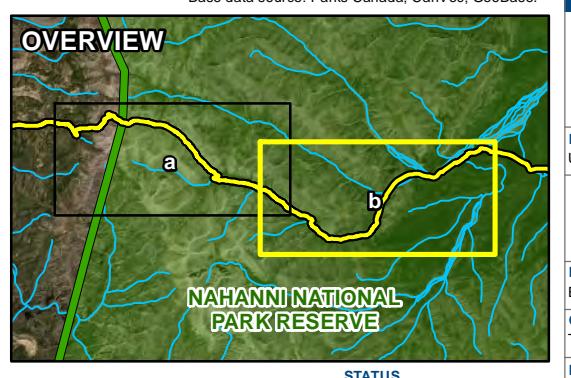


LEGEND

- Pika Haypile
- Pika Talus Site
- Possible Pika Talus Site (Aerial Reconnaissance)
- Pre-Construction Survey
- Snow/Construction Debris Exclusion Zone (Pika Talus)
- Nahanni National Park Reserve Boundary

- All-Season Road Kilometre Marker
- Proposed Winter Road
- Watercourse
- Waterbody

NOTES
Winter Road alignment provided by AllNorth (June 2021).
Base data source: Parks Canada; CanVec; GeoBase.



WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Collared Pika Construction Survey Plan

PROJECTION		DATUM		CLIENT	
UTM Zone 10	NAD83	500	250		
Scale: 1:30,000		Metres			
FILE NO. EARC03145-03_WMMMP_FigD2b_PikaSurvey.mxd					
OFFICE	DWN	CKD	APVD	REV	
Tt-VANC	SL	YL	KL	0	
DATE	PROJECT NO. ENG. EARC03145-03				
October 4, 2022					

Figure D2b

WMMP #3

Blast Procedure

WMMP #3 BLAST PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 4 + attachments
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	Blasting			EXPIRY DATE:	

1.0 INTRODUCTION

Blasting is not required for the construction of the Winter Road (WR) but may be required for avalanche control from approximately KP 0 to 35. The objective of this procedure is to identify how to detect wildlife within the restricted setback distance to blast sites, prior to and after avalanche control blasting, to inform adaptive management action for big game and Species at Risk (e.g., wolf, coyote, wolverine, Dall's sheep, moose, caribou, and grizzly and black bears). Additional procedures to detect wildlife prior to, during, and after road construction blasts (if required) are also provided herein.

2.0 BACKGROUND

- Blasting is disturbing and could adversely affect big game and Species at Risk if persistent.
- Blasting is prohibited when big game/Species at Risk are within 1 km of the blast site.
- Blasting should not occur within 1.5 km of known (occupied, unoccupied) or suspected bear dens.
- Blasting for avalanche control only occurs during periods of high avalanche hazard and when the area closures are secure. For the safety of a Dene Monitor and QEP, a ground-based blast monitoring procedure will not be performed for avalanche control. Refer to the safety precautions identified in the Avalanche Control Management Plan.
- The Blaster of Record¹ will lead a helicopter reconnaissance immediately prior to avalanche control to confirm that no wildlife are within the avalanche path and within 1 km of the avalanche control area.
- A 2 km blasting setback of the poljes (Appendix A Map Book) is in place from September 15 to June 1 to protect possible bat hibernacula (B.C. Ministry of the Environment 2016²; Appendix A Mapbook).
- If spot blasting is required for road construction, a Dene Monitor will perform ground-based surveys following the methods outlined herein should they be necessary.

3.0 RESPONSIBILITIES

The Blaster of Record is responsible for consulting with the Qualified Environmental Professional (QEP), prior to any avalanche control blasts, to determine if any bear dens are known or suspected within 1.5 km of the planned blast site, leading the helicopter reconnaissance, notifying the QEP of wildlife sighted, and follow adaptive management provided by the QEP and regulators.

¹ The Blaster of Record is responsible for avalanche control.

² B.C. Ministry of the Environment. 2016. Best Management Practices Guidelines for Bats in British Columbia, Chapter 2: Mine Development and Inactive Mine Habitats. B.C. Ministry of Environment, Victoria, BC. 60 pp.

The QEP consults with ENR and/or Parks Canada when bear dens are known within the setback, follows instructions provided by the regulators, relays instructions to the Blaster of Record/Dene Monitor, and reports Wildlife Incident Reports.

A Dene Monitor is responsible for carrying out the ground-based reconnaissance if blasting is required for road construction, notifying the Blast Supervisor³ to temporarily stop blasting until wildlife leave the area, deterring wildlife (as required and as authorized by Parks Canada), and supporting the QEP when preparing the Wildlife Incident Report.

4.0 SURVEY LOCATIONS

- Within a 1 km setback distance when no bear dens are known (occupied or unoccupied) or suspected within the restricted setback to blasts.
- Within a 1.5 km setback distance when bear den(s) are known (occupied or unoccupied) or suspected within the restricted setback to blasts.

5.0 SCHEDULE

The following survey and reporting schedules will be applied:

Aerial Reconnaissance

- **Immediately Prior to and Within a Half Hour After Blasts:** Conduct the blast reconnaissance before avalanche control and within a half hour after blasting stops.
- **Within 24 Hours:** after the blast monitoring, the QEP prepares a Wildlife Incident Report for ENR and/or Parks Canada, if required.

Ground-based Reconnaissance (applies only to road construction blasts)

- **Immediately Prior to, During, and a Half Hour After Blasts:** Conduct the blast reconnaissance beginning a minimum of 1 hour before blasting and continue until a half hour after blasting stops.
- **Immediately:** A Dene Monitor to notify the Blast Supervisor via radio when wildlife are detected within the 1 km setback and to temporarily stop blasting.
- **Within 24 Hours:** after the blast monitoring the QEP prepares a Wildlife Incident Report for ENR and/or Parks Canada, as required.

6.0 EQUIPMENT AND MATERIALS

- Helicopter (aerial reconnaissance only)
- Binoculars and/or spotting scope (ground-based reconnaissance only)
- Blast site locations
- GPS
- Radio and digital camera
- Blast form
- Viewshed map (ground-based reconnaissance only)
- Vehicle, snowmobile, and or snowshoes (ground-based reconnaissance only)

³ The Blast Supervisor is responsible for spot blasting on the WR alignment.

7.0 METHODS

Weather conditions such as fog, low clouds, or precipitation may impede visibility during the blast reconnaissance, such that the full search radius cannot be fully surveyed. Blasting and the blast reconnaissance will be suspended when visibility within the blast survey radius is impeded.

Aerial Reconnaissance

Road closures and safety hazards prohibit the use of ground-based reconnaissance surveys before and after avalanche control blasts. An aerial reconnaissance shall be led by the Blaster of Record when blasting for the purposes of avalanche control.

- Prior to the helicopter reconnaissance, the Blaster of Record confirms with the QEP that no bear dens are known (occupied or unoccupied) or suspected within 1.5 km of the planned blast.
- **No Dens Known:** If there are no known dens, the Blaster of Record/Dene Monitor complete the aerial reconnaissance to check for wildlife, fresh wildlife tracks/trails, and dens within a 1 km setback.
- **Dens Known:** If there are known or suspected dens (occupied or unoccupied), the QEP consults with ENR and or Parks Canada. Following the instructions of the regulators and QEP, the Blaster of Record completes the aerial reconnaissance to check for wildlife and fresh tracks/trails, as well as the known den(s), within the 1.5 km setback distance.
- Use a GPS to establish the setback from the blast site.
- Fly following the terrain contours (no pre-determined transects) and spaced approximately 250 m apart. Deviate off the transect to investigate fresh wildlife sign, areas of known dens including areas of predicted grizzly denning habitat (Figure D3), treed areas, and fresh and well-established wildlife tracks/trails that may suggest a mineral lick. Perform the reconnaissance at a height approximately 100 m agl and at a maximum speed of 80 km/hr.
- Record all big game/Species at Risk sighted on the Blast form, including fresh tracks and possible mineral licks.
- If target species are sighted within the setback distances before blasting, the following procedures apply:

Any Portion Inside NNPR	Any Portion on Territorial Land
1. Prohibit blasting when a target species is sighted inside the setback until the animal moves out of the area on its own accord or Parks Canada authorizes the use of active deterrent.	1. Prohibit blasting when a target species is sighted inside the setback until the animal moves out of the area on its own accord or the QEP/Dene Monitor authorizes the use of active deterrent.
2. Record the wildlife sighting on the Blast form including any reason(s) for the animal to be in the area (e.g., eating, resting, denning, possible mineral lick).	
3. Monitor the wildlife for a period of 30 minutes. When monitoring, the helicopter shall shut down at a distance away from the wildlife so as to not disturb (i.e., a minimum of 200 m away) and beyond the potential avalanche pathway. If possible, shut down within view of the wildlife to allow monitoring or alternatively, return to the area in 30 minutes to check on the wildlife.	
4. Call the QEP/Dene Monitor if an animal is within the setback. Describe the sighting, including any reason(s) for the animal to be in the area.	
5. After the 30 minute period, allow wildlife that are moving out of the area to continue. Continue observations until they have left the setback.	

Any Portion Inside NNPR	Any Portion on Territorial Land
6. Notify the QEP/Dene Monitor when the wildlife remains in the setback area after 30 minutes and are not believed to be leaving the area.	
7. The QEP calls Parks Canada's 24 hr/7 days a week line for authorization and instruction to deter. Consideration will be given to possible reason the wildlife may be remaining in the area. The QEP relays the instruction(s) and authorization to the Blaster of Record.	7. Receive instruction from the QEP/Dene Monitor to deter, with consideration for why the wildlife may be remaining in the area (i.e., suspected mineral lick; refer to SOP #1 <i>Reporting, Responding to, and Deterring Wildlife</i>).
8. Only with approval from Parks Canada, encourage the wildlife to leave the setback by the least invasive deterrent action necessary and as instructed by Parks Canada.	8. Encourage the wildlife to leave the setback by the least invasive deterrent action necessary (refer to SOP #1 <i>Reporting, Responding to, and Deterring Wildlife</i>).
9. Record the deterrent action taken on the Blast form and notify the QEP to prepare a Wildlife Incident Report. If deterrent action is ineffective at encouraging the animal to move away from the setback, blasting shall be postponed until the animal leaves on its own accord.	

- Proceed with blasting when no big game/Species at Risk are within the setback.
- Within a half hour after the blasts, the Blaster of Record undertake a second helicopter reconnaissance within the applicable setback distance to check for wildlife and/or dens. Completes the followup reconnaissance per the procedures performed earlier (100 m agl, maximum 80 km/hr., and along contours spaced 250 m apart, to extent possible). Repeat the search near known bear dens and in habitat predicted suitable for denning.
- Record and notify the QEP when wildlife sighted after the blast(s), and if required, the QEP prepares an Incident Report and begins other adaptive management.
- Record all wildlife observations, including suspected mineral licks in the Wildlife Observation Log.

Ground-based Reconnaissance

Ground-based reconnaissance will be completed by a Dene Monitor if spot blasting is required for road construction. This procedure shall be performed before the blast, during blasting, and after the blasting stops. A Dene Monitor will perform the ground-based blast reconnaissance by scanning slopes using binoculars/spotting scope from multiple observation stations and travel routes on and near the road or from suitably accessible areas. Scans will cover slopes within a 1 km radius of the blast site but not including over mountain ridgelines.

The reconnaissance requires that a Dene Monitor scan from multiple observation stations and travel routes based on the terrain and visibility of the slopes. Plan for the reconnaissance to take a minimum of 1 to 2 hours before the blasting begins for the day, and after blasting ends, as scanning is required for 10 minutes at each station/search area; scanning must be performed at all stations/search areas at least once before blasting can begin. A viewshed analysis shall be used to assist the Dene Monitor when determining appropriate observation stations. An example viewshed analysis is shown on Figure D3b. Additional viewshed analyses will be prepared specific to each blast site, before blasting begins, should road construction require blasting.

The Dene Monitor maintains radio communication with the Blast Supervisor before and during blasting to immediately stop blasting if wildlife are sighted.

Ground-based blast reconnaissance will be undertaken by the Dene Monitor before, during, and after the blast following the procedure below:

- Prior to the reconnaissance survey, confirm with the QEP that no bear dens are known (occupied or unoccupied) or suspected within 1.5 km of the planned blast. The Dene Monitor also inputs the planned blast location, provided by the CM, into the GPS.
- **No Dens Known:** If there are no known dens (occupied or unoccupied) or suspected, a Dene Monitor completes the ground-based reconnaissance to check for wildlife and fresh wildlife tracks/trails within the 1 km setback.
- **Dens Known:** If there are known or suspected dens (occupied or unoccupied), the QEP consults with ENR and or Parks Canada, and the blast reconnaissance must be completed following the procedures outlined for an aerial survey within a 1.5 km setback distance (ground-based reconnaissance prohibited).
- Check for wildlife and dens by slowly driving/snowmobiling/snowshoeing to scan for wildlife and fresh wildlife tracks/trails in transit as well as stop and perform the reconnaissance at multiple observation stations and search areas identified by the viewshed analysis.
- Visually follow fresh wildlife tracks/trails with binoculars/spotting scope to find the animal or follow on-foot (snowshoe) as far as it is safe (or to a maximum of the setback). Look for fresh and well-established wildlife tracks/trails that might suggest a mineral lick within the setback.
- If multiple observation stations/search areas are needed, per the viewshed analysis, a Dene Monitor will rotate between stations/search areas; scanning a minimum of 10 minutes at each before moving to the next.
- Record all big game/Species at Risk sighted on the Blast form, including fresh tracks and possible mineral licks.
- Proceed with blasting when no big game/Species at Risk are within the 1 km setback.
- If target species are sighted within the setback before and during blasting, the following procedures apply:

Any Portion Inside NNPR	Any Portion on Territorial Land
<ol style="list-style-type: none">1. Prohibit blasting when a target species is sighted inside the setback until the animal moves out of the area on its own accord or Parks Canada authorizes the use of active deterrent.2. Notify the Blast Supervisor at once to temporarily delay blasting until the animal has moved out of the setback.3. Record the wildlife sighting on the Blast form including any reason(s) for the animal to be in the area (e.g., eating, resting, denning, possible mineral lick).4. Monitor the wildlife for a period of 30 minutes or until it moves out of the setback.5. Notify the QEP when the wildlife remains in the setback after 30 minutes and are not believed to be moving.6. After the 30 minute period, allow wildlife that are moving out of the area to continue.7. Update the QEP and Blast Supervisor when the wildlife remain in the setback area after 30 minutes and are not believed to be moving.	<ol style="list-style-type: none">1. Prohibit blasting when a target species is sighted inside the setback until the animal moves out of the area on its own accord or the QEP/Dene Monitor authorizes the use of active deterrent.

Any Portion Inside NNPR	Any Portion on Territorial Land
8. The QEP calls Parks Canada's 24 hr/7 days a week line for authorization and instruction to use deterrent. Consideration will be given to possible reason the wildlife may be remaining in the area. The QEP relays the instruction(s) and authorization to the Dene Monitor.	8. Receive instruction from the QEP to use deterrent, with consideration for why the wildlife may be remaining in the area (i.e., suspected mineral lick; refer to SOP #1 <i>Reporting, Responding to, and Deterring Wildlife</i>).
9. Only with approval from Parks Canada, encourage the wildlife that are not believed to be moving to leave the setback by using deterrent action instructed by Parks Canada.	9. Encourage the wildlife that are not believed to be moving to leave the setback by the least invasive deterrent action necessary (refer to SOP #1).
10. Record the deterrent action taken on the Blast form and notifies the QEP to prepare a Wildlife Incident Report. If deterrent action is ineffective at encouraging the animal to move away from the setback, blasting shall be postponed until the animal leaves on its own accord.	

- Notify the Blast Supervisor to proceed with blasting when no big game/Species at Risk are sighted within the setback.
- Blasting will begin by a horn signal. Record the time each blast was detonated.
- Repeat the reconnaissance for a minimum of 10 minutes at each observation station while blasting.
- Repeat the reconnaissance again for 10 minutes at each observation station or 1 hour in total, whichever is greater, after blasting stops for the day.
- If a big game/Species at Risk is observed within the setback during blasting or within 30 minutes after blasting stopped, a Dene Monitor first immediately notifies the Blast Supervisor to stop blasting, if applicable.
- Record the wildlife sighting on the Blast form including the time the wildlife was first sighted, time since the last blast, and any reason(s) for the animal to be in the area (e.g., eating, resting, denning, possible mineral lick).
- If no den is suspected, proceed with deterrent action, as necessary to encourage the wildlife to move away from the 1 km setback.
- If a den is suspected, notify the QEP. The QEP reports the incident within 24 hours to ENR and or Parks Canada. Blasting shall be postponed until the QEP prepares an Incident Report and begins adaptive management response(s).
- Record all wildlife observations, including suspected mineral licks in the Wildlife Observation Log.

8.0 SUPPORTING DOCUMENTS ATTACHED

Blast Form

Wildlife Incident Report Form

Figure D3a: Pre-Blast Survey Plan

Figure D3b: Viewshed Analysis Example KP 25.2

9.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

SOP #1 *Reporting, Responding to, and Deterring Wildlife*

Traffic Control Mitigation and Road Operations and Maintenance Plan

Explosives Management Plan

Avalanche Hazard Management Plan

Blast Location:

Page _____ of _____

Fill out a new form for each blast location and day.

Location of Incident (e.g., GPS, KP, worksite name):

Date of Incident:	Time of Incident:	Incident Report No.:
Name(s) of Individual(s) Involved: Contact Number(s):		

Nature of Wildlife Incident:

Wildlife Mortality/Injury from Project; Euthanized? Yes; No

Wildlife Attack

Aggressive/Threatening Wildlife Behaviour

Deterrent Used

Property Damaged

Large Carnivore in Camp

Wildlife Has, or Potentially Has, Accessed an Attractant

Wildlife Detected While Blasting or a Half Hour After

Wildlife Residence Damaged

Wildlife Residence Found While Clearing, but not Damaged

Other: _____

Species: _____

of Animals Involved: _____

Cubs/Young Present? Yes; NoEvidence of Disease, Injury, or Malnourished? Yes; No. Explain: _____

Wildlife Behaviour: Predatory; Defensive; Curious/Approached; Foraging; Resting;
 Running/Traveling; Fled the Scene; Other: _____

Details of Incident (e.g., age and sex of wildlife, distinguishing features of the animal (colour, markings), the animal's direction of travel, aggressive behaviour, weather conditions, unsecured attractants, estimate how long the animal was dead, any other animals seen in the area, description of property damage, photographs):

Reason(s) for Deterrent Use (if applicable):

On Road at KP: _____

On or near Camp: _____

Endangering Human Safety

On or near Active Worksite (e.g., blast) at KP: _____

Destroying Property

Gained Access to a Food Reward

Involved in Previous Incident(s)

Other (Specify): _____

Deterrent(s) Used

Air Horn / Whistle

Bangers

Herding with: _____

Screamers

Bear Spray

Other: _____

Deterrent Success

(provide more info on back)

Yes No

Yes No

Yes No

Yes No

Yes No

Yes No

Damage by Wildlife*

Human Injury

Human Mortality

Equipment/Supplies: _____
Damage \$ _____

Other: _____

*Describe the damage in the Details of Incident section

Report to a regulator anytime an animal is injured/harmed from the project, damaged property, deterred, obtained food reward, involved in a human-wildlife conflict (large carnivore in camp, within setback during/after the blast) when nest/den accidentally destroyed (or near miss). Report to a regulator within 24 hours.

ENR 24-hour Emergency Line: 1-867-695-7433 (Fort Simpson). Parks Canada 1-867-695-6483.

ENR

Date & Time Spoke to ENR: _____

Report Completed by: _____

ENR Contact: _____

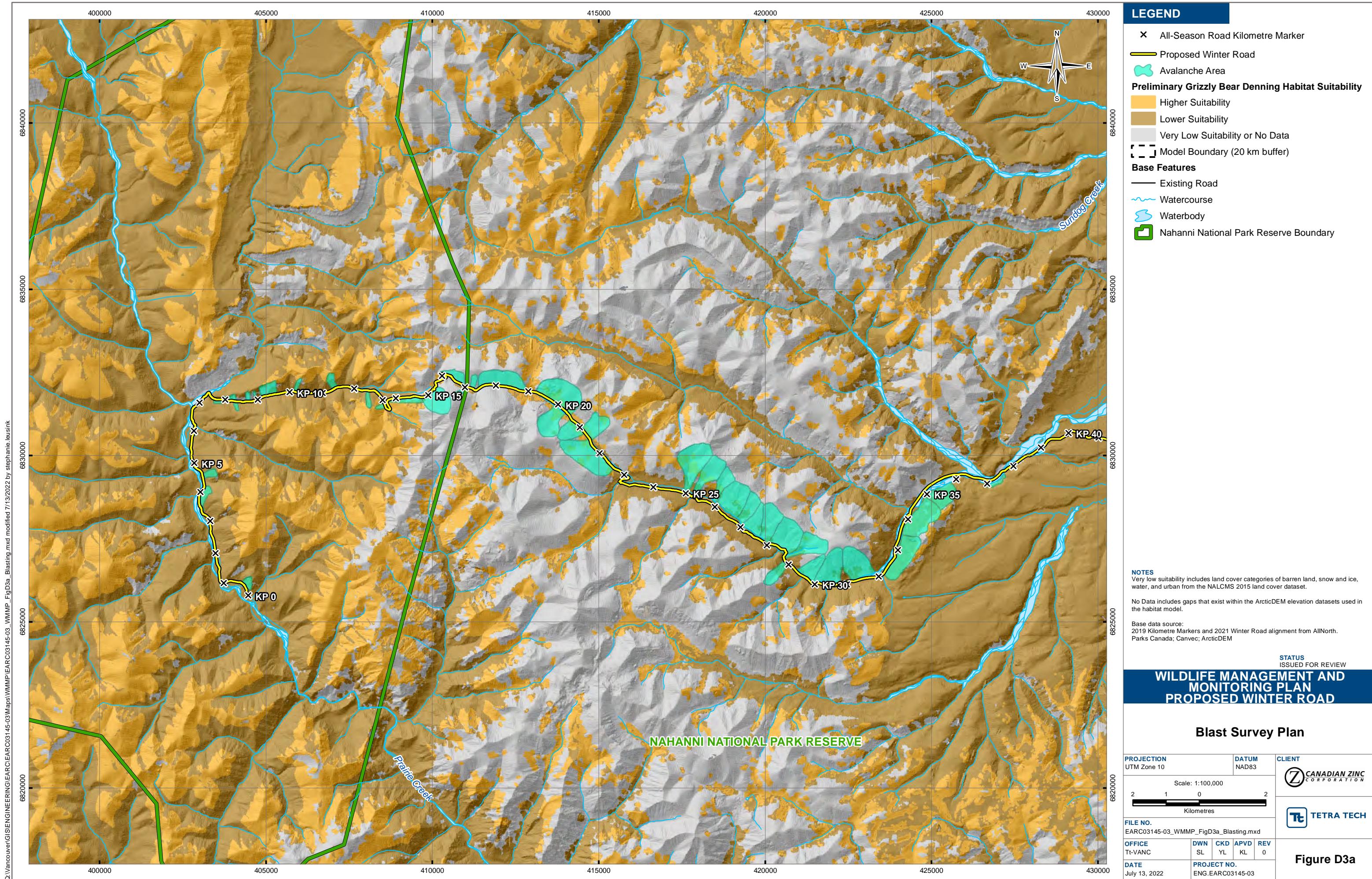
Report Submitted to: ENR on Date: _____ Parks on Date: _____**Parks Canada**

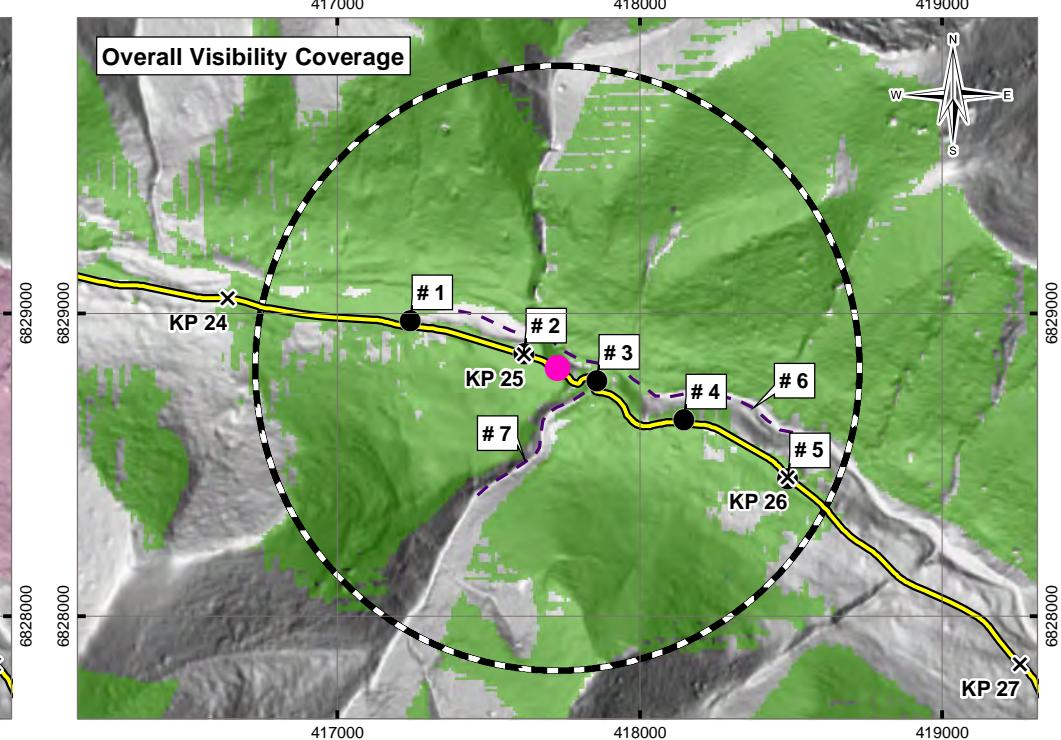
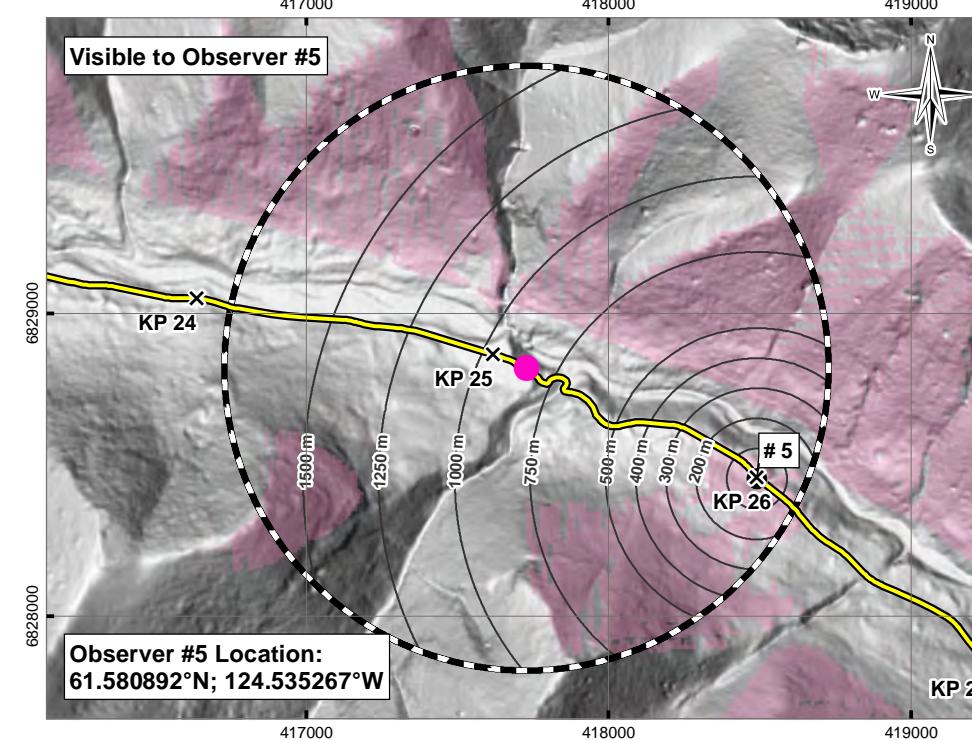
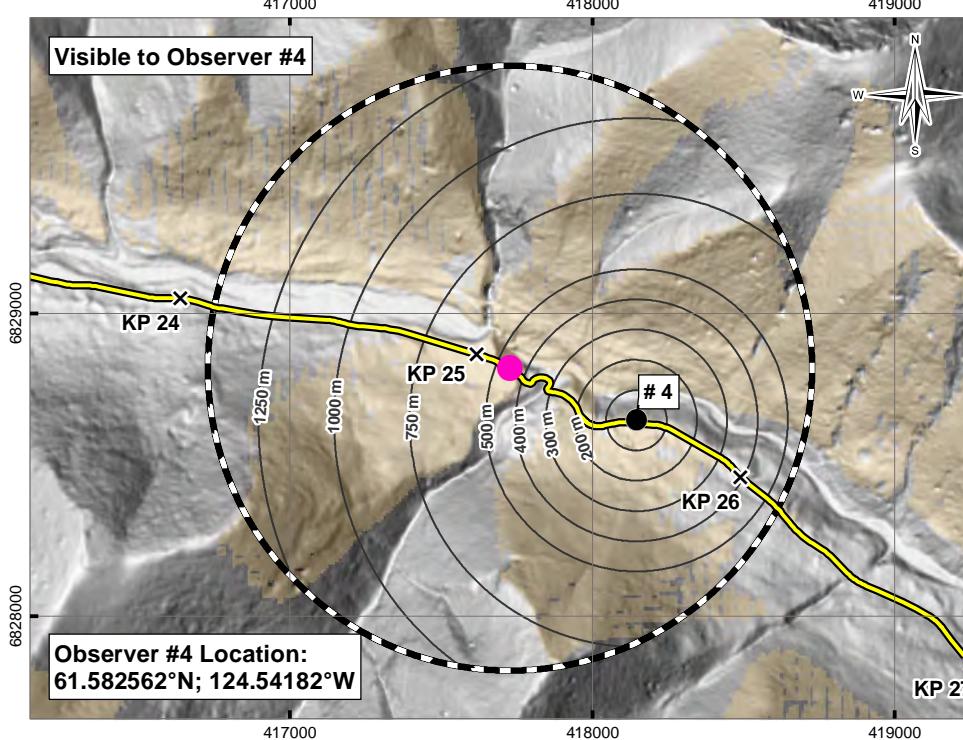
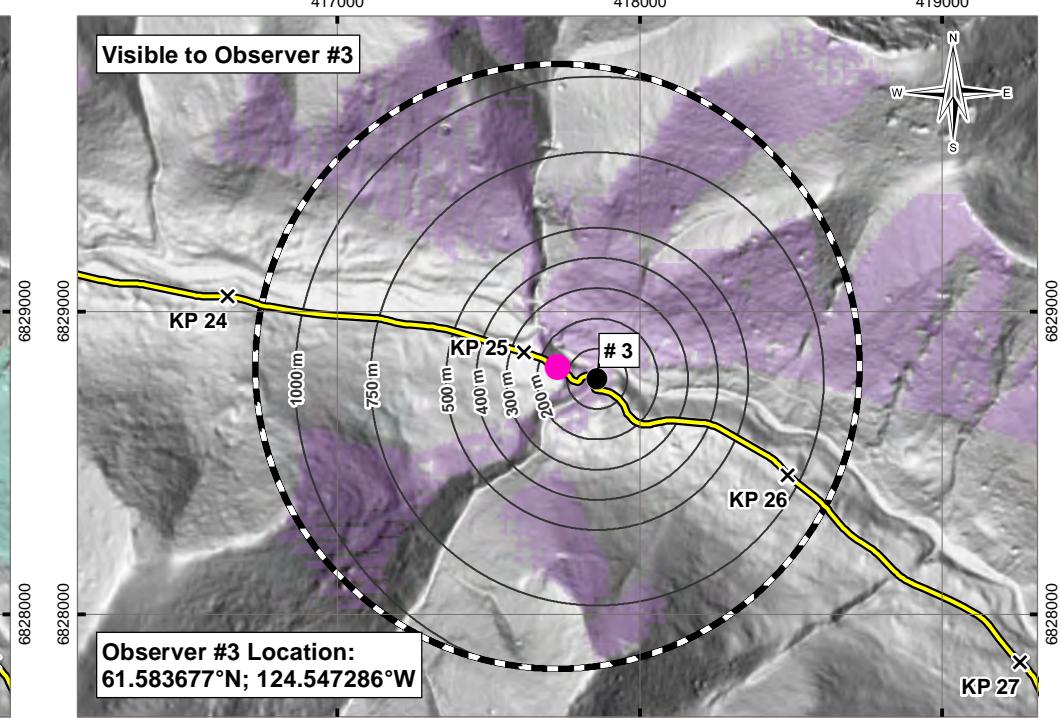
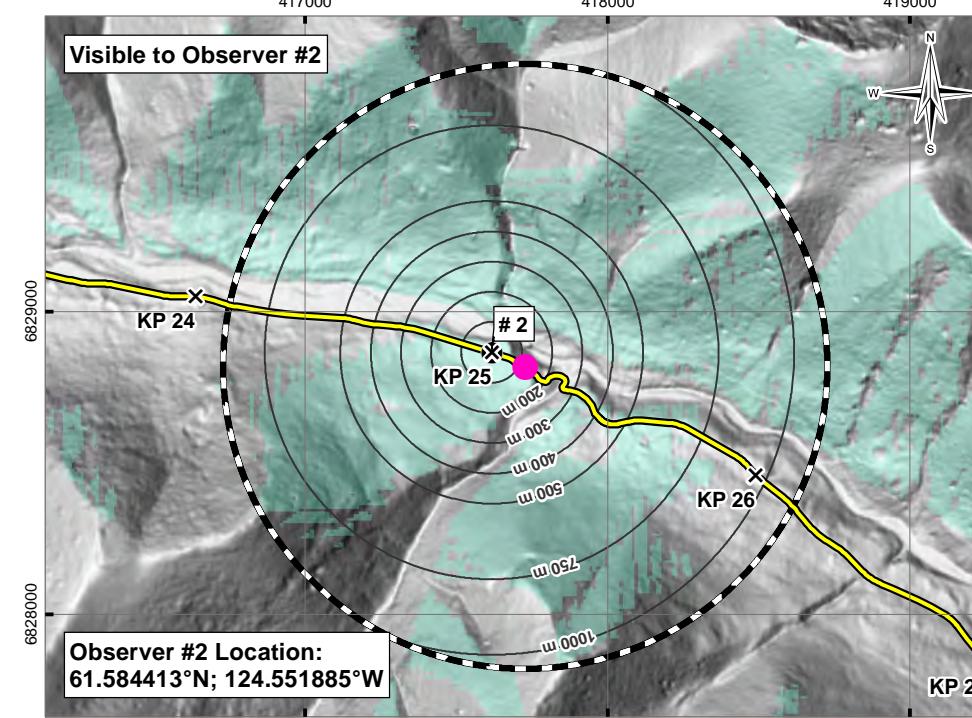
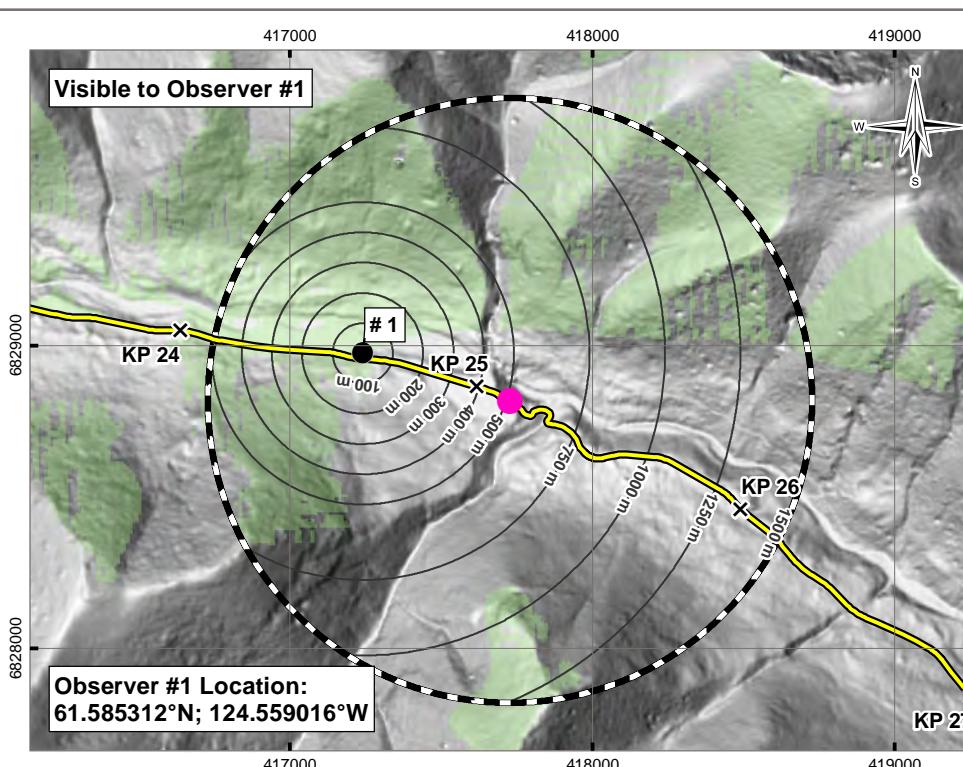
Date & Time Spoke to Parks Canada: _____

Report Submitted by: _____

Parks Canada Contact: _____

Direction Provided by ENR/Parks Canada: (type of deterrent, carcass disposal, removal of attractant, reporting, etc.)





LEGEND

- Spot Blasting Location (KP 25.2)
- Observer Station
- Blasting Zone Buffer (1 km)
- Additional Search Area
- ✖ All-Season Road Kilometre Marker
- Visible to Observer #1
- Visible to Observer #2
- Visible to Observer #3
- Visible to Observer #4
- Visible to Observer #5
- Proposed Winter Road
- Overall Visibility Coverage

NOTES

Base data source:
2019 Kilometre Marker and June 2021 Winter Road
alignments from AllNorth.
Existing roads and water from CanVec (1:50,000).
ArcticDEM multidirectional hillshade provided by ESRI.

WILDLIFE MANAGEMENT AND MONITORING PLAN PROPOSED WINTER ROAD

Viewshed Analysis Example KP 25.2

5-03_WMMP_FigD3b_Viewshed.mxd

	DWN SL	CKD BB	APVD KL	REV 0
PROJECT NO. FNG FARCO3145-03				

STATUS
ISSUED FOR REVIEW

Figure D3b

WMMP #4
Wildlife Hazard Procedure

WILDLIFE HAZARD

WMMP #4 WILDLIFE HAZARD PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 4 + attachments
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	All WR Activities			EXPIRY DATE:	

1.0 INTRODUCTION

The objective of this procedure is to systematically document wildlife activity, monitor compliance and effectiveness of mitigations in place, and proactively modify and/or improve the Project policies and practices, to the extent possible to minimize human-wildlife conflicts and habitat alteration at camps and worksites. This procedure will be in effect throughout the Winter Road (WR) Project.

2.0 BACKGROUND

This monitoring program focuses on areas where higher risks to wildlife and wildlife habitat alteration at worksites may present should mitigation measures fail.

- Road construction crews and self-contained skid-camps will generate and accumulate domestic waste and sewage. Domestic waste will be collected regularly and temporarily stored the main road camp for off-site for landfill disposal. Black water will be stored temporarily for later removal by septic truck, unless incinerating toilets are used. On territorial land, grey water will be disposed into sumps after filtration. There will be no grey water disposal to sumps inside the Nahanni National Park Reserve (NNPR). Grey water from camps inside the NNPR will be temporarily stored and then taken to a territorial camp by septic truck. Hazardous waste (e.g., oil filters) will be trucked out. In NNPR, waste will be temporarily stored in the self-contained skid camps for regular collection and transport off site for treatment and disposal.
- The proper storage, handling, and disposal of waste is essential. Wildlife that has been rewarded (food, shelter) by visiting the skid-camp and waste/storage areas may continue to return, thus increasing the risk of human-wildlife conflicts and wildlife mortality.

3.0 RESPONSIBILITIES

A Dene Monitor is present with each clearing crew and, together with the QEP, the Dene Monitors are responsible for performing the Worksite Check and Waste Management Audit at camps and other Project worksites to minimize effects on wildlife and wildlife residences, recommend improvements to mitigations based on the monitoring results and/or Dene Knowledge, make improvements to mitigations following the QEP's instructions, and recording results of noncompliance and emerging issues.

The QEP supports the Dene Monitors when performing the Wildlife Hazard monitoring program and decisions relating to implementing mitigations and advancing with adaptive management action. The QEP is also responsible for notifying the Construction Manager and/or the Spill Incident Response Team Supervisor, as applicable and reporting issues of noncompliance and consulting with regulators.

4.0 SURVEY LOCATIONS

Monitoring locations include camps and worksites where the risk to wildlife and wildlife habitat is highest, including:

- WR worksites (all portions with activity (i.e., equipment, workers))
- Active camps (camp perimeter, refueling area)
- Any waste storage and transfer areas

5.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **Once a Week:** perform the Worksite Check and Waste Management Audit during WR activities.
- **Immediately** after the Worksite Check and Waste Management Audit report noncompliance and emerging issues to the QEP and Construction Manager and/or the Spill Incident Response Team Supervisor.

6.0 EQUIPMENT AND MATERIALS

- Vehicle
- GPS
- Radio and digital camera
- Field forms: 1) Worksite Check, 2) Waste Management Audit forms, and 3) Wildlife Observation Log
- The previous three weeks of Worksite Check and Waste Management Audit forms regarding the detection of big game/Species at Risk at the monitoring locations that may be suggestive of an available attractant
- If applicable, previous Wildlife Incident Reports of wildlife gaining access to an attractant as a result of WR activities
- If applicable, previous reports made per the Spill Contingency Plan (for spills and/or hazardous materials)

7.0 METHODS

The **Worksite Check** will be undertaken following the procedure below:

- Perform the Worksite Check at each monitoring location and record the results using the Worksite Check form
- A Dene Monitor may complete the Worksite Check and the Waste Management Audit together
- Assess compliance with seven key mitigation conditions, using the Worksite Check form, at each active camp and WR worksite:
 - **1) Driving beyond the planned Project footprint:** this monitors for incremental habitat loss and/or alteration beyond the Project areas.
 - **2) Orientation of lights away from wildlife habitat:** this reduces visual disturbances beyond the limits of camps and active work sites.

- **3) Wildlife denning, nesting, or gaining shelter:** den and nest surveillance to limit risk of destruction and/or disturbance to the den/nest and monitors habituation to the Project and people. If dens and nests are found, a Dene Monitor will follow the appropriate procedure outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife*. If wildlife has gained shelter in/on Project sites and could lead to habituation and a human-wildlife conflict, the QEP with support from a Dene Monitor will repair or improve the mitigation following the appropriate adaptive management responses.
- **4) Attractant storage:** this monitors the availability and accessibility of attractants throughout camps and other worksites (not just at the designated waste storage areas that are monitored through the Waste Management Audit), including the proper storage and use of bear-proof containment to proactively reduce the risk of human-wildlife conflict. A Dene Monitor will walk throughout camp and other worksites and investigate all areas where attractants may be improperly stored, including the back of pickup trucks.
- **5) Evidence, or suspicion, of a big game species/Species at Risk that has accessed an attractant:** this indicates a possible mitigation failure where adaptive management action is required without delay. Access to an attractant may lead to habituation, increased human-wildlife conflict, and property damage. Previous Wildlife Incident Reports of human-wildlife conflicts regarding improper waste storage/handling that have been filed as part of WR activities may also provide sufficient evidence and/or suspicion of an animal gaining access to an attractant.
- **6) Evidence of a spill:** this monitors compliance with the Spill Contingency Plan and ensures that spills of any size are reported to the Spill Incident Response Team Supervisor for action.
- **7) Hazardous material storage:** this monitors compliance with the Spill Contingency Plan and proactively ensures materials are stored, handled, and managed in a timely manner to minimize risk of spills and habitat alteration.
- Document wildlife (including fresh sign) on the Wildlife Observation Logs (noting that the sighting was during Wildlife Hazard monitoring) and consider each of the seven key mitigation conditions while walking along the outside of the buildings, storage areas, and other applicable areas. Record all applicable observations on the Worksite Check form;
- Dens, nests, hibernacula, and roosts are protected under federal and territorial legislation. No person shall, without a permit, disturb wildlife and damage a wildlife residence (whether occupied or unoccupied). If a wildlife residence is observed and has the potential to be destroyed or disturbed, notify the QEP and the QEP will consult with the regulator. Follow procedures outlined in SOP #1 *Reporting, Responding to, and Deterring Wildlife*;
- Confirm that any mitigation improvements or repairs recommended in previous monitoring events have been completed and are in working order for quality assurance purposes;
- Dispose of all litter seen;
- If no wildlife is observed, no sign seen, and or no other observable issues are documented, then specifically state as such on the Worksite Check form;
- A Dene Monitor will submit the completed form to the QEP for entry into the database, quality control for completeness, and notify the Construction Manager and/or the Spill Incident Response Team Supervisor (as applicable);
- Together with a Dene Monitor, the QEP will review previous mitigation results for each site and determine if adaptive management is required (refer to Section 9.1.4); and
- The QEP, with support from a Dene Monitor are responsible for improvements based on the monitoring results and adaptive management while working with the Construction Manager, and or Spill Incident Response Team Supervisor.

The **Waste Management Audit** will be undertaken following the procedure below to monitor for proper waste segregation and that waste containers and storage area are kept clean and odour free:

- A Dene Monitor may complete the Waste Management Audit and Worksite Check together;
- A Dene Monitor will thoroughly investigate each waste storage and transfer areas for compliance with waste segregation following the Waste Management Plan and clean storage area/containers;
- Waste segregation includes an investigation of waste, prior to its storage inside the designated waste storage area (i.e., Sea Can). This waste segregation check involves an external examination of the contents of 1) transparent bags (without opening the bags) and shifting items within and/or 2) looking inside waste containers from the top. A Dene Monitor is to report the amount of improperly stored waste in each audit location following the categories below, as well as the type of improperly stored waste as:
 - None
 - Low (1 to 2 pieces)
 - Moderate (3 to 5 pieces)
 - High (more than 5 pieces)
- Types of improperly stored waste include:
 - Combustible Non-Hazardous Waste: kitchen and food waste, corrugated cardboard, and domestic refuse
 - Hazardous Waste: petroleum products
 - Recyclable Waste: beverage containers
- Properly dispose of improperly segregated waste seen;
- Assess the condition of the waste containers (e.g., lids secured, cleanliness, holes, leaks) and storage areas (e.g., cleanliness, odour);
- Record is an animal has, or is suspected of, accessing a food reward on the Waste Management Audit form as well as the Wildlife Observation Log;
- Record observations on the Waste Management Audit form. If there are no observable issues with waste segregation or storage cleanliness, then specifically state as such on the data form;
- The Dene Monitor will submit the completed form to the QEP for entry into the database, quality control for completeness, and notify the Construction Manager and/or the Spill Incident Response Team Supervisor (as applicable);
- Together with the Dene Monitor, the QEP will review previous mitigation audit results for each site and determine if adaptive management is required (refer to Section 9.1.4); and
- The QEP, with support from the Dene Monitor, will be responsible for improvements based on the audit results and adaptive management.

8.0 SUPPORTING DOCUMENTS ATTACHED

Worksite Check form

Waste Management Audit form

9.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

1. SOP #1 *Reporting, Responding to, and Deterring Wildlife*
2. BMP #2: Guidelines for Industrial Activity in Bear Country, 2008
3. BMP #3: Camp Waste & Wildlife Attraction Guideline, 2013
4. Plan: Waste Management Plan
5. Plan: Spill Contingency Plan and Emergency Response Plan

Active Worksite (e.g., road KP start and end):

Page ____ of ____

Fill out a new form for each worksite and survey day.

Monitor:				Date (YY/MM/DD): ____ / ____ / ____			
Start Time:			End Time:				
Mitigation Condition	Yes (if yes, then repair needed)	No	Not Applicable	Description/Comments (e.g., specific location of den, species, size of spill, type of attractant, Dene Knowledge)	Photo Number(s)	Opportunity for Improvements or Repairs Needed?	
						Recommendation	Date Improved/ Repaired
Is there evidence of vehicles (i.e., snowmobiles) driving off the planned Project footprint?							
Are light sources oriented towards wildlife habitat?							
Is wildlife denning, nesting, gaining shelter?							
Are possible attractants stored in a manner accessible to wildlife?							
Is there reason to believe wildlife gained access to an attractant?							
Is there evidence of a spill?							
Are hazardous materials stored inappropriately?							

Audit Location:

Fill out a new form for each camp/facility and day.

Page ____ of ____

WMMP #5
Road Mortality Risk Procedure

ROAD MORTALITY RISK MONITORING

WMMP #5 ROAD MORTALITY RISK PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 4 + attachments
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	All WR Activities			EXPIRY DATE:	

1.0 INTRODUCTION

The objectives of this procedure are to locate wildlife trails that intersect with the Winter Road (WR), to proactively manage warning signs to reduce the potential risk of animal-vehicle collisions (AVCs) and monitor compliance with mitigations to avoid road-related wildlife mortality. This procedure will be used during WR activities and focuses on big game and Species at Risk (i.e., coyote, wolf, wolverine, grizzly and black bears, caribou, moose, bison, Dall's sheep, and collared pika).

2.0 BACKGROUND

- During the environmental assessment, several groups raised concern of AVCs as a result of the Project.
- CZN's mitigations and monitoring reduce the risk of AVCs and other road-related mortalities, including mitigations relating to snow storage on and near the WR.
- Wildlife trails described in this procedure are defined as obvious trails of repeated use that may be used by a variety of species, and rarely change location over time. Wildlife tracks signal the distinct movements of an animal.
- Wildlife trails, including those of Species at Risk (caribou, bison), identified during the other monitoring programs, such as the Boreal Caribou Winter Track surveys, Wildlife Observation Logs, and Wildlife Incident Reports (where applicable) also inform where temporary signage is needed following this work procedure.
- New wildlife trails, vigilance areas, and wildlife caution zone locations will be reviewed annually (Annual Report) to inform more permanent management options in next Project phases, as required.
- Three exclusion zones exist along the WR near four pika talus sites where the storage of snow, rock, or roadbed debris on or within 10 m of pika talus sites are prohibited (Appendix A Mapbook or Figure D2). Brightly painted rebar is currently installed to warn equipment operators of the pika exclusion zones and caution tape may be added in the fall 2022 to further mark the boundary. In addition, the equipment operators have the locations of these pika exclusion zones on their GPSs which provide a proximity warning to the operator when approaching each exclusion zone.

3.0 DEFINITIONS

Fresh track: an estimate of 1-2 days since the animal was present.

Old track: an estimate of more than 2 days since the animal was present.

Talus: rock debris that accumulates at the bottom of a slope or cliff. Collared Pika inhabit talus (boulder fields) and forage in the nearby meadows (a maximum of 10 m away from the security cover of the talus).

4.0 RESPONSIBILITIES

A Dene Monitor will perform the Clearing Scan and Road Survey daily during clearing and weekly during Project-activities, respectively. A Dene Monitor will search for fresh wildlife trails that intersect with the WR alignment and will proactively mitigate these possible areas of AVC risk by installing temporary wildlife caution zone signage immediately ahead of the clearing equipment. During the weekly Road Survey, a Dene Monitor is responsible for driving the WR, maintaining the wildlife caution zone signs (installing, removing), and monitoring road-mitigations in place.

The Qualified Environmental Professional (QEP) is responsible for supporting the Dene Monitors during the Clearing Scan and Road Survey, incorporating the results from other wildlife monitoring programs and database into this survey, and decisions to advance adaptive management action.

5.0 SURVEY LOCATIONS

The Clearing Scan and Road Survey are completed along the WR; remaining within the WR project footprint to minimize disturbance to wildlife and wildlife habitat.

6.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **While Clearing:** scheduled immediately ahead of the clearing equipment
- **Daily:** Report the locations of where wildlife caution zone signs are installed and/or removed to the QEP, Construction Manager, and Checkpoint Monitor per the daily Clearing Scan and Wildlife Observation Logs and the weekly Road Survey
- **Weekly:** Conduct the Road Survey during WR activities

7.0 EQUIPMENT AND MATERIALS

- Clearing Scan and Road Survey forms
- Radio
- Snowshoes and or snowmobile
- GPS and camera
- Measuring tape
- Vehicle (Road Survey only)
- Wildlife caution zone signs and flagging tape
- Wildlife deterrents (e.g., air horn, bangers, bear spray)

- Figure D4 (and associated GPS locations from database) of possible wildlife trail areas identified during baseline surveys
- WMMP Map Book
- Wildlife Observation Logs (past 3 days relevant to the area being assessed)
- Wildlife Incident Reports (past 3 days relevant to the area being assessed)

8.0 METHODS

Road Mortality monitoring uses two survey approaches:

1. Clearing Scan (similar procedure as outlined in WMMP #1 *Den and Nest Pre-Clearing* procedure) immediately ahead of the clearing equipment
2. Road Survey

Clearing Scan

A Dene Monitor is responsible for scanning for wildlife, including their tracks and trails, on or immediately adjacent to the footprint of the WR in advance of the clearing equipment. The overall procedure for the Clearing Scan is the same as scanning for dens and nests (refer to WMMP #1 procedure) and will be completed at the same time:

- One to two surveyors snowshoe/snowmobile ahead of the clearing equipment to look for big game/Species at Risk tracks and trails that intersect with and/or travel along the WR alignment.
- Ground-based reconnaissance on the WR footprint actively being cleared; the survey may occur several days ahead of the clearing equipment depending on the weather and clearing progress.
- A Dene Monitor will be vigilant for wildlife trails at or near areas identified during the baseline surveys (Figure D4), in applicable Wildlife Observation Logs and Wildlife Incident Reports, and from other monitoring programs recorded in the database.
- Record the GPS location of fresh big game/Species at Risk track/trail (1-2 days old), species (if known), direction of trail in association with the WR, photos, and add additional Dene Knowledge on the Clearing Scan form.
- Notify the Construction Manager via radio if a fresh big game/Species at Risk trail (1-2 days old) intersects with the WR footprint, and construction shall proceed with caution nearby. The Dene Monitor will record the trail observation on the Clearing Scan form, including the GPS location, and install flagging tape (at the edge of the proposed footprint) to temporarily identify the trail until equipment clears the alignment.
- Once the footprint is cleared, the Dene Monitor will return to the flagged trail, retrieve the flagging tape, and determine if a wildlife caution zone sign should be installed. Wildlife caution zone signs are required if there is recent evidence of wildlife use (1-2 days old) and/or when Dene Knowledge promotes sign use.
- A Dene Monitor will submit completed forms to the QEP for entry into the Wildlife Observation Log database, quality control for completeness, and determining adaptive management actions.

Road Survey

- Prior to conducting the road survey, the QEP and a Dene Monitor will review applicable Wildlife Observation Logs and Wildlife Incident Reports and Clearing Scan forms to determine where wildlife have been reported in the past three days (if any) and if a wildlife caution zone sign is required. Reoccurrence of a big game/Species at Risk observation in the same general area (i.e., within 1 km buffer) could suggest a wildlife trail and possible AVC risk area and may trigger adaptive management action.

- Drive maximum 30 km/hr along all active portions of the WR and stop to document wildlife, fresh wildlife trails (and other wildlife sign (e.g., scat)), condition of wildlife trails at existing caution zone signs, and compliance with key road-related mitigations (see Road Survey form for key mitigations). Install wildlife caution zone signs where fresh wildlife trails exist and as required based on adaptive management. Extra vigilance is required where wildlife have been reported during the past three days in the Wildlife Observation Logs, locations of previous Wildlife Incident Reports, as well as areas identified in Figure D4.
- Record the Road Survey data in the Road Survey form.
- Based on the evidence of fresh wildlife use, a Dene Monitor with support from the QEP, will determine if a caution zone sign is still required at that location, and/or if a new caution zone sign is needed where a new fresh game trail is detected.
- Signs are to remain installed for a minimum of 1 week or until there is no longer evidence of wildlife use, and/or based on Dene Knowledge.
- The Dene Monitor will determine where to place each wildlife caution zone sign based on the observation of trails and driver visibility. At minimum, the following must be considered:
 - If multiple trails occur along a stretch of the WR (e.g., multiple trails within 100 m), two caution zone signs will be installed at the start and end of that zone;
 - If a single wildlife trail intersects with the WR, place two caution zone signs on either side of the trail; and
 - Place signs where they are most visible to drivers and at a distance that allows drivers to appropriately slow down. Signs should be placed a minimum of 50 m from either side of the trail or the outside extent of multiple trails.
- A Dene Monitor will submit completed forms to the QEP to enter into the Wildlife Observation Log database, quality control for completeness, and determine adaptive management actions (also in consideration of other monitoring results per the Wildlife Observation Logs and Boreal Caribou Winter Track monitoring programs).

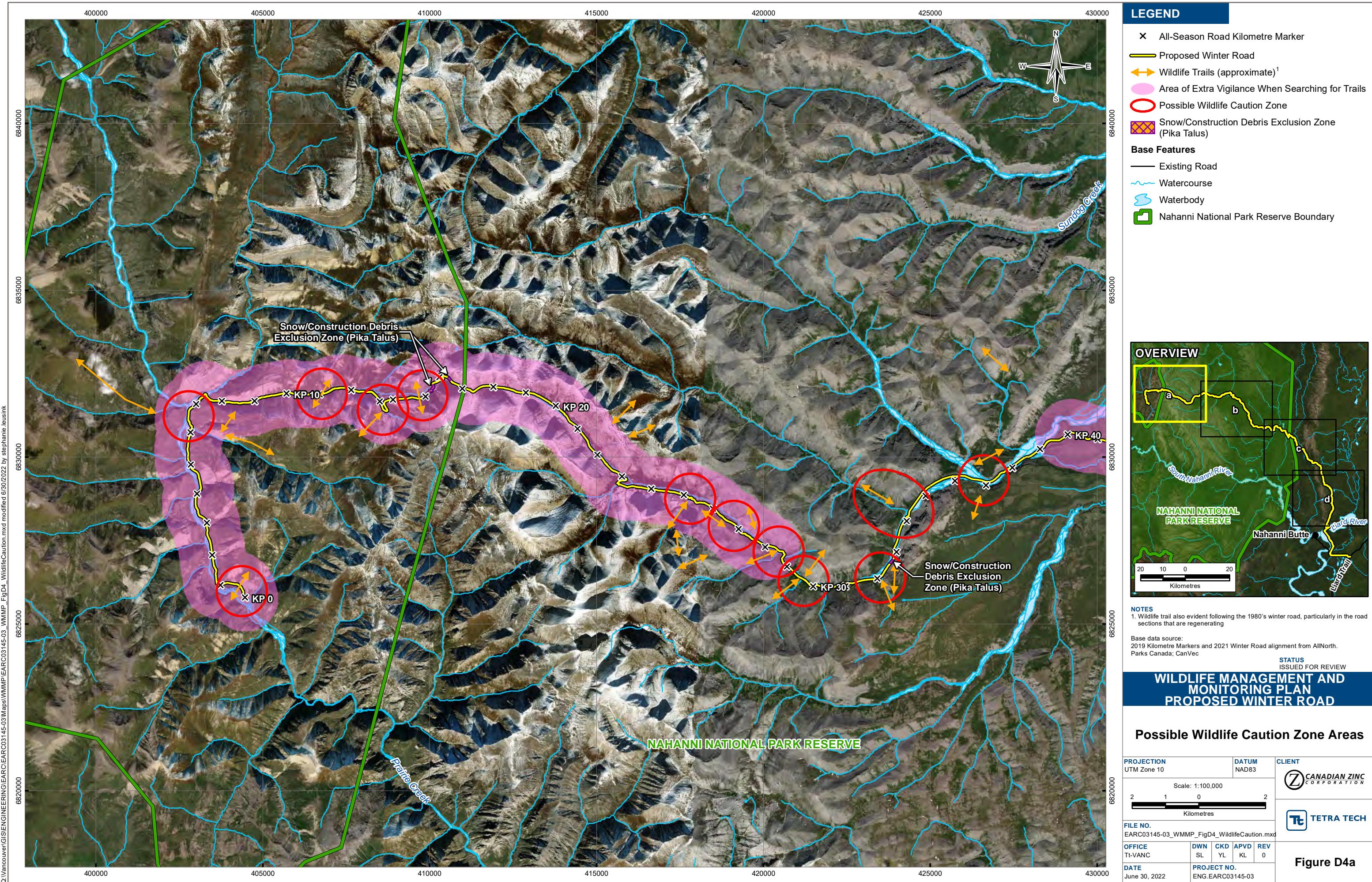
9.0 SUPPORTING DOCUMENTS ATTACHED

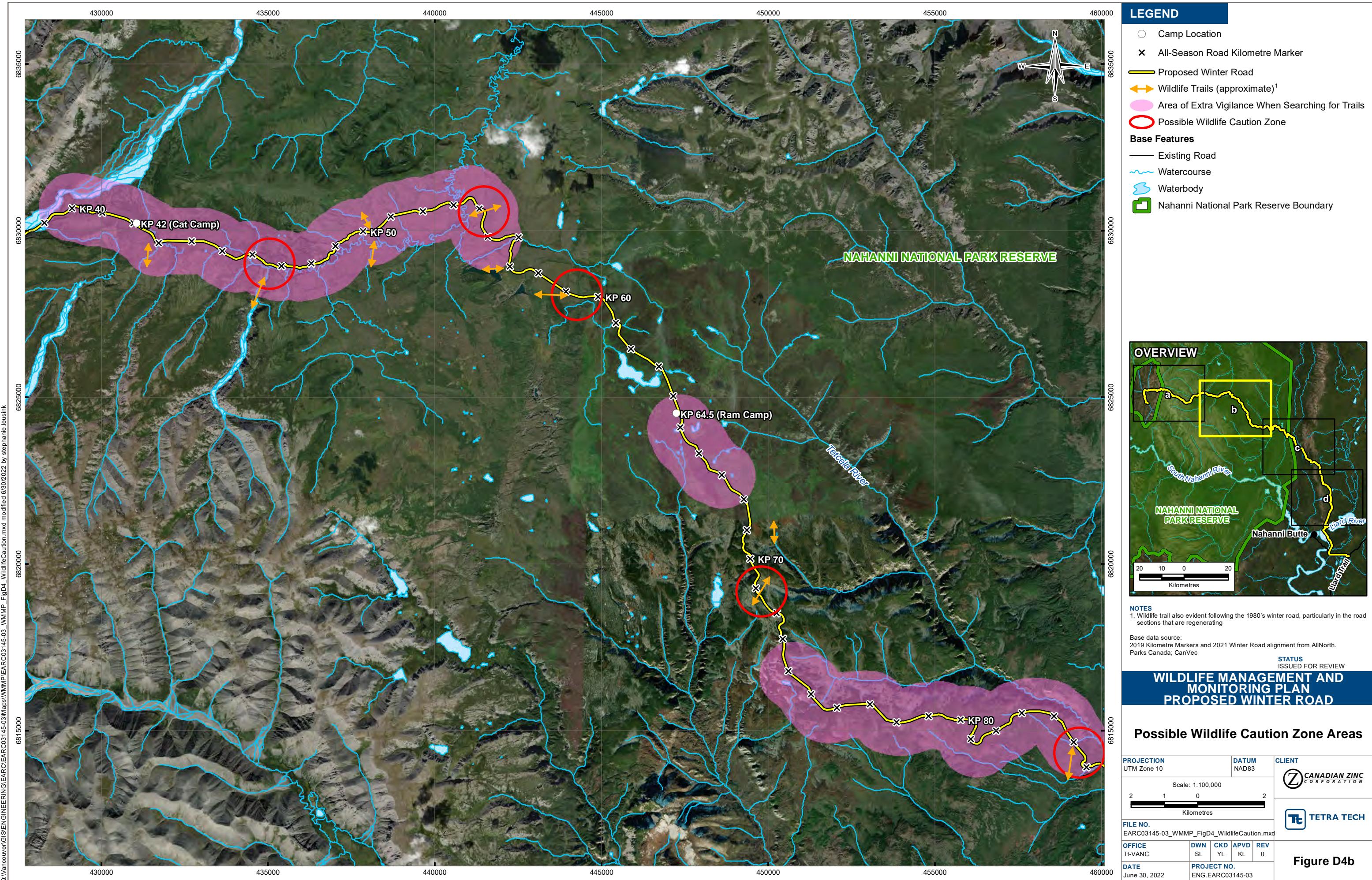
1. Clearing Scan Form
2. Road Survey Form

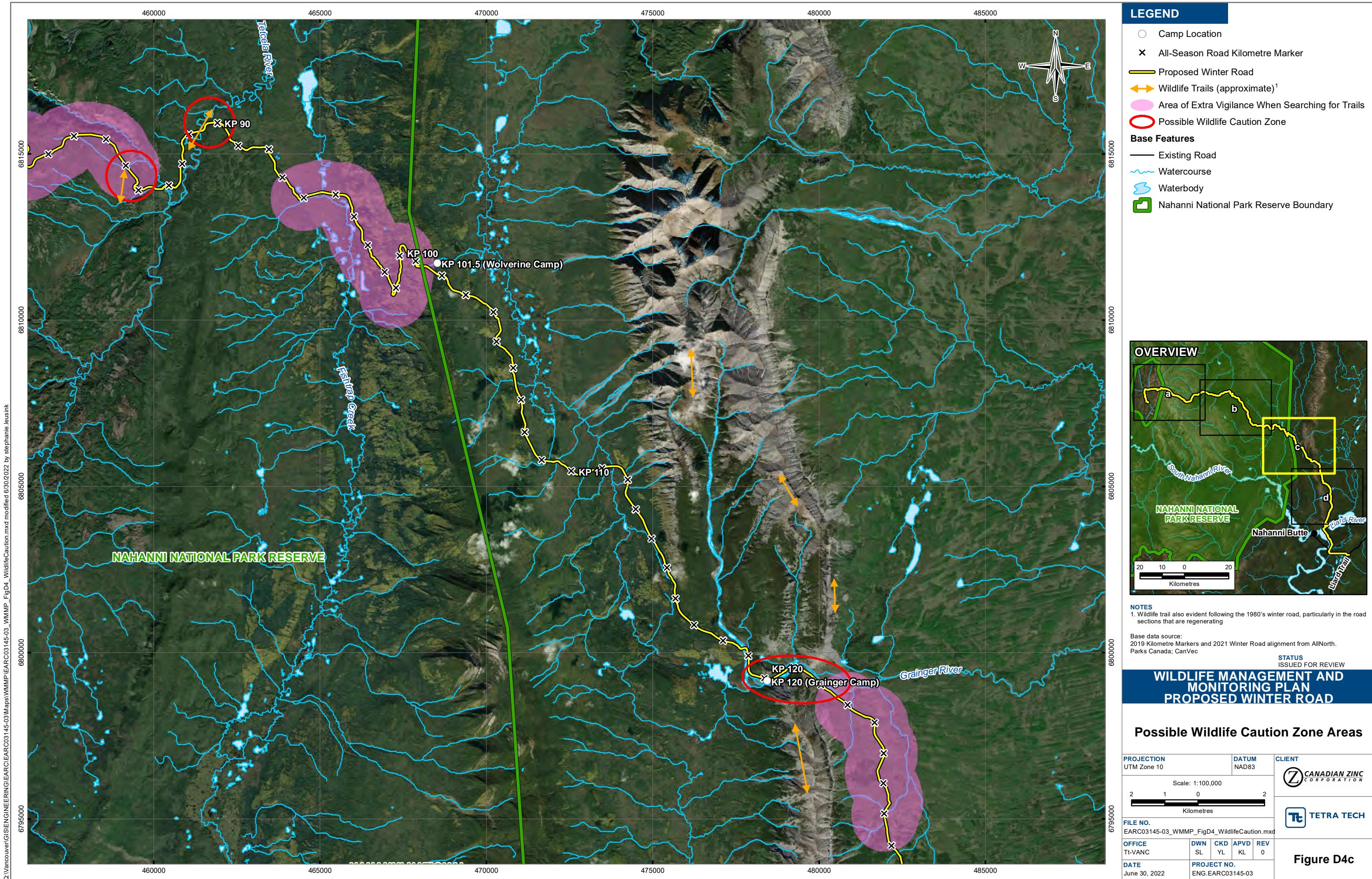
10.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

1. Figure D4 Possible Wildlife Caution Zone Areas
2. Wildlife Observation Log database of trails identified during other wildlife monitoring programs
3. Collared Pika Pre-Construction Monitoring Program
4. SOP #1 *Reporting, Responding to, and Deterring Wildlife*
5. Traffic Control Mitigation and Road Operations and Maintenance Plan

Date (YY/MM/DD): ____ / ____ / ____				Monitor:	Page ____ of ____		
Start Time:				End Time:			
KP Start:				KP End:			
Mitigation Condition	Yes	No	Not Applicable	Description/Comments (e.g., specific location where not in compliance, Dene Knowledge)	Photo Number(s)	Opportunity for Improvements or Repairs Needed?	
						Recommendation	Date Improved/ Repaired
Is snow from snowplowing deposited 10 m from identified pika talus?							
Is the snow bank height and spacing noncompliant (i.e., <10m wide breaks and or spaced >300 m apart when height >1m)?							
Is line of sight at intersecting linear features noncompliant (i.e., windrows or brush not installed or effectively reducing line of sight)?							
Existing Sign Location (e.g., KP 4.5)	GPS Location (e.g., 10V, 404462, 6825794)		Recommendation to Keep Sign? (e.g., yes or no with rationale)			Removed Sign? (e.g., yes or no with rationale)	









WMMP #6
Traffic Monitoring

TRAFFIC MONITORING

WMMP #6 TRAFFIC MONITORING PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 3 + attachments
CATEGORY:	Effects Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	All WR Activities			EXPIRY DATE:	

1.0 INTRODUCTION

The traffic monitoring objectives, at the checkpoint station and associated remote cameras, are to determine traffic and traffic levels (including Non-Project vehicle use) along the Winter Road (WR) to inform adaptive management for other wildlife monitoring program, as well as the Traffic Control Mitigation and Road Operations and Maintenance Plan.

2.0 BACKGROUND

The checkpoint station will be staffed daily, for 12-hour days, during WR activities to the entry and exit of all Project and non-Project vehicles during WR activities. Two remote cameras will also operate, one at the checkpoint and another north of the Liard River crossing, to record traffic use outside of staffed checkpoint hours of operation. Outside WR activities, at least one remote camera, north of the Liard River crossing, will be maintained between Phase 1 construction of the WR and Phase 2.

3.0 RESPONSIBILITIES

The Checkpoint Monitor (attendant) is responsible for documenting all vehicles (including snowmobiles and all-terrain vehicles [ATVs]) that pass the checkpoint while on duty, reporting non-Project vehicle access outside checkpoint station hours following the review of remote camera data, and relay construction and related traffic safety information to all vehicles at the checkpoint. The location of the wildlife caution zones will only be relayed to Project-related drivers.

The Checkpoint Monitor is also responsible for administering the Wildlife Harvest Questionnaire while on duty at the checkpoint station; refer to WMMP #7 *Wildlife Harvest Monitoring* procedure.

4.0 SURVEY LOCATIONS

Traffic is monitored directly at the checkpoint station, established near the WR's junction with the Nahanni Butte Access Road and at a remote camera north of the Liard River crossing.

5.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **Daily Operation of Checkpoint Station:** Collect traffic monitoring data following this procedure

- **Daily:** Relay applicable road information (e.g., speed limit requirements, WR activity locations) to drivers prior to their transit along the WR
- **Daily during WR Activities:** Review the remote cameras for non-Project vehicle access outside checkpoint station hours and enter vehicles detected on the cameras onto the Traffic Monitoring Form
- **Daily:** Return the completed Checkpoint Traffic Monitoring forms to the Dene Monitor or Qualified Environmental Professional (QEP)
- **Daily:** Administer the Wildlife Harvest Questionnaire (details provided in WMMP #7 *Wildlife Harvest Monitoring* procedure)
- **Monthly after WR Activities:** Review the remote camera for vehicle access between Phase 1 construction activities and Phase 2.

6.0 EQUIPMENT AND MATERIALS

- Radio
- Watch
- inReach and satellite phone
- Traffic Monitoring Form
- Wildlife Harvest Questionnaire
- Clipboard
- Field tablet with SD card reader to review remote camera data
- Bear spray and air horn

7.0 METHODS

The following procedures will be carried out by the Checkpoint Monitor, unless otherwise indicated:

- Stop each Project and non-Project vehicle (including snowmobiles, ATVs) and record the following in the daily Traffic Monitoring Form:
 - Time vehicle arrived at the checkpoint
 - Licence plate number for non-Project traffic only
 - Vehicle size category and description:
 - Large = construction equipment
 - Medium = personal vehicles
 - Small = snowmobiles, ATVs
 - Description of the vehicle, such as the colour, make, and model to help identify non-Project vehicles that leave the WR after checkpoint hours of operation and detected by the remote cameras
 - Vehicles direction of travel along the road
 - Purpose of travel
 - Vehicles looking to access the WR for the purpose of harvesting will be asked to voluntarily participate in the Wildlife Harvest Questionnaire (details provided in WMMP #7 *Wildlife Harvest Monitoring* procedure)

- Destination along the road (i.e., number of kilometers up the road)
- Whether the vehicle was detected after the checkpoint hours of operation using the remote camera
- Complete a new Traffic Monitoring Form each day.
- Review the remote camera SD cards daily and record all vehicles entering and leaving the WR outside the checkpoint station hours of operation on the Traffic Monitoring Form.
- Enter all wildlife observed from the checkpoint station, remote cameras, and/or relayed from motorists on the Wildlife Observation Log.
- The Checkpoint Monitor will submit completed forms to the Dene Monitor or QEP. The QEP will /enter the data into the traffic and or Wildlife Observation Log databases, as applicable, quality control for completeness, advise Parks Canada whenever non-Project vehicles are encountered inside the Park boundary, and determine adaptive management actions per the Animal-Vehicle Collision Risk, Wildlife Harvest, and Traffic Control Mitigation and Road Operations and Maintenance Plan monitoring.
- Maintain operations of the remote cameras (e.g., replace batteries and SD cards).

8.0 SUPPORTING DOCUMENTS ATTACHED

Checkpoint Traffic Monitoring Datasheet

9.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

1. Design and Construction Plan
2. Traffic Control Mitigation and Road Operations and Maintenance Plan
3. SOP #1 *Reporting, Responding to, and Deterring Wildlife*
4. WMMP #7 Wildlife Harvest Monitoring Procedure

Attendant Name:

Date (YY/MM/DD): ____ / ____ / ____

Checkpoint Station Hours of Operation: from _____ (am) to _____ (pm)

Fill out a new form each day. Include traffic detected by the remote cameras on the same day.

Time (24 HR)	Licence Plate # (only for non- Project vehicles; will be kept confidential)	Vehicle Size Large = construction equip. Medium = personal vehicle Small = snowmobile/ATV	Vehicle Description (e.g., pickup truck colour, grader)	Direction of Travel	Purpose of Travel (if Harvesting, also fill out the Harvest Questionnaire)	Destination (how far up the road; e.g., KP 100, Silent Hills)	Camera Location (if applicable)
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		
____:____				<input type="checkbox"/> Northbound <input type="checkbox"/> Southbound	<input type="checkbox"/> WR Project <input type="checkbox"/> Recreation; <input type="checkbox"/> Harvesting		

WMMP #7
Wildlife Harvest Monitoring

WILDLIFE HARVEST MONITORING

WMMP #7 WILDLIFE HARVEST MONITORING PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 2 + attachments
CATEGORY:	Effects Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	All WR Activities			EXPIRY DATE:	

1.0 INTRODUCTION

The objective of Wildlife Harvest Monitoring procedure is to monitor harvest levels and possible patterns to inform the Road Oversight Committee (ROC) and support Winter Road (WR) management decisions. This procedure uses a voluntary Wildlife Harvest Questionnaire that will be collected at the checkpoint station during WR activities.

2.0 BACKGROUND

A voluntary Wildlife Harvest Questionnaire is issued verbally at the checkpoint station, which is staffed daily, for 12-hour days, during WR activities.

3.0 DEFINITIONS

Wildlife Harvesting: includes hunting, trapping, fishing, and collecting wood, plants, and berries.

4.0 RESPONSIBILITIES

The Checkpoint Monitor is responsible for administering the Wildlife Harvest Questionnaire to all willing, non-Project related vehicles that pass the checkpoint while on duty. Per WMMP #6 *Traffic Monitoring* procedure, the Checkpoint Monitor is also responsible for reporting non-Project vehicle access outside the checkpoint station hours based on the review of the remote camera data.

The Qualified Environmental Professional (QEP) is responsible for reviewing the Wildlife Harvest Questionnaire for completeness, entering the data into a Wildlife Harvest database, summarizing the data into a Monthly Harvester Questionnaire report (refer to Section 10.0), and submitting to the ROC.

5.0 SURVEY LOCATIONS

The Wildlife Harvest Questionnaire will be administered at the checkpoint station; however, it will include harvest information from across the WR.

6.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **Daily Operation of Checkpoint Station:** Collect wildlife harvest monitoring data following this procedure

- **Daily:** Review data from the remote camera for non-Project vehicle access outside checkpoint station hours and enter vehicles on the Traffic Monitoring Form
- **Daily:** Return completed Wildlife Harvest Questionnaires to the QEP
- **Weekly:** Quality control of information collected from the Wildlife Harvest Questionnaire
- **Monthly:** Submit a summary of the harvest monitoring data to the ROC

7.0 EQUIPMENT AND MATERIALS

- Wildlife Harvest Questionnaire
- Clipboard
- Field tablet with SD card reader to review the remote cameras

8.0 METHODS

- The Checkpoint Monitor will stop all non-Project vehicles, per WMMP #6 *Traffic Monitoring*;
- If the purpose of non-Project vehicle travel on the WR is harvesting, the driver will be asked to voluntarily participate in completing the Wildlife Harvest Questionnaire;
- The Checkpoint Monitor will read the questions to participants and record their responses on the Wildlife Harvest Questionnaire;
- All questions the participants declined to answer will be noted; and
- The Checkpoint Monitor will submit completed forms to the Qualified Environmental Professional for entry into the database, quality control for completeness, and reporting to the ROC.

9.0 SUPPORTING DOCUMENTS ATTACHED

Wildlife Harvest Questionnaire

Figure D5 Wildlife Harvest Location Plan

See the Checkpoint Traffic Monitoring Datasheet in WMMP #6 procedure

10.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

WMMP #6 Traffic Monitoring Procedure

USE A NEW FORM FOR EACH VEHICLE

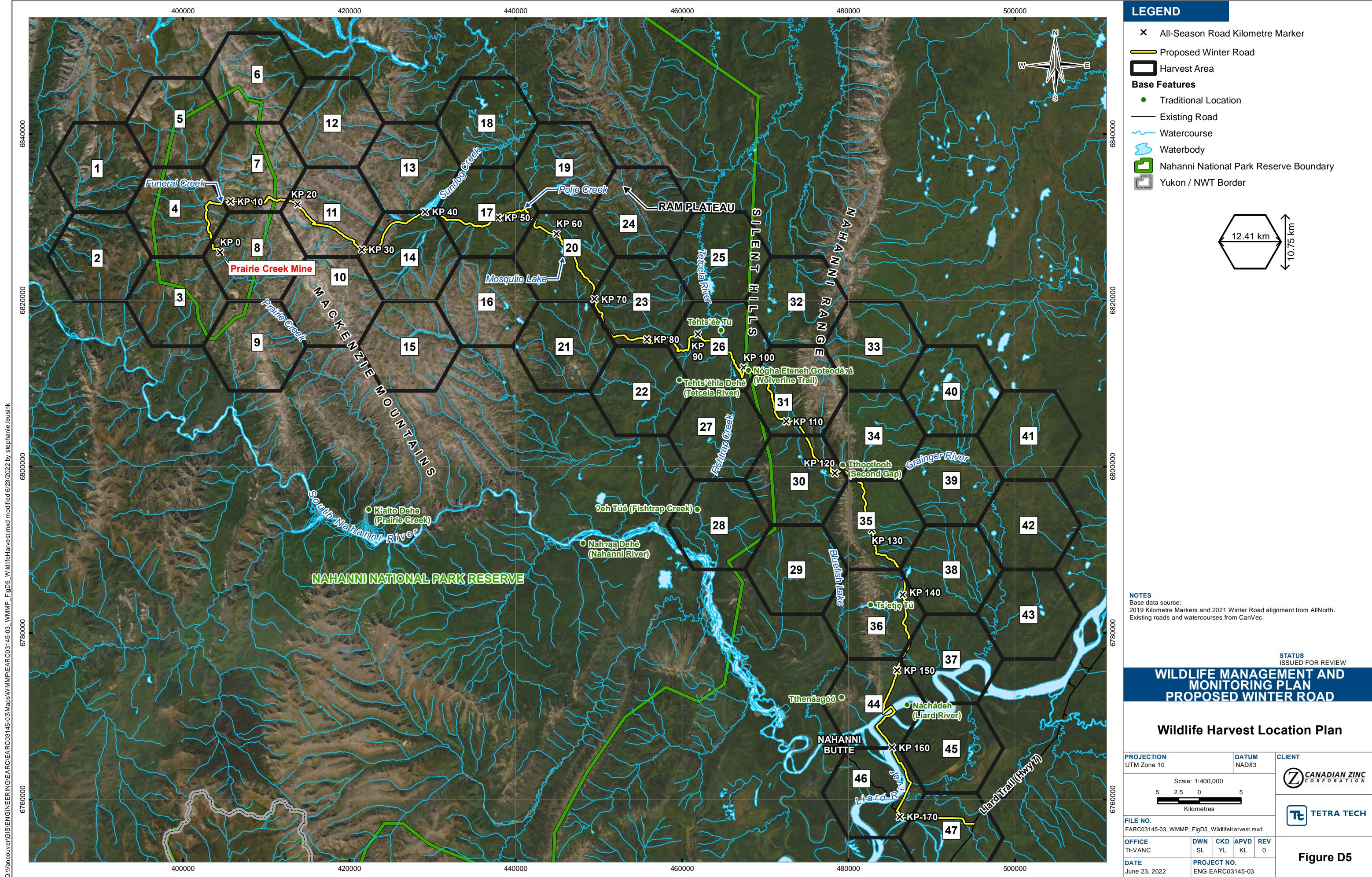
Checkpoint Attendant Name:

Number of People in the Vehicle:	# of People: _____		
Licence Plate # (copy from the Traffic Monitoring Form): _____			
Which community are you from?	<input type="checkbox"/> Nahanni Butte; <input type="checkbox"/> Fort Simpson; <input type="checkbox"/> Fort Liard; <input type="checkbox"/> Declined to Answer <input type="checkbox"/> Other: _____		
Entering the Road	Date: _____	Time at Checkpoint: _____ (24 hour)	
What are you planning to harvest? Check all that apply	Hunting: <input type="checkbox"/> Big or <input type="checkbox"/> Small Game Trapping: <input type="checkbox"/> Big or <input type="checkbox"/> Small Game <input type="checkbox"/> Declined to Answer		Collecting: <input type="checkbox"/> Berries; <input type="checkbox"/> Firewood; <input type="checkbox"/> Medicinal Plants <input type="checkbox"/> Other: _____
What type of hunting licence do you have? Check all that apply for each person	<input type="checkbox"/> No licence needed (because an Indigenous harvester with traditional rights to harvest in the NWT) <input type="checkbox"/> Resident (because a resident of the NWT but don't have traditional harvesting rights in the NWT) <input type="checkbox"/> Non-Resident (because a Canadian citizen or landed immigrant but don't live in the NWT and don't have traditional harvesting rights in the NWT) <input type="checkbox"/> Non-Resident Alien (because not a Canadian citizen or a landed immigrant) <input type="checkbox"/> Not Applicable (because not hunting or trapping) <input type="checkbox"/> Declined to Answer		
Exiting the Road	Date: _____	Time at Checkpoint: _____ (24 hour)	
Did you harvest anything?	<input type="checkbox"/> Yes; <input type="checkbox"/> No <input type="checkbox"/> Declined to Answer	Approximate search effort?	_____ hours/ days (circle one)
What species did you harvest?	Species 1 Check only 1 species	Species 2 Check only 1 species	Species 3 Check only 1 species
	<input type="checkbox"/> Moose; <input type="checkbox"/> Caribou; <input type="checkbox"/> Sheep; <input type="checkbox"/> Bear; <input type="checkbox"/> Berries <input type="checkbox"/> Firewood <input type="checkbox"/> Plants <input type="checkbox"/> Declined to Answer <input type="checkbox"/> Other: _____	<input type="checkbox"/> Moose; <input type="checkbox"/> Caribou; <input type="checkbox"/> Sheep; <input type="checkbox"/> Bear; <input type="checkbox"/> Berries <input type="checkbox"/> Firewood <input type="checkbox"/> Plants <input type="checkbox"/> Declined to Answer <input type="checkbox"/> Other: _____	<input type="checkbox"/> Moose; <input type="checkbox"/> Caribou; <input type="checkbox"/> Sheep; <input type="checkbox"/> Bear; <input type="checkbox"/> Berries <input type="checkbox"/> Firewood <input type="checkbox"/> Plants <input type="checkbox"/> Declined to Answer <input type="checkbox"/> Other: _____
How many of each sex?	<input type="checkbox"/> Male: _____ <input type="checkbox"/> Female: _____ <input type="checkbox"/> Not Applicable <input type="checkbox"/> Declined to Answer	<input type="checkbox"/> Male: _____ <input type="checkbox"/> Female: _____ <input type="checkbox"/> Not Applicable <input type="checkbox"/> Declined to Answer	<input type="checkbox"/> Male: _____ <input type="checkbox"/> Female: _____ <input type="checkbox"/> Not Applicable <input type="checkbox"/> Declined to Answer
	<input type="checkbox"/> Excellent; <input type="checkbox"/> Good; <input type="checkbox"/> Fair; <input type="checkbox"/> Poor; <input type="checkbox"/> Not Applicable; <input type="checkbox"/> Declined to Answer		
What was the body condition of the species harvested?	Additional Comments and Dene Knowledge (e.g., changes over time, reason(s) such as parasites or malnourishment): _____		
What is the harvest pressure compared to other roads in the region?	<input type="checkbox"/> Higher harvest pressure along Prairie Creek road; <input type="checkbox"/> Lower harvest pressure along Prairie Creek road; <input type="checkbox"/> About the same; <input type="checkbox"/> Not Applicable; <input type="checkbox"/> Declined to Answer		
Based on the map, where did you harvest the species?	Area #: _____; Area #: _____; Area #: _____		
Based on the map, where did you search? (choose 1 or more)	Area(s) #: _____; Area(s) #: _____; Area(s) #: _____		



WILDLIFE HARVEST QUESTIONNAIRE

Additional Comments or Observations (either from the Checkpoint Monitor or Harvester):



WMMP #8
Boreal Caribou Winter Track Procedure

BOREAL CARIBOU WINTER TRACK

WMMP #8 BOREAL CARIBOU WINTER TRACK PROCEDURE

MANAGEMENT PLAN	Wildlife Management & Monitoring Plan	REVISION NO.:	00	PAGE:	1 of 3 + attachment
CATEGORY:	Mitigation Monitoring	REVISION DATE:	October 2022	APPROVED DATE:	
SUBCATEGORY:	All WR Activities			EXPIRY DATE:	

1.0 INTRODUCTION

The objectives of this procedure are to identify how to identify winter tracks and distribution of boreal caribou, their predators, and alternate prey that cross the Winter Road (WR) to manage risk of animal-vehicle collisions.

2.0 BACKGROUND

- Boreal Caribou are listed as Threatened under the federal and territorial SARAs.
- Regulators and local Indigenous groups have raised concern for increased Boreal Caribou mortality potential due to caribou-vehicle collisions.

3.0 DEFINITIONS

Fresh track: an estimate of 1-2 days since the animal was present

Old track: an estimate of more than 2 days since the animal was present

Snow obliterating event: snowfall of 1 cm or more

Wind obliterating event: an average daily wind speed of 30 km/hr or more

4.0 RESPONSIBILITIES

The winter track surveys will be conducted by the Dene Monitor and local guardians with support from the Qualified Environmental Professional (QEP). Following each track survey, the Dene Monitor will submit the results to the QEP for data entry into the Wildlife Observation Log database and for determining wildlife caution zones along the WR.

5.0 SURVEY LOCATIONS

The winter track surveys will be carried out along the WR from KP 110 to 170 (approximately 60 km to the Nahanni Access Road).

6.0 SCHEDULE

The following survey and reporting schedules will be applied:

- **One Week Before the Winter Track Survey:** coordinate with the Construction Manager to delay snowplowing activities (as road safety allows);
- **Between December 2022 to March 2023 (approx.):** conduct two winter track surveys, at least three weeks apart, once the survey area (KP 110-170) has been cleared of vegetation, access across the Liard River is safe, and during a period of suspended travel;
- **Two to Four Days After Snow/Wind Obliterating Event:** Track surveys are preferably conducted two to four days after a snow and/or wind obliterating event and prior to snowplowing (as road safety allows) to better detect fresh tracks; and
- The track survey is to be completed over the course of one day.

7.0 EQUIPMENT AND MATERIALS

- Snowmobiles (and related safety gear) and/or suitable vehicle for potentially challenging (i.e., deep snow) winter driving conditions
- GPS
- Measuring tape
- Radio and/or satellite phone
- Digital camera (or field tablet) with ability to collect georeferenced photo locations
- Winter Track Survey form

8.0 METHODS

Winter Track Survey

- Coordinate with the QEP and the Construction Manager at least one week prior to the survey to delay snowplowing activities (as road safety allows);
- Conduct surveys 2-4 days after a snow or wind obliterating event (snowfall of 1 cm or more or an average daily wind speed of 30 km/hr or more) as this removes old tracks and allows sufficient time for fresh tracks to accumulate in the snow before the survey is conducted;
- Surveyors (at least two people) will drive maximum 10 kilometres per hour (km/hr.) or less along the WR to look for and record caribou, wolf, wolverine, moose, Dall's sheep, and bison tracks that approach, walk along, and/or cross the WR. These species are the primary focus; however, all identifiable species tracks may be recorded;
- The main focal area of the survey should be along the road-forest edge, where tracks are likely to be in the best condition, if present;
 - Observations will be recorded on the Winter Track Survey form and include the following information at a minimum:
 - Date
 - Surveyor names
 - Survey start and end times
 - Weather and days since last obliterating snowfall/wind event
 - GPS locations of tracks
 - Species

- Whether the track/trails were fresh or old
- Comment on the direction of the tracks (e.g., approaching/crossing/paralleling the WR)
- Photos (geo-referenced photos of all big game/Species at Risk tracks recorded for independent species verification)
- At each recorded observation location, the surveyors will take photos of both a print and the track, that includes an object of known length in the photo, such as a ruler, beside the print and track for scale.
- Upon reaching the end of the survey area, the surveyors will repeat the winter track survey along a randomly selected 10 km section of the WR when returning back to camp/Nahanni Butte. A random start point will be identified for the 10 km re-survey area by the QEP and provided to the Dene Monitor. This replication will help determine a detection correction factor. The resurveyed KP's and fresh tracks detected will be recorded on the same Winter Track Survey form. A line across the datasheet will mark where the resurveyed data begins.
- The Dene Monitor will submit completed forms to the QEP for entry into the database, quality control for completeness, and determining wildlife caution zones along the WR (in consideration with previous winter track surveys, Wildlife Observation Logs and Incident Reporting, and Road Mortality Risk monitoring results).

9.0 SUPPORTING DOCUMENTS ATTACHED

Winter Track Survey Form

10.0 OTHER RELEVANT PLANS, STANDARD OPERATING PROCEDURES, AND BEST MANAGEMENT PRACTICES

1. Design and Construction Plan
2. Traffic Control Mitigation and Road Operations and Maintenance Plan

PRAIRIE CREEK ALL SEASON ROAD: PHASE 1 - WINTER ROAD

