



Blackwater Mine

2023 Wildlife Mitigation and Monitoring Program Compliance Report

PREPARED FOR



Blackwater
Mine

BW Gold LTD.

DATE

March 2024

REFERENCE

0722163-02



Blackwater Mine

2023 Wildlife Mitigation and Monitoring Program Compliance Report

March 2024

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ACRONYMS AND ABBREVIATIONS

Alpine	High-elevation land above the tree-line: alpine vegetation on zonal sites is dominated by low shrubs, herbs, bryophytes and lichens. Although treeless by definition, patches of stunted (krummholz) trees may occur. Much of the alpine is covered by rock and ice rather than vegetation.
APLIC	Avian Power Line Interaction Committee
Application/EIS	Environmental Assessment
Artemis	Artemis Gold Inc.
ARU	Automated Recording Units
BACI	Before-After-Control-Impact
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre - collects and disseminates information on plants, animals and ecosystems (ecological communities) at risk at the provincial level, and is tied to Nature Serve, an international, non-profit organization of cooperating Conservation Data Centres and Natural Heritage Programs all using the biogeoclimatic zone same methods to gather and exchange information on the threatened elements of biodiversity.
BC MFLNRO	British Columbia Ministry of Forests, Land, and Natural Resource Operations, changed to Ministry of Forests
BC MOE	British Columbia Ministry of Environment
<i>Wildlife Act (1996)</i>	The main British Columbia law for protecting wildlife, endangered species, and wildlife habitat. The Act has a number of provisions for protecting, managing, and purchasing habitat areas as well as protecting endangered and threatened species. The Act is administered by the Ministry of Environment.
BEC	Biogeoclimatic Ecosystem Classification: a standard, hierarchical classification system for mapping terrestrial ecosystems in British Columbia. Divided into zones and subzones.
Blue-listed	A list of ecological communities, and aboriginal species and subspecies of special concern in British Columbia, maintained by the BC Ministry of Environment.
BW Gold	BW Gold LTD.
CMMP	Caribou Mitigation and Management Plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada: a federal committee of experts that assesses and designates the level of threat to wildlife and vegetation species in Canada.
DS	Decision Statement
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
ECCC	Environment and Climate Change Canada
Ecosystem (terrestrial)	A volume of earth-space that is composed of non-living parts (climate, geologic materials, groundwater, and soils) and living or biotic parts, which are all constantly in a state of motion, transformation, and development. No size or scale is inferred.

EIS	Environmental Impact Statement
ESSF	Engelmann Spruce – Subalpine Fir BEC zone
FSR	Forest Service Road
GPS	Global Positioning System
ha	Hectare: 10,000 m ² or 0.01 km ² or 2.47 acres
Habitat	Land and water surface used by wildlife, which may include biotic and abiotic aspects such as vegetation, exposed bedrock, water and topography.
July Wildlife	Davidson Creek Wildfire that occurred July 10 th , 2023
km	Kilometre
KM	Kilometre marker
LDN	Lhoosk'uz Dené Nation
LSA	Local Study Area, 27,589 ha in size
m	Metre
Migration	The regular seasonal or daily movement of animal populations to and from different areas, often considerable distances apart. Migration often occurs in corridors between preferred habitat types.
<i>Migratory Birds Convention Act (1994)</i>	A federal government commitment established in 1917 to protect most migrating birds found in Canada. The Act fulfilled the terms of the Migratory Birds Convention of 1916 between Canada and the United States of America (USA). The Canadian government has the authority to pass and enforce regulations to protect those species of migratory birds which are included in the Convention.
Mine, the	Blackwater Mine
Model	An idealized representation of reality developed to describe, analyze or understand the behaviour of some aspect of it a mathematical representation of the relationship under study.
MT	Mitigation Table (November 2020), defines mitigations required and approved by the BC Environmental Assessment Office
NABAT	North American Bat Monitoring Program
New Gold	New Gold Inc.
Parkland	Subalpine area characterized by forest clumps interspersed with open subalpine meadows and shrub thickets. Vegetation cover may vary in the proportion of treed patches, meadows, and shrub thickets. The term parkland can also be used for lower elevation forest that are open due to restricted moisture availability, such as occurs in the Ponderosa Pine zone.
Red-listed	List of ecological communities, and aboriginal species and subspecies that are extirpated, endangered or threatened in British Columbia, maintained by the BC Ministry of Environment.
RIC	Resource Inventory Committee: a body of the BC government that develops survey standards for BC wildlife and ecosystems.
RSA	Regional Study Area – 274,098 ha in size

SARA	<i>Species at Risk Act (2002)</i> – A Canadian federal statute which is designed to meet one of Canada’s commitments under the International Convention on Biological Diversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.
SCP	Sediment Control Pond
SOP	Standard Operating Procedure
UNBC	University of Northern British Columbia
TSF	Tailings Storage Facility
UFN	Ulkatcho First Nation
URPC	Unlimited Radius Point Count
Upland Bird	Interior forest breeding birds
VRPC	Variable Radius Point Count
Wetland	Sites dominated by hydrophytic vegetation where soils are water-saturated for a sufficient length of time such that excess water and resulting low soil oxygen levels are principal determinants of vegetation and soil development (MacKenzie and Moran 2004).
WMMP	Wildlife Mitigation and Monitoring Plan
Yellow-listed	List of ecological communities and aboriginal species which are not at risk in British Columbia, maintained by the BC Ministry of Environment.

1. INTRODUCTION

The Blackwater Mine (the Mine) is an open pit gold and silver mine currently under construction, located in central British Columbia (BC) 160 kilometres (km) southwest of Prince George, BC. The Mine is located within the traditional territories of Lhoosk'uz Dené Nation (LDN), Ulkatcho First Nation (UFN), Skin Tyee Nation and Tsilhqot'in Nation. The Kluskus and Kluskus-Ootsa Forest Service Roads (FSR) and Mine transmission line cross the traditional territories of Nadleh Whut'en First Nation, Saik'uz First Nation, and Stelat'en First Nation (collectively, the Carrier Sekani First Nations) as well as the traditional territories of the Nazko First Nation, Nee-Tahi-Buhn Band, Cheslatta Carrier Nation, and Yekooche First Nation.

Mineral tenures, assets, and rights for the Mine were transferred from New Gold Inc. (New Gold) to Artemis Gold Inc. (Artemis) in August 2020. Artemis transferred the Mine certificate to their subsidiary Blackwater Gold LTD. (BW Gold) who currently runs the Mine. The Mine Construction phase is estimated to last two years and includes the establishment of a tailings storage facility (TSF), ore processing facilities, waste rock, overburden, and soil stockpiles, borrow areas and quarries, water management infrastructure, water treatment plants, accommodation camps, and ancillary facilities. A 135 km, 230 kilovolt overland transmission line will supply electrical power to the Mine from the Glenannan substation BC Hydro grid.

Early Works construction began in October 2022, and both early works and major works construction was undertaken throughout 2023. Construction works undertaken in 2023 included tree clearing and grubbing, as well as earthworks associated with the plant site, explosives magazine site, topsoil stockpiles, water management pond, TSF, borrow area and various mine site roads. Additionally, upgrades were completed on the existing camp area.

A Wildlife Mitigation and Monitoring Plan (WMMP) was developed to manage potential adverse Mine-related effects on wildlife and wildlife habitat during the Construction, Operations, Closure, and Post-closure phases (ERM 2023a). The WMMP incorporates requirements from the Environmental Assessment Certificate #M19-01 (EAC), the federal Decision Statement (DS), and the master Mitigation Table (MT) which was approved by the BC Environmental Assessment Office in November 2020 to address EAC condition 43. This report presents the results of the wildlife monitoring activities completed in 2023, following the WMMP. Annual monitoring programs are overseen by a QP and completed by experienced personnel, as outlined in the WMMP.

A concordance table tracking requirements from the Decision Statement (DS) and Environmental Approval Certificate (EAC) is in Appendix A.

As defined by the WMMP and relevant Mine conditions, this annual report will:

- Summarize and present the results of the follow up programs and monitoring of mitigation measures during the previous year, during Construction and Operation of the Mine;
- Include a table of concordance indicating where EAC and DS conditions have been addressed (see Appendix A);
- Be sent to the Environmental Assessment Office (EAO) and Aboriginal Groups by March 31 the year following the reporting year;

- Subsequently, be sent to Environment and Climate Change Canada (ECCC) and aboriginal groups for review and comment by June 30 of the year following the reporting year (DS condition 2.12); and
- Be delivered in its final version to the Canadian Environmental Assessment Agency by September 30 of the year following the reporting year (DS condition 2.13).

1.1 2023 WILDFIRE

In 2023, the Davidson Creek fire (July Wildfire; Fire Number: G41493; BC Wildfire Service) was discovered west of the Mine on July 10, 2023, impacting various WMMP monitoring programs. The Blackwater camp was evacuated by provincial order due to an uncontrolled wildfire in the area later that day. The site was closed for all non-essential employees and activities were resumed in a staged approach starting July 24, with construction resuming August 3. With respect to the Mine footprint, the fire extended from approximately kilometre marker (KM)8–KM16 along the Blackwater Access Road (Figure 1.1-1). Some building structures were lost to the fire, including offices located directly across from the main facilities. The fire primarily affected standing timber and understory vegetation along smaller Mine roads on the western area of the mine site. The fire also caused damage to whitebark pine (*Pinus albicaulis*) areas, across lower and higher elevation regions south of the drill pad area.

Various WMMP monitoring programs were cancelled or only partially completed as a result of the July wildfire. Health and safety concerns preventing access to the Project resulted in a shortened field season. Impacts to the 2023 monitoring programs are detailed in each relevant monitoring program section. The following 2023 monitoring programs were impacted by the July wildfire:

- Site Wildlife Camera Monitoring array to evaluate wildlife use and interaction with the Mine footprint and monitor wildlife use of habitat features (Sections 2.6;
- Monitoring of Kokanee Spawning Streams to monitor stream for ongoing grizzly bear use (Sections 3.4.2.2 and 3.4.3);
- Bat Distribution Monitoring to evaluate bat species composition and distribution within the LSA and improve baseline data quality (Sections 3.6.2.1 and 3.6.3.1);
- Waterbird Population Monitoring to evaluate changes in waterbird population dynamics in the Mine area (Sections 3.8.2.1 and 3.8.3.1);
- Common Nighthawk Monitoring to evaluate changes in common nighthawk population dynamics in the Mine area (Sections 3.9.2.2 and 3.9.3.2);
- Clark's Nutcracker Monitoring to evaluate changes in Clark's nutcracker population and utilization of whitebark pine critical habitat (Sections 3.9.2.4 and 3.9.3.4);
- Monitoring Western Toad Mortality on Roads to evaluate potential western toad mortalities due to vehicle collisions on Mine roads adjacent to breeding ponds (Sections 3.10.2.1 and 3.10.3.1); and
- Monitoring Western Toad Breeding Ponds to assist in confirming and identifying western toad habitat and breeding sites (Sections 3.10.2.2 and 3.10.3.2).

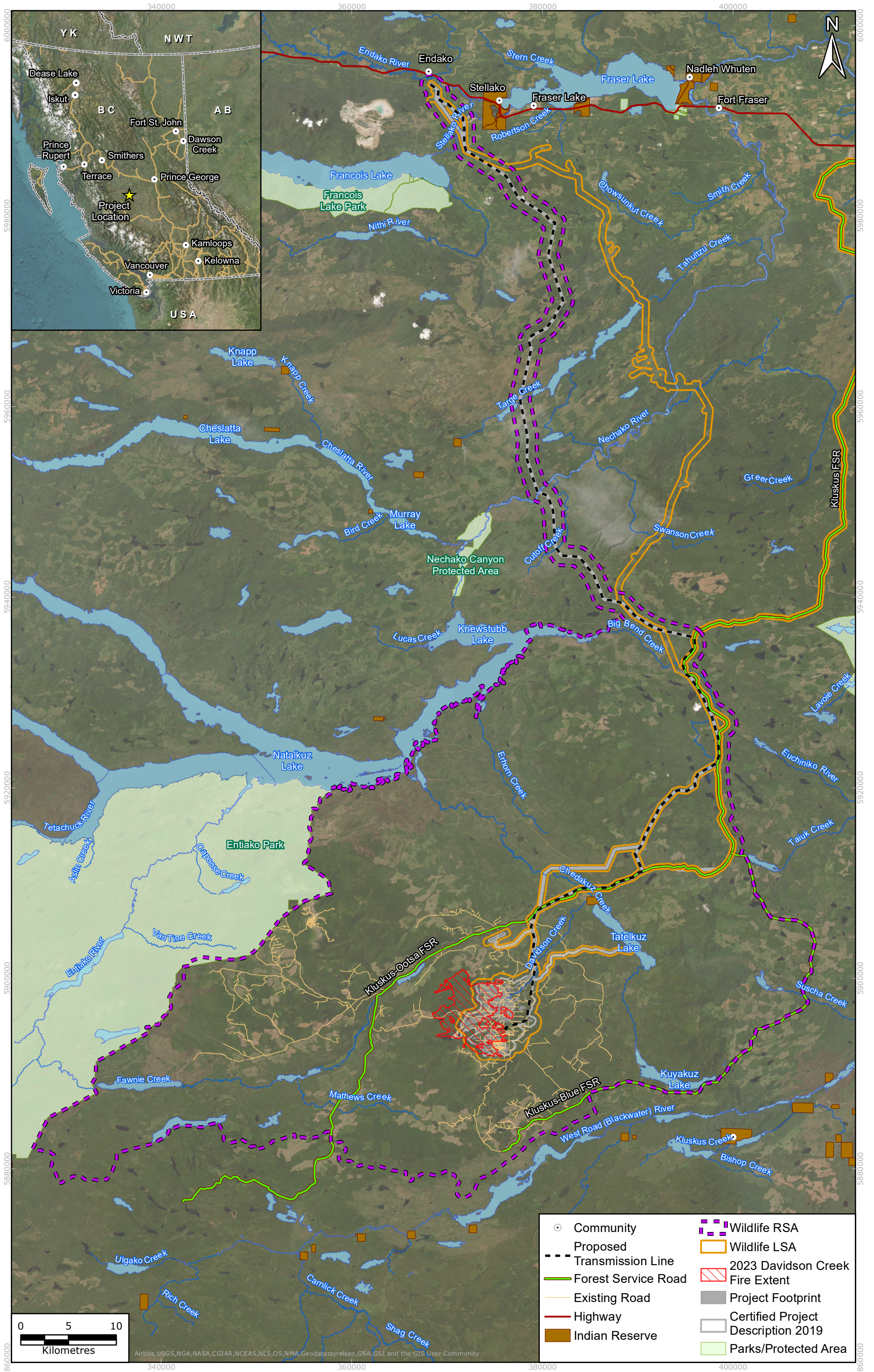
Additionally, adjustments to the WMMP monitoring programs is expected in 2024 to account for annual monitoring locations that were impacted by the July wildfire.

1.2 STUDY AREAS

Wildlife monitoring activities were undertaken in two study areas: the Local Study Area (LSA) and the Regional Study Area (RSA).

The LSA is 27,589 hectares (ha) in size and includes a buffer extending at least to the height of land or 1–1.5 km around the outer limits of the proposed infrastructure and linear developments associated with the mine site and transmission line (Figure 1.1-1). The LSA has been established to include the area in which most direct and indirect Mine effects are expected to occur.

FIGURE 1.1-1 LOCAL AND REGIONAL STUDY AREAS OF THE BLACKWATER MINE



The RSA is 274,098 ha in size and was delineated to reflect the area anticipated to provide habitat for wildlife species that interact with Mine infrastructure during a season or lifetime (Figure 1.1-1). The RSA extends roughly 15 km from the designated Mine area and is used to provide context for the evaluation Mine-specific effects and potential cumulative effects.

Ecologically, the RSA is composed of primarily coniferous forest, with mixed areas of young forest plantations, mature and old growth forest, and small portions of sub-alpine and alpine mountain. Most of the RSA is represented by the biogeoclimatic ecosystem classification (BEC) units of Engelmann Spruce – Subalpine Fir (ESSF) and Sub-boreal Spruce (Figure 1.1-1). The LSA is less diverse, comprised of primarily coniferous forest in the ESSF BEC zone.

1.3 MONITORING REQUIREMENTS AND OBJECTIVES

The objectives of the WMMP Compliance Report are:

- Summarize and present the results of the follow-up programs carried out the previous year, as outlined in the WMMP (ERM 2023a),
- Summarize and present the results of the monitoring of mitigation measures carried out the previous year, as outlined in the WMMP (ERM 2023a),
- Provide analysis of monitoring results to test impact predictions from the Environmental Impact Statement (EIS; New Gold 2015, ERM 2017), and
- Provide an overview of adaptive management actions carried out the previous year, along with the reasoning and outcome for each action.

The WMMP Compliance Report is separated into site-specific programs which include data from multiple wildlife groups, and species-specific monitoring programs which include monitoring of a single wildlife species or group (e.g., waterbirds). Table 1.3-1 summarizes the programs and their corresponding section in the WMMP Compliance Report.

TABLE 1.3-1 MONITORING PROGRAMS IN THE WMMP COMPLIANCE REPORT

Program Category	Program Name	Section
Site-Specific Monitoring	Wildlife Pre-clearing Surveys and Mitigation	2.1
	Habitat Loss Monitoring	2.2
	Interactions, Incidents, and Mortalities	2.3
	Facility Water Structure Monitoring	2.4
	Transmission Line Monitoring	2.5
	Site Wildlife Camera Monitoring	2.6
Species-Specific Monitoring	Moose	3.1
	Caribou	3.2
	Mountain Goat	3.3
	Grizzly Bear	3.4
	Furbearers	3.5
	Bats	3.6
	Raptors	3.7
	Waterbirds	3.8
	Upland Birds	3.9
	Amphibians	3.10

2. SITE-SPECIFIC PROGRAMS

2.1 PRE-CLEARING SURVEYS AND MITIGATION

DS conditions addressed: 4.1, 8.9, 8.10, 8.14

EAC conditions addressed: 23.c, 23.h.ii

Clearing and construction activities may occur during multiple Mine phases and at different spatial scales (e.g., primary site construction or annual brush clearing in localized areas). Clearing is planned to occur outside sensitive timing windows for wildlife, where possible, with pre-clearing surveys and mitigation if clearing must occur during sensitive timing windows.

Pre-clearing surveys are required for wildlife when species' sensitive periods overlap the planned clearing period, as part of the provincial EAC condition 23.c. Sensitive periods for wildlife requiring the completion of pre-clearing surveys have been identified for moose (*Alces alces*), grizzly bear (*Ursus arctos horribilis*), furbearers (wolverine [*Gulo gulo*], American marten [*Martes americana*], fisher [*Pekania pennanti*], black bear [*Ursus americanus*]), bats, birds (raptors, waterbirds, and forest and grassland birds), amphibians (Columbia spotted frog [*Rana luteiventris*] and western toad [*Anaxyrus boreas*]), and caribou (*Rangifer tarandus caribou*; southern mountain population), as required by Federal condition 8.9 and EAC condition 23.h.ii (Table 2.1-1). Species and group specific sensitive periods applicable to the Mine are further defined and described in Section 3.3.1 of the WMMP (ERM 2023a).

TABLE 2.1-1 WILDLIFE SENSITIVE PERIODS

Species Name	Habitat or Feature Type	Guideline Period
Caribou and Mountain Goat	Ungulate Winter Range	Sensitive kidding period: January 15 to July 15
Mineral Licks	Mineral Licks	Protected year-round
Grizzly and Black Bear	Dens	Sensitive denning period: October 1 to March 31
Fisher	Dens	Sensitive denning period: March 15 to June 30
American Marten	Dens	Sensitive denning period: March 1 to September 30
Wolverine	Dens	Sensitive denning period: February 1 to June 30
Bat	Roosts	Sensitive roosting period: May 15 to September 30
	Hibernacula	Sensitive hibernation period: October 1 to May 31
Raptor	Nests, eggs, and young	Sensitive breeding period: March 15 to April 15
	Nests	Protected year-round
Waterbirds and Upland Birds	Nests, eggs, and young	Sensitive breeding period: April 15 to August 31
Clark's Nutcracker (<i>Nucifraga Columbiana</i>)	Nests, eggs, and young	Sensitive breeding period: March 15 to July 30
Amphibians	Wetlands	Sensitive Breeding Period: April 1 to September 30

Pre-clearing surveys were conducted in 2023 for bears, furbearers, bats, raptors, waterbirds, and upland birds by multiple different consultants; reports for each set of pre-clearing surveys are presented in Appendix B. This section includes amphibian pre-clearing surveys and salvage completed by ERM in 2023.

2.1.1 OBJECTIVES

The objective of pre-clearing surveys is to identify and protect wildlife features during designated sensitive periods as described in Table 2.1-1.

2.1.2 METHODS

The pre-clearing Standard Operating Procedures (SOPs) developed for the Mine for bird nests and general wildlife features (i.e., bear and furbearer dens, bat roosts and hibernacula, and mineral licks) are provided in Appendix C and Appendix D, respectively. Pre-clearing surveys and subsequent follow-up monitoring completed in 2023 for these features are reported in Appendix B.

2.1.2.1 AMPHIBIAN PRE-CLEARING SURVEYS AND SALVAGE

Amphibian pre-clearing surveys and salvage was completed in accordance with the *Amphibian Pre-clearing and Salvage SOP* provided in Appendix E and in compliance with wildlife permits SM23-802181 and SM-809568. To prevent the spread of potentially harmful pathogens, including Chytrid fungus, all capture and handling of amphibians was completed in accordance with *Live Animal Capture and Handling Guidelines for Wild Mammals, Birds, Amphibians, and Reptiles* (RIC 1998a) and the *Standard Operating Procedures: Hygiene Protocols for Amphibian Fieldwork* (BC MOE 2008). All equipment was cleaned using a bleach solution prior to salvage.

Pre-clearing surveys for amphibian presence and breeding were completed for waterbodies and wetlands in areas scheduled for clearing or construction activities. Amphibians were captured via dipnets and relocated in buckets or Ziplock bags while wearing disposable nitrile gloves. See Appendix E for additional details.

2.1.3 RESULTS

Results from the pre-clearing surveys conducted for bears, furbearers, bats and birds in 2023 and any subsequent buffering and follow-up monitoring is provided in Appendix B.

2.1.3.1 AMPHIBIAN PRE-CLEARING SURVEYS AND SALVAGE

Amphibian salvage was completed under wildlife permit SM23-802181 on June 13, 14, and 15, 2023 for Columbia spotted frog and western toad adults and tadpoles (Table 2.1-2; Figure 2.1-1; Appendix F).

Western toad and Columbia spotted frog adults and tadpoles were observed by onsite environmental personnel in four adjacent ponds within the footprint of road construction close to the ore body. The four western toad breeding ponds were isolated using drift fencing, and amphibians were salvaged and relocated. A total of 29,204 tadpoles and three adult western toads were salvaged without incident (Table 2.1-2; Figure 2.1-1). Columbia spotted frog tadpoles (n = 912) and adults (n = 63) were also salvaged.

FIGURE 2.1-1 AMPHIBIAN SALVAGE AND RELOCATION SITES, 2023

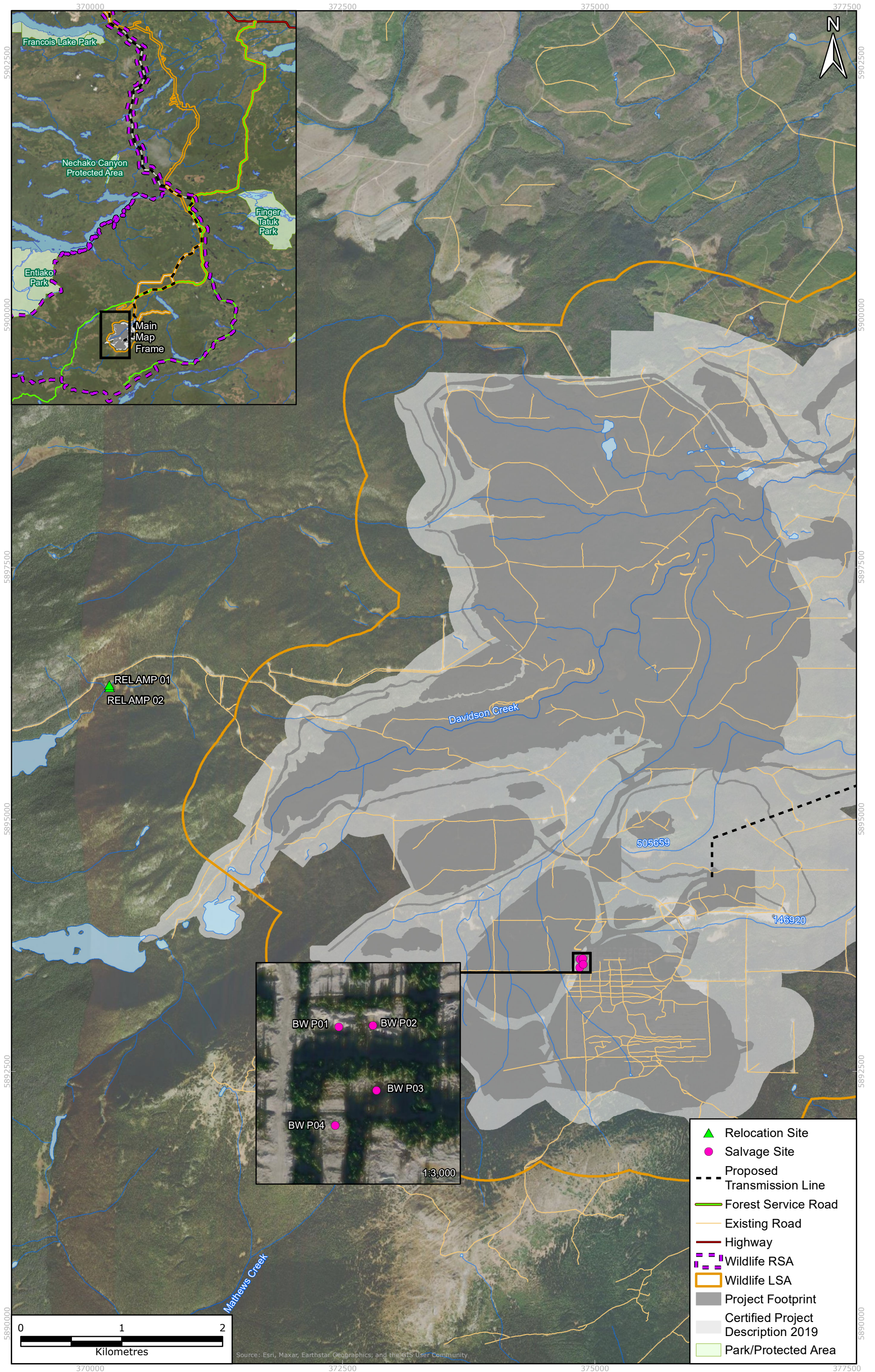


TABLE 2.1-2 AMPHIBIAN SALVAGE AND RELOCATION, 2023

Amphibian Salvage Site Name	Dates Salvaged and Relocated	Columbia Spotted Frog		Western Toad		Relocation Site Name
		Tadpole	Adult	Tadpole	Adult	
BW P01	June 13–16	486	14	0	0	REL AMP 01
BW P02	June 14–16	0	9	0	0	REL AMP 02
BW P03	June 14–16	0	20	0	0	REL AMP 02
BW P04	June 13–17	332	20	29,204	3	REL AMP 01
Total		818	62	29,204	3	

All salvaged amphibians were immediately relocated to the nearest suitable waterbody outside of the construction area. Two relocation sites were utilized, the sites were adjacent to each other and 5.4 km from the salvage site (within the same watershed). Both relocation sites were observed to be western toad breeding sites and were deemed suitable for relocation of both western toad and Columbia spotted frog. The relocation sites contained suitable breeding habitat and had similar pH and water temperature to the salvage sites.

Amphibians were encountered as incidental bycatch during fish salvage activities at Davidson Creek undertaken by Triton Environmental Consultants Ltd. Amphibian handling was completed under wildlife permit SM23-809568 from August 19 to October 11 for Columbia spotted frog, western toad, and long-toed salamander (*Ambystoma macrodactylum*) adults and juveniles. A total of 18 western toads, 90 Columbia spotted frogs, and one long-toed salamander were incidentally encountered during the Davidson Creek fish salvage. All amphibians encountered were removed from the water while electro-fishing surveys were completed and placed on the banks for the duration of the surveys. Primarily adult amphibians were present, given the seasonal timing most tadpoles or larvae had emerged and dispersed from the waterbodies.

2.1.4 DISCUSSION

Clearing and construction activities are planned to occur outside of sensitive timing windows for wildlife, where possible, with pre-clearing surveys and mitigation mandated by provincial EAC condition 23.c if clearing must occur during sensitive timing windows, as well as Mines Act permit -246 condition C.7 and the Construction Environmental Management Plan. Results from the pre-clearing surveys conducted for bears, furbearers, bats, and birds in 2023 and any subsequent buffering and follow up monitoring are provided in Appendix B.

Amphibian salvage was completed under wildlife permit SM23-802181 at four artificial wetlands (old drainage ponds) located within the footprint of planned road construction. While Mine activity was avoided at most waterbodies during the breeding season, salvages of western toad and Columbia spotted frog were completed for the second year from June 13 to 15, 2023. The majority of the salvages were of western toad tadpoles. Surveys were conducted to monitor the success of relocation sites for salvaged western toads per the WMMP and federal DS condition 8.11 (ERM 2023a) and are reported in Section 3.10.

Additionally, amphibians encountered incidentally during fish salvage activities at Davidson Creek from August 19 to October 11 were removed from the water and placed on the banks for the duration of the surveys (wildlife permit SM23-809568). Amphibians captured and released included adult and juvenile western toads, Columbia spotted frogs, and one long-toed salamander. This work was not related to construction activities or conditions relevant to wildlife pre-clearing and was conducted incidentally to preserve the health of the amphibians in Davidson Creek during fish salvage activities.

2.2 HABITAT LOSS MONITORING

DS conditions addressed: none

EAC conditions addressed: 23.h

Habitat loss monitoring is used to validate predictions in the EIS relating to the amount of wildlife habitat lost due to construction of the Mine, as outlined in the WMMP (Sections 4.1, 4.4, 4.7, and 4.8; ERM 2023a) and the Caribou Mitigation and Management Plan (CMMP; Section 6.2.1; ERM 2022a). Habitat loss is evaluated by comparing the as-built Mine footprint with existing habitat suitability mapping for the following focal species or groups: moose, caribou, grizzly bear, birds (interior forest habitat birds, short-eared owl [*Asio flammeus*], greater yellow legs [*Tringa melanocoleuca*], and Wilson's snipe [*Gallinago delicata*]), and western toad (ERM 2017, 2023a; New Gold 2015). Any loss of habitat over predicted levels for these focal species would require adaptive management.

2.2.1 OBJECTIVES

The objectives of habitat loss monitoring are to:

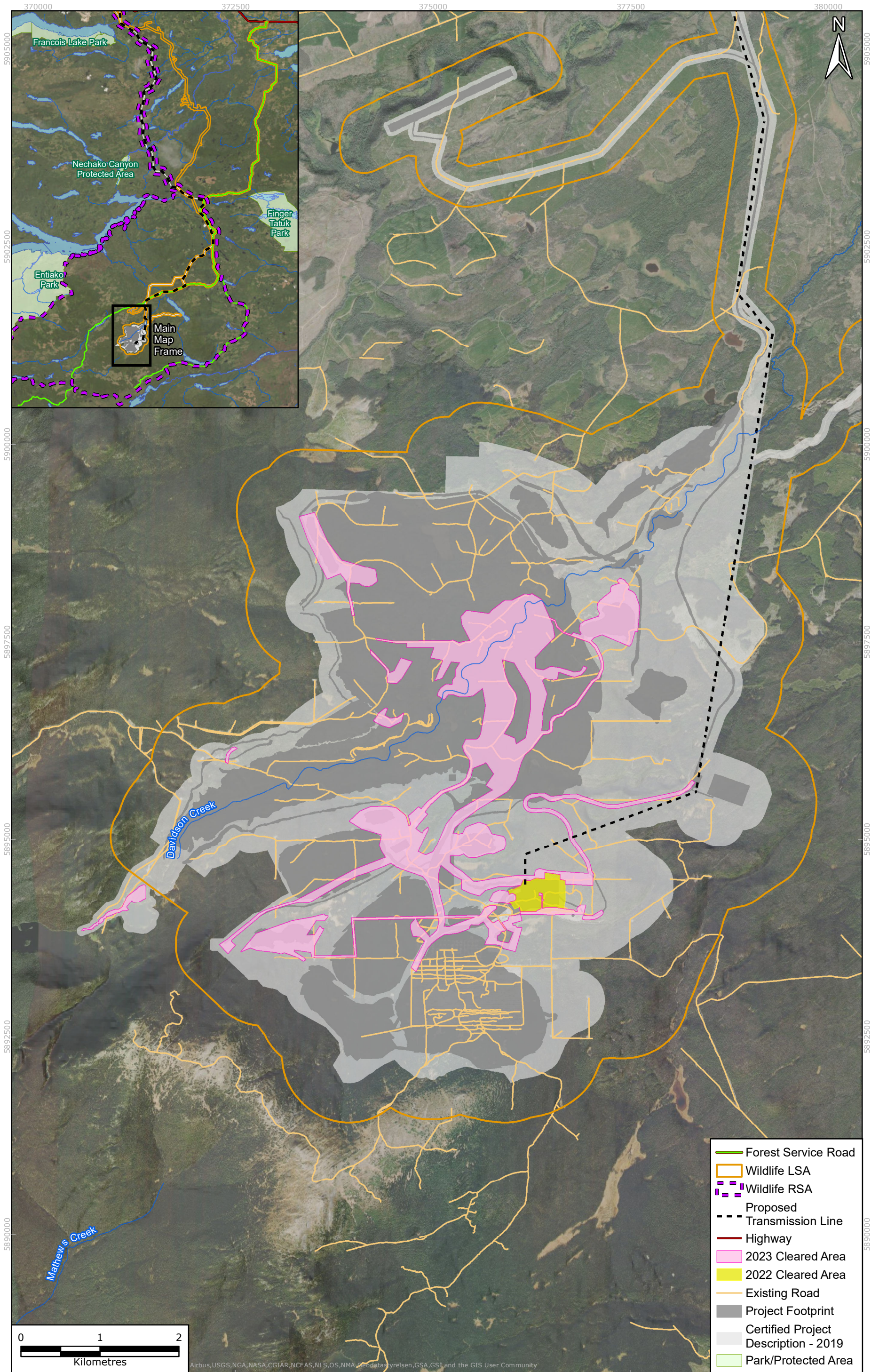
- Evaluate wildlife habitat loss from Mine construction and compare to predictions from the EIS.
- Measure the amount of habitat recovery at the site during Closure.

2.2.2 METHODS

Habitat loss monitoring was conducted for the second year in 2023. Habitat loss was calculated by comparing the as-built Mine footprint with existing habitat suitability mapping for specific focal species to verify predicted effects of the Mine (Figure 2.2-1; ERM 2023a). Species monitored for habitat loss, based on the WMMP (ERM 2023a) are:

- Moose (growing and winter);
- Caribou (spring, summer/fall, winter);
- Grizzly bear (spring, summer, fall, and winter);
- Forest and grassland birds (interior forest habitat, and short-eared owl nesting habitat);
- Waterbirds, using individual indicator species:
 - Greater yellowlegs;
 - Wilson's snipe; and
- Western toad.

FIGURE 2.2-1 BLACKWATER MINE FOOTPRINT, 2023



Habitat suitability models were developed for the EIS using a combination of ecosystem mapping and field surveys for model validation (New Gold 2015; ERM 2017). Models consider species life history and seasonal patterns. Model development was consistent with similar models across the province of BC.

A six-class habitat suitability model was used for moose, caribou, and grizzly bear habitat suitability ranging from (1) high, (2) moderately high, (3) moderate, (4) low, (5) very low, and (6) nil (ERM 2017). Western toad habitat suitability was rated on a four-class scale (high, moderate, low, and nil). Suitable habitat for birds typically uses fewer seasons and a coarser rating structure. Suitability mapping for forest interior birds used a two-class scale (available or unavailable), while all other birds (short-eared owl, greater yellowlegs, and Wilson's snipe) used a three-class scale (high, moderate, low).

Suitable habitat to calculate habitat loss was considered moderately to highly suitable mapped habitat. For forest interior birds, habitat suitability maps only provided available habitat, so all available habitat was considered suitable.

Annual habitat loss was calculated as the difference between the current year's footprint and the existing footprint from previous years, while cumulative habitat loss was calculated as the difference between the current year's footprint and the pre-construction state.

2.2.3 RESULTS

Early Works and major works construction completed throughout 2023 accounted for 541.2 ha of habitat loss (Table 2.2-1). The total habitat loss at the Mine since 2022 accounts for 567 ha, which is 8% of the total area predicted to be lost in the EIS (7,032 ha; Table 2.2-1). Habitat loss in the RSA was primarily associated with forested habitat in 2023, therefore suitable habitat loss was greatest for species which rely on these areas, including moose, caribou, grizzly bear, and forest interior birds (Table 2.2-1). There was no overlap between the 2023 clearing limits and short eared owl suitable habitat (Table 2.2-1). Among each of the species for which habitat loss is evaluated, between 0% and 0.6% of available suitable habitat within the RSA and 0% to 8% of suitable habitat within the LSA has been lost due to the Mine to date (Table 2.2-1).

2.2.4 DISCUSSION

Habitat loss is monitored for specific species to validate predictions from the EIS and confirm the effectiveness of mitigation measures (ERM 2023a). Total habitat loss since 2022 accounts for 567 ha, with 541.2 ha of habitat loss attributed to construction completed in 2023. The realized habitat loss to date is 8% of the predicted habitat loss within the LSA in the EIS (7,032 ha). Early Works construction was initiated in October 2022, with 2023 marking the first full year of early works and major works construction being completed. Therefore, the annual habitat loss was added to the cumulative habitat loss from 2022 to determine the cumulative habitat loss from both years. Currently, habitat loss for the RSA represents between 0% and 0.6% of the predicted total habitat loss for the Mine across all species, based on the EIS (ERM 2017).

TABLE 2.2-1 ANNUAL AND CUMULATIVE HABITAT LOSS IN THE REGIONAL STUDY AREA BY SPECIES, 2023

Species		Suitable Habitat ¹			LSA Habitat Loss			RSA Habitat Loss		
Common Name	Scientific Name	Seasonal Habitat	RSA (ha) ²	LSA (ha) ³	Annual Loss (ha)	Cumulative Loss (%)	Predicted Cumulative Loss (%)	Annual Loss (ha)	Cumulative Loss (%)	Predicted Cumulative Loss (%)
Moose	<i>Alces alces</i>	Growing	81,623	7,709	265.6	3.8	32.7	269.6	0.4	28.0
		Winter	48,693	4,244	127.9	3.0	18.0	127.9	0.3	16.7
Caribou ⁴	<i>Rangifer tarandus caribou</i>	Spring	108,717	5,877	378.6	6.9	41.8	385.3	0.4	42.1
		Summer/Fall	116,389	7,539	385.1	5.5	53.6	391.7	0.4	45.0
		Winter	114,701	6,572	426.0	6.9	46.7	419.4	0.4	44.4
Grizzly bear	<i>Ursus arctos horribilis</i>	Spring	88,316	7,445	203.6	3.1	31.6	204.1	0.3	30.3
		Summer	125,469	10,071	302.2	3.3	42.8	302.7	0.3	43.0
		Fall	136,664	10,056	319.4	3.4	42.7	322.7	0.3	46.9
		Winter	612,22	3,826	303.4	8.6	16.2	309.3	0.6	21.0
Short-eared owl	<i>Asio flammeus</i>	Nesting	1,013	0	0.0	0.0	0.0	0.0	0.0	0.4
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Nesting	47,603	7,033	19.5	0.3	29.9	20.0	<0.1	16.3
Wilson's snipe	<i>Gallinago delicata</i>	Nesting	27,808	3775	0.3	<0.01	16.0	0.4	<0.01	9.5
Interior forest birds	NA	NA	128,685	10,633	505.9	5.0	45.1	508.0	0.4	44.1
Western Toad	<i>Anaxyrus boreas</i>	Living	94,341	10,700	155.2	1.5	45.4	155.2	0.2	32.3

¹ Suitable habitat is based on habitat suitability models developed for the EIS. Small variations exist in the RSA and LSA mapped for habitat suitability models to the current study area boundaries (New Gold 2015; ERM 2017).

² The RSA mapped for habitat suitability models accounted for a total of 291,714 ha in the EIS (ERM 2017).

³ The LSA mapped for habitat suitability models accounted for a total of 23,554 ha in the EIS (ERM 2017).

⁴ Caribou habitat suitability mapping only completed for the mine site LSA (14,061 ha) and RSA (258,408 ha), i.e., not including the Transmission Line (ERM 2017).

2.3 INTERACTIONS, INCIDENTS, AND MORTALITIES

DS conditions addressed: none

EAC conditions addressed: 23.n

A wildlife interaction occurs when Mine personnel or infrastructure encounter wildlife where deterrents may be used, but does not result in direct harm, injury, damage, or wildlife mortality (e.g., a bear deterred from camp). A wildlife incident occurs when an interaction results in direct harm, injury, damage, or wildlife mortality occurs.

Mine personnel and subcontractors receive wildlife training during site orientation and during annual refreshers. Training includes reporting protocols for wildlife sightings, interactions, and incidents, including reporting of habitat features (e.g., nest, den, mineral lick). All wildlife incidents, including vehicle collisions and mortalities from human-wildlife interactions, require a formal incident report as per the WMMP (ERM 2023a). Wildlife incidents and mortalities from 2023 are included in this section.

Wildlife observed on the Mine site is reported to the Mine's Environment Department. All incidental wildlife observations are summarized in the annual WMMP Compliance Report. Incidental observations from 2023 are described under each relevant species section in this report (EAC condition 23.n).

2.3.1 VEHICLE COLLISIONS

Mine-related vehicle traffic was predicted to potentially increase mortality risk for moose, caribou, and grizzly bear (ERM 2017). Vehicle-related mortality has the potential to alter the abundance and distribution of these species within the LSA. BW Gold installed signage to identify potential wildlife crossing areas that were identified during pre-construction habitat suitability surveys along the Kluskus (FSR) and Blackwater Access Road. Additionally, a mineral lick primarily used by mountain goats was identified in 2022 on the northwestern side of Mount Davidson. Wildlife access trails to the mineral lick were noted to potentially intersect with an infrequently used Mine trail and the Blackwater Access Road. As a result, mountain goats were added to the WMMP in 2023 and identified as a focal species for vehicle collision monitoring, specifically near Mount Davidson (ERM 2023a).

Wildlife interaction and incidents involving vehicles are summarized separately from other incidents to validate EIS predictions and the effectiveness of the mitigation measures outlined in the WMMP.

2.3.2 OBJECTIVES

The objectives of the interactions, incidents, and mortality monitoring are to:

- Record and report any wildlife related interaction, incident, and mortality associated with Mine activity.
- Monitor wildlife-vehicle incidents and mortalities, specifically for moose, caribou, mountain goat, and grizzly bear.

2.3.3 METHODS

Incidental Observations and Interactions

Incidental observations, interactions, and records of any incidentally observed dead animals (where the mortality was not caused by the Mine) were recorded by BW Gold staff (Appendix G) and by consultants and field crews during field surveys (Appendix H) in 2023. Additionally, aircraft pilots and passengers recorded observations or encounters with wildlife, specifically mountain goats, and any mitigation actions taken. Observation data include, where available: the recorder, species, date, time, location, activity, and any management response.

Incidental observations are reported in each relevant species section. Interactions are reported in the Results section below.

Incidents

All incidents were recorded in formal incident reports, including: a summary of the event, response action and means of implementation, copies of internal and external communications, follow-up monitoring results, and any adaptive management outcomes, if required.

Vehicle Collisions

All wildlife interactions, collisions, and mortalities along or on the roadways were recorded and reported to the Mine Environment Department and other relevant personnel as soon as safe to do so. Vehicle collisions are considered wildlife incidents and therefore follow the same incident report protocol as described in the section above. The focal species for vehicle collision monitoring are moose, caribou, mountain goat, and grizzly bear.

2.3.4 RESULTS

Five wildlife interactions events and one incident occurred in 2023 (Appendix I). The single incident was a woodchuck (*Marmota monax*) recorded as roadkill at KM6 of the Blackwater Access Road on June 14, 2023. Wildlife interaction events were associated with red fox (n = 3; *Vulpes vulpes*) and ravens (n = 2; *Corvus corax*). Four of the interaction events were associated with food waste or feeding of wildlife.

Ravens were noted feeding on food waste that was left in the bed of a pick-up truck on February 21, 2023, and on food waste that was accessible through the mesh top of the food waste dumpsters due to overfilling on October 21, 2023. In response, proper disposal of food waste was revisited, and any accessed waste was appropriately disposed of and distributed across dumpsters as to not overfill to where waste was accessible.

Three interactions with fox occurred in 2023. A fox that frequents the camp area was observed being fed on April 1. On May 28, a site worker was observed discarding food waste on the ground, allowing a fox to eat it. On both occasions, the individuals involved were reminded of proper waste disposal and that feeding of wildlife is not permitted on site. A fox gained access to the Plant Site Sediment Control Pond (SCP) on October 19, 2023. The fox was unable get traction on the smooth liner of the SCP to leave the pond, and as a result a traction aid was rolled down a portion of the

SCP. The fox was able to leave the SCP using the traction aid. Snow fencing was established around the perimeter of the SCP to prevent access by wildlife. Construction of site ponds was initiated in the second half of 2023, with completion of the Plant Site SCP and other ponds occurring in Q3 and Q4 2023. Monitoring of these ponds will be initiated in 2024, as required by the WMMP (see Section 2.4).

Additionally, a Mediterranean house gecko (*Hemidactylus turcicus*), a non-native species of reptile, incidentally, arrived on site in a shipment at the Plant Site on October 13, 2023. Environment Department staff were immediately called, and the gecko was placed in a container near a heat source. When Environment staff arrived, the gecko had died due to natural causes. This species is not adapted to the climate in the Blackwater area and likely stressed from a long period among shipping supplies. The specimen was delivered to the Royal BC Museum to be held in their inventory. This event is not considered as an incident or interaction as the non-native species presence and mortality was not due to Mine activities.

2.3.5 DISCUSSION

Wildlife interactions are encounters with wildlife where deterrents may be used, but does not result in direct harm, injury, damage, or wildlife mortality. Wildlife incidents are interactions resulting in direct harm, injury, damage, or wildlife mortality. Five wildlife interactions events and one incident occurred in 2023.

One incident associate with Mine roads was recorded at KM6 of the Blackwater Access Road on June 14, 2023, where a woodchuck was noted to have been struck and killed. This is the first vehicle related incident recorded at the Mine. Incidents associated with Mine roads may happen occasionally but are expected to be uncommon with sufficient mitigation measures in place, including training for all personnel to give wildlife right-of-way on roads, and conservative speed limits as detailed in Section 3.6.2 of the WMMP (ERM 2023a).

In total, five wildlife interactions were recorded at the Mine in 2023. All interactions were associated with ravens or foxes. Of the interactions, four were related to improper food waste disposal or feeding of wildlife. On all occasions, remaining food waste was disposed of properly and the individuals involved were reminded of site policies and proper disposal procedures. Waste management mitigation measures are developed and implemented at the Mine during all phases to manage risks to wildlife as detailed in Section 3.5 of the WMMP (ERM 2023a) and the Mine's *Waste (Refuse and Emissions) Management Plan*. Regular mine safety and environmental orientations for mine personnel and contractors include wildlife awareness information including reviewing waste management procedures. After each wildlife interaction, waste management procedures were reviewed and adaptive measures were implemented, such as ensuring waste was properly distributed within disposal containers, so it is not obtainable by wildlife through the mesh of the food waste dumpsters.

A fox gained access to the Plant Site Sediment Control Pond (SCP) and was unable get traction on the smooth liner of the Plant Site SCP. Promptly after identification, to help the fox climb out of the SCP, a traction aid was rolled down allowing the animal to escape. Snow fencing was established around the perimeter of the SCP as a temporary barrier prevent access by wildlife.

The need for additional mitigation measures to limit access to the Plant Site SCP and other Mine ponds by wildlife will be assessed in 2024 to reduce the risk of drowning.

A non-Mine related wildlife event occurred when a non-native Mediterranean house gecko was found in a shipment to the Plant Site. The individual died from natural causes and was delivered to the Royal BC Museum to be held in their inventory. This event is not considered as an incident or interaction as the non-native species presence and mortality was not due to Mine activities. Identification and reporting of the house gecko is an example of successful compliance with the preventative protocols outlined in the WMMP. Inspections of equipment and reporting non-native or invasive species to supervisory personnel is required as detailed in Section 3.2 of the WMMP (ERM 2023a).

Vehicle collisions are summarized separately from other types of wildlife incidents and mortalities to validate EIS predictions and the effectiveness of the mitigation measures outlined in the WMMP. To date, no vehicle collisions with focal species have occurred at the Mine. Existing mitigations to prevent wildlife vehicle collisions include speed limits, signage at potential wildlife crossings, and reporting incidental sightings. No adaptive management actions are required at this time.

2.4 FACILITY WATER STRUCTURE MONITORING

DS conditions addressed: 4.2, 8.12

EAC conditions addressed: 23.k

Facility water structures (i.e., the TSF and all Mine ponds) will undergo management and monitoring to prevent wildlife use of areas that may be hazardous. Wildlife (including migratory birds, furbearers, and amphibians) will be deterred from facility water structures until water quality parameters meet permit limits as per DS condition 4.2. Monitoring will be completed at facility water structures to determine whether wildlife are using the ponds, and whether deterrence measures are required, based on water quality testing (ERM 2023a). Monitoring will include remote wildlife cameras, surveys for breeding amphibians, and incidental sightings, as per WMMP Sections 4.1.3.4, 4.6.2.2, and 4.8.3.9, and is anticipated to begin in 2024. Additionally, as described in Section 2.3 of this report, an assessment will be conducted in 2024 to identify site ponds which may require mitigation measures to limit access by wildlife.

Construction of four facility water structures was initiated in the second half of 2023. Three water management structures were completed through the third and fourth quarters of 2023, including the Plant SCP with four associated rapid infiltration basins, TSF stage 1 construction SCP, and Davison Creek Diversion Berm Sump. Additionally, construction of the Water Management Pond was initiated in 2023 but is anticipated to be completed in spring of 2024. Monitoring of all four facility water structures, and any additional ones built in 2024, will commence in 2024.

2.4.1 OBJECTIVES

The objectives of the facility water structure monitoring program, once initiated, will be to:

- Evaluate amphibian use of facility water structures.
- Monitor the use of facility water structures by birds and other wildlife, such as furbearers.
- Evaluate the effectiveness of deterrents for migratory birds and amphibians used at facility water structures.

2.5 TRANSMISSION LINE MONITORING

DS conditions addressed: none

EAC conditions addressed: MT 9-22, 9-28, 9-33, 14-28

Electrical power will be supplied to the Mine by a new 135 km, 230 kilovolt overland transmission line that will connect to the BC Hydro grid at the Glenannan substation located near the Endako mine, 65 km west of Vanderhoof. The transmission line poses a potential risk to wildlife through habitat loss, disturbance, and risk of bird mortality from collision or electrocution.

There are two follow-up and monitoring programs designed to assess the adverse effects of the transmission line on birds: a transmission line bird mortality monitoring program and a literature review and possible follow-up monitoring program for effects of electromagnetic fields. The program to assess potential effects of electromagnetic fields on birds has not begun but will commence during the Construction phase.

2.5.1 OBJECTIVES

The objectives of the transmission line monitoring programs are to:

- Verify the effectiveness of mitigation measures for bird mortality along the transmission line.
- Evaluate potential effects of electromagnetic fields on birds interacting with the transmission line.

2.5.2 METHODS

Transmission line monitoring was not completed in 2023 as construction of the line has not begun. Transmission line monitoring transects were established in 2022 following guidelines in the WMMP and industry standardized methods (APLIC 2012; Birdlife International 2015). Locations were chosen in areas with potentially heightened waterbird mortality risk, including where the line crosses waterbodies and wetlands (ERM 2023a). No other terrain features which have potential to restrict bird flight and heighten mortality risk, such as valleys or cliffs, were noted across the length of the transmission line right of way. The chosen survey locations were also compared with waterbird survey observations to confirm that waterbirds are active at the chosen sites.

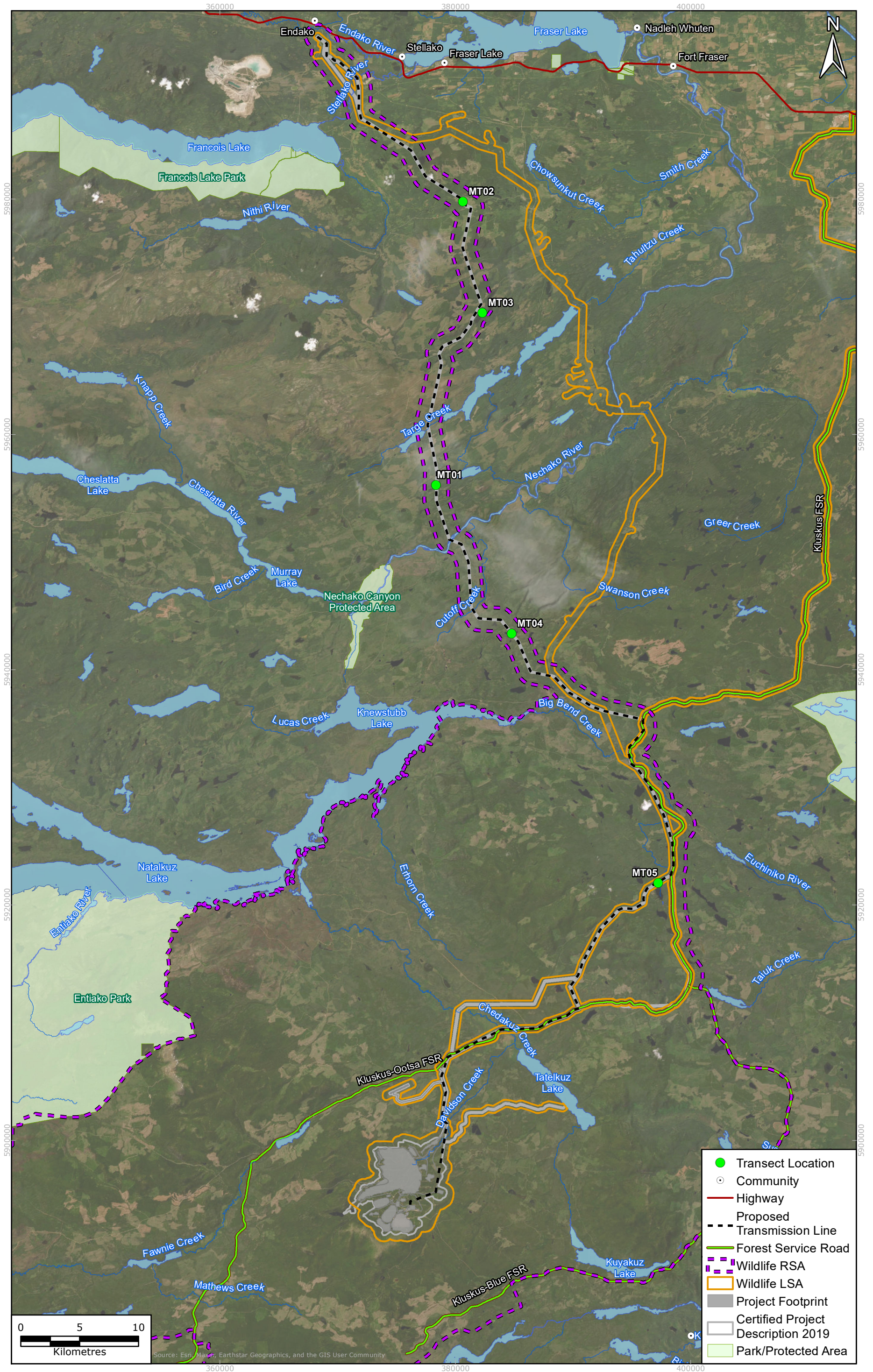
Although the right of way for the transmission line has not yet been cleared, an initial survey was completed in 2022 for each transect to collect baseline data and establish the survey route. Surveys were completed for transects 200 m in length and 20–25 m in width, with two observers walking in parallel to each other. The search area extended 50 m on either side of the transmission line (ERM 2023a).

Post-construction monitoring will include surveys of each transect once per week during April (spring migration), June (summer breeding period), and September (fall migration) each year. Subsequent monitoring and analysis will be completed once post-construction surveys have begun, as described in Section 4.8.3.6 of the WMMP (ERM 2023a).

2.5.3 RESULTS

No surveys were conducted for the transmission line in 2023, because construction of the line had not yet begun. A total of five transmission line monitoring transects were established and surveyed in 2022 (Figure 2.5-1). Monitoring for this program will commence once the transmission line is completed.

FIGURE 2.5-1 TRANSITION LINE MORTALITY MONITORING TRANSECTS, 2022



2.5.4 DISCUSSION

No compliance work was completed for the Transmission Line portion of the Mine in 2023. Five transects to monitor potential bird mortality were established in 2022 in preparation for the monitoring program, which will formally begin post-construction. Transect locations were chosen in areas of potentially higher waterbird mortality risk, where the transmission line crosses waterbodies. The initial mortality surveys in 2022 (completed during the establishment of the permanent transects) did not detect any signs of bird mortality.

A literature review examining potential effects of electromagnetic fields on birds is required prior to operation of the transmission line and will be completed once construction of the transmission line starts, likely in 2024.

2.6 SITE WILDLIFE CAMERA MONITORING

DS conditions addressed: none

EAC conditions addressed: none

The Mine site provides suitable habitat for various mammal species. Site wildlife camera monitoring is used to determine wildlife use, specifically ungulates and large mammals, within the Mine footprint. Camera monitoring is conducted in areas with sensitive features or prevalent signs of wildlife use, such as identified mineral licks, dens, and wildlife trails that intersect with Mine roads. As outlined in the WMMP, wildlife cameras will be deployed within the Mine footprint to monitor site use by moose (Section 4.4), mountain goat (Section 4.5), and grizzly bear (Section 4.7: ERM 2023a)

2.6.1 OBJECTIVES

The objectives of the site wildlife camera monitoring program are to:

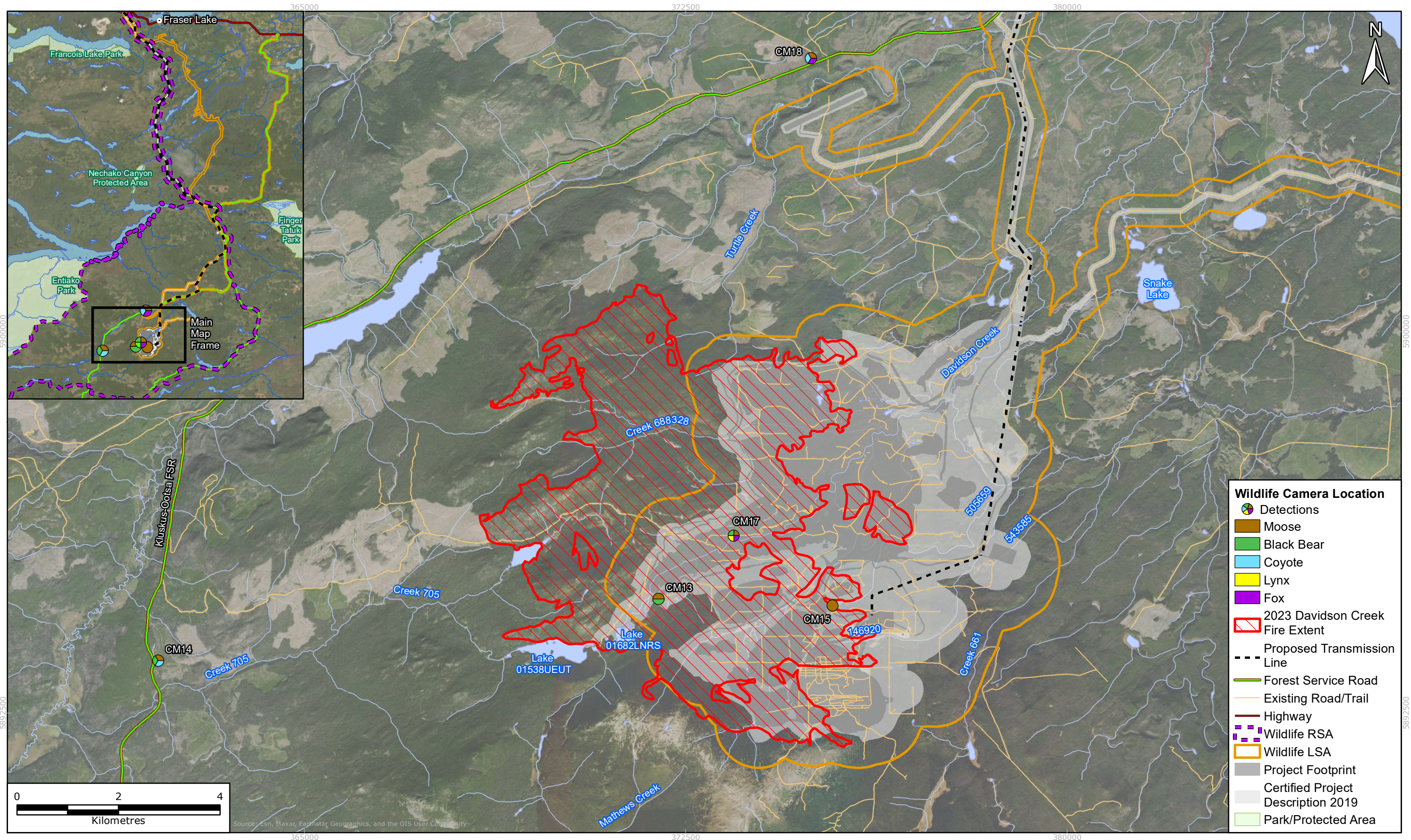
- Evaluate wildlife use and interaction with the Mine footprint; and
- Monitor the use of habitat features (e.g., nests, dens, trails, and mineral licks) that are within the Mine footprint or intersect Mine roads.

2.6.2 METHODS

Site wildlife camera monitoring was conducted via remote cameras. Remote cameras were deployed in October 2021 at five locations within the mine site LSA where wildlife trails or features were noted near roads or proposed roads and Mine infrastructure (Figure 2.6-1). Camera deployment locations were chosen to monitor areas with known features of wildlife activity from focal mammals (e.g., moose, mountain goats, caribou, or bear) such as dens, tracks, trails, and rut rubs.

Cameras were serviced to ensure working condition, replace batteries, and download photos. In 2023, camera servicing was completed on May 20, June 19, and between September 25 to 27. If a camera was noted to be damaged or the location was considered unsafe to visit, cameras were collected and have not yet been redeployed.

FIGURE 2.6-1 SITE MONITORING WILDLIFE CAMERA LOCATIONS AND DETECTIONS



Reconyx Hyperfire 2X cameras were programmed to have a medium-high motion sensitivity. When motion was detected, cameras take three consecutive photos one second apart and then there is a delay for one minute before potential triggering by additional motion. Cameras were also programmed to take a photo every eight hours to ensure the camera was functioning and the view was clear. Cameras are powered by 12 lithium-ion AA batteries and photographs were saved on a 32 GB mini-SD card. Camera deployment methodology aligned with the procedure described in the *Blackwater Gold Mine Pre-Construction Wildlife Baseline 2021* (ERM 2022b).

2.6.2.1 PHOTO DATA ANALYSIS

Analysis was completed for camera data collected from October 15, 2021, to September 27, 2023.

MegaDetector, a camera artificial intelligence model, was used for photo processing and analysis to classify photos from trail cameras based on vehicle, human, animal or blank photos (Beery et al. 2019). Photos were filtered using the artificial intelligence model within the categories from the first processing. A filter was used to include animal photos between a conservative confidence interval of 0.2 to 1, which was designed to capture all photos with animals in it. The resulting classified photos were then visually analysed by ERM personnel using Timelapse, a photo viewing software (Greenberg 2023). Timelapse allows the user to create a custom interface template to record data with respect to each photo and automatically extracts information from all photos such as dates, times and location. The template data can then be compiled into a spreadsheet. Both timed and motion-triggered photos were processed through MegaDetector and Timelapse. Information manually classified from the photos included:

- Species,
- Number of adults, number of juveniles, number of unknown;
- Behavior of individual and;
- Comments from the analyzer.

Multiple photos of the same animal within a 15-minute time interval were considered a detection episode, which helped reduce analysis of multiple photos of the same animal (Fennell et al. 2022; Burton et al. 2015). Individuals recorded greater than 15 minutes apart in triggered photos were considered different detection episodes, unless behaviour suggested that they were the same individual (e.g., individuals resting in camera view) this capture window guarantees temporal independence from other photographic captures. After a detection episode is determined, a detection event is determined as the analysis of the photos associated with the detection episode, a single detection event was defined to include only the individuals associated with that episode, not the number of pictures.

The species list in the Timelapse template included: mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), moose, black bear, grizzly bear, Canada lynx (*Lynx canadensis*), bobcat (*Lynx rufus*), wolf (*Canis lupus*), coyote (*Canis latrans*), fox, small mammal, bird, mountain goat, caribou, elk (*Cervus canadensis*), wolverine, unknown, and other (comment). Behaviors included: travelling, feeding, resting, alarmed, inspecting camera, and other (comment). When "other (comment)" or "unknown" was selected, it would be followed with a descriptive note in the comment box within the template. Photos classified as blanks were then

analyzed with 0.9 to 1 confidence interval and manually scanned by ERM personnel to confirm photos were indeed blanks. Additionally, photos could be flagged for review for a project lead to analyze. Next, data were extracted from the files and compiled for further analysis. Data were categorized by camera, site, date, and species. The overall photos associated with a detection as classified as a detection episode. All photos associated with a detection event were analyzed and data were reviewed for quality assurance by experienced ERM personnel. After an episode was analyzed and total individual animals associated with the episode was determined, it represented one detection event.

Camera effort was calculated using deployment days and days obstructed. Days where the camera was obstructed by 50% or more, such as by snow, fog, or vegetation, or when a camera fell down and resulted in at least one photo of that day were considered obstructed and therefore, not included in camera effort. A detection event was defined as an animal present in the photo, either by motion-triggered or timed photo. Multiple photos of the same animal within a 15-minute time interval were considered an episode, which helped reduce analysis of multiple photos of the same animal (Fennell et al. 2022; Burton et al. 2015).

2.6.3 RESULTS

Five cameras were deployed on October 15, 2021, within the mine site LSA in areas where wildlife trails or features were noted near roads or proposed roads and Mine infrastructure (Figure 2.6-1). Cameras were deployed in locations with one or more known wildlife features or signs of wildlife use (Table 2.6-1). Primarily, deployment locations were along wildlife trails (CM13, CM14, and CM15) or locations where tracks of multiple species, including bear, moose, and wolf, were present (CM17 and CM18; Photo 2.6-1; Appendix J). Additional features noted at deployment locations included a previously used bear den (CM13), a rut rub (CM14), bear scat (CM18), and a wetland with high wildlife use (CM15; Appendix J; ERM 2022b).

Camera servicing occurred on May 20, June 19, and September 26–27, 2023. Data analysis was completed for camera data collected from October 15, 2021, to September 27, 2023.

Camera Effort

Of the five cameras deployed, two failed during the monitoring period and were retrieved in 2023. Camera CM18 was grounded on October 27, 2022 and was obstructed until it was retrieved during the May servicing event. During the September servicing event, it was noted that camera CM13 was burnt and destroyed during the July wildfire. As a result, only data from October 2021 to June 2023 (its last servicing before the fire) was available.

Camera effort was determined by total functional days to account for days when the camera is obstructed by elements such as snow, fog, vegetation, or when the camera has been knocked down. The number functional days for each camera in each month between October 2021 and September 2023 represents camera effort. The average number of days all five cameras were deployed that data was retrieved for was 666 days, with an average camera effort of 583 days (Table 2.6-1).

TABLE 2.6-1 SITE WILDLIFE CAMERA MONITORING DETECTIONS, 2023

Camera	Wildlife Feature	Camera Effort ¹	Black Bear		Canada Lynx		Moose		Fox		Coyote		Total Detection Events ²
			Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	
CM13	Bear den, trails	578 (34)	1	1	-	-	7	7	-	-	-	-	8
CM14	Trails, rut rub	688 (23)	1	1	-	-	15	18	-	-	5	6	16
CM15	Trails, edge of wetland	561 (151)	-	-	-	-	6	10	-	-	-	-	6
CM17	Moose, bear, and wolf tracks	712 (0)	16	16	3	3	15	16	1	1	-	-	34
CM18	Moose and wolf tracks, bear scat	376 (206)	-	-	-	-	10	13	1	1	1	1	12
Total		3,329 (414)	18	18	3	3	52	64	2	2	6	7	76

¹ Camera effort is determined as total functional days excluding days obstructed. Days obstructed shown in parenthesis.

² Detection events are number of occurrences that the species is detected through either motion-triggered or timed photograph.

Wildlife Activity

In total, five focal species were detected: moose, black bear, coyote, Canada lynx, and fox (Table 2.6-1; Appendix K). Moose were the most common species detected and the only species detected at all five cameras, with a total of 52 detection events (Photo 2.6-1). Moose were detected in the majority of months across the study period, but most common in summer months (June to August). Black bears were detected at three cameras (CM13, CM14, and CM17), with 18 detection events between April–September 2022 and May–August 2023. Additionally, coyotes were detected at two cameras (CM14 and CM18) with six detection events, fox were detected at two cameras (CM17 and CM18) with two detection events, and Canada lynx were detected at one camera (CM17) with three detection events in March, May, and August 2022.

The number of times each focal species was detected varied between cameras, with CM15 having the least ($n = 6$) and CM17 having the most ($n = 35$) number of detection events. CM17 had the most species detected ($n = 4$) and CM15 had the least species detected ($n = 1$). Use of wildlife trails, specifically ones near roads, by multiple species was noted (Photo 2.6-2).



Photo 2.6-1 Moose recorded at CM18, October 18, 2021.



Photo 2.6-2 Detections at CM17 that show use of a wildlife trail by multiple species, including black bear, lynx, and moose, August 9 to 28, 2022.

2.6.4 DISCUSSION

Site wildlife camera monitoring was aimed at identifying wildlife use, specifically by ungulates and other large mammals within the Mine footprint. Data were analysed for five cameras deployed between October 15, 2021 and September 27, 2023 within the mine site LSA in areas where wildlife trails or features were noted near roads or proposed roads and Mine infrastructure (Figure 2.6-1). Cameras detected five focal species, including black bear, Canada lynx, moose, fox, and coyote (Table 2.6-1). Three of the five cameras are still deployed within the mine site LSA. Additional cameras will be deployed as areas with sensitive features or prevalent signs of wildlife use are identified. This includes deployment of cameras at a mineral lick, primarily used by mountain goats, located on Mount Davidson and wildlife trails leading to the site that may intersect with a Mine road.

Cameras CM17 and CM14 had the highest number of detections representing 69% of all detections. Results suggest that the trails these cameras were deployed at are used frequently and by multiple species, including black bear, moose, Canada lynx and fox.

The most commonly occurring species was moose, which were detected at 100% of cameras and made up 64% of the total number of wildlife detections. Moose detection events typically consisted of between one and three individuals. Data from the deployed cameras suggest that black bears, Canada lynx, coyote and fox are more likely to be detected alone than in groups.

Wildlife features may influence wildlife species and abundance detected at deployed camera locations. Features such as a bear den may deter some species from returning to this area. Camera CM13, which was deployed near a bear den, had the lowest detections ($n = 8$) of focal wildlife species. The lack of bear detections at this camera may suggest the den has not been used since the denning periods since 2021. Habitat features such as wetlands may attract species such as moose but may not be preferred for others. For example, camera CM15 was deployed on the edge of a wetland only detected moose. Site fidelity for a wildlife feature such as a rut rub may contribute to detections of certain species as animal activity or use of site may continue throughout years. Camera CM14 was deployed near a rut rub and has the highest number of moose detections of all the cameras, although the rut rub was not within the camera field of view. Scent deposited from some species may attract other species as well. A well-established travel corridor may be used by multiple species, resulting in more species abundance and diversity detected. Other wildlife features in the area that were not observed by field staff may contribute to the variations of species and detections observed.

3. SPECIES SPECIFIC MONITORING PROGRAMS

3.1 MOOSE

DS conditions addressed: 6.14

EAC conditions addressed: 23.h

Moose are one of the most wide-ranging ungulate species occurring throughout the forested areas of BC. The species has not been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is not federally listed under Schedule 1 of the *Species at Risk Act* (SARA). Since 2015, moose have remained Yellow-listed (widespread, abundant, and secure) in BC (BC CDC 2023). They are a culturally important species for Indigenous groups and considered a highly valued big game species sustainably managed from both resident and non-resident hunting opportunities (Gorley 2016).

Pre-clearing surveys are required year-round for mineral licks, which are considered sensitive features for ungulates including moose (Section 2.1). There are no specific sensitive timing windows to avoid disturbance to moose. Mitigation measures for moose are designed to reduce disturbances (e.g., noise, light) which may cause moose to avoid the Mine. Additionally, mitigation measures have been established along Mine roads to reduce the risk of moose mortalities due to vehicle collisions.

The predicted residual effects of the Mine on moose as identified in the EIS, Vol 4, Section 5.4.10.4 (New Gold 2015; ERM 2017) are:

- Habitat loss and alteration (not significant, negligible magnitude);
- Wildlife mortality (not significant, minor magnitude);
- Moose movement patterns (not significant, minor magnitude); and
- Changes in moose population dynamics (not significant, minor magnitude).

Monitoring and follow-up programs for moose will be used to verify EIS predictions and evaluate the effectiveness of the mitigation measures outlined in the WMMP. As described in Section 4.4.3 of the WMMP (ERM 2023a) and Section 6.2.2 of the Caribou Mitigation and Monitoring Plan (CMMP; ERM 2022a), the monitoring programs developed for moose include:

- Habitat Loss Monitoring (Section 2.2);
- Moose-vehicle Collision Monitoring (Section 2.3.1);
- Ungulate Distribution Monitoring via:
 - Pellet Counts (Sections 3.1.2.1 and 3.1.3.1);
 - Winter Track Surveys (Sections 3.1.2.2 and 3.1.3.2); and
- Site Wildlife Camera Monitoring (Section 2.6).

The follow-up programs for moose distribution monitoring are included in this section.

3.1.1 OBJECTIVES

The objectives of the follow-up monitoring programs for moose distribution are to:

- Monitor the winter distribution and relative density of moose within the buffered Mine area (DS condition 6.14);
- Determine whether there is a change in the relative abundance of moose, by proximity to the Mine site (DS condition 6.14); and
- Compare ungulate survey methods to determine whether ground-based snow track surveys, aerial-based snow track surveys, or pellet counts are the most effective.

3.1.2 METHODS

3.1.2.1 UNGULATE PELLETT COUNT SURVEYS

Ungulate pellet count surveys were completed for the second year in June 2023, to evaluate if the Mine is adversely affecting the distribution and relative abundance of ungulates. Monitoring was completed in accordance with the ungulate pellet count survey SOP (Appendix I). Surveys were completed in the spring when pellets are most visible, i.e., after snow melt and before new vegetation growth in the summer.

Baseline field observations from previous years indicated that caribou pellets are less common than moose pellets. To determine the most effective approach to meeting survey objectives, two different methods were used during the first year of surveying in 2022: quadrat and distance sampling pellet counts. The results showed that distance sampling pellet counts detected more pellet groups than quadrat sampling pellet counts (ERM 2023b). As a result, surveys completed in 2023 were only conducted following the distance sampling methodology.

The pellet count survey area included the proposed Mine footprint and the surrounding area within 10 km, divided into five zones of potential impact versus control (ERM 2022a). The potential impact zones in relation to the Mine footprint were defined as: < 500 m, 500 m–1 km, 1–3 km, and 3–5 km from the Mine footprint. The control zone for the survey area was defined as 5–10 km from the Mine footprint.

During the previous and first year of sampling in 2022, 22 transects were established across all zones, with the majority in close proximity to the Mine site (< 500 m). Surveys completed in 2023 included all previously established transects and four additional transects established within the 500 m–1 km range zone (Table 3.1-1; Figure 3.1-1). Surveys were conducted for transects consisting of 10 pellet count locations spaced at 18 m intervals.

Further data analysis including a power analysis and Before-After-Control-Impact (BACI) analysis will be completed as the ungulate pellet count surveys continue, as described in the Section 6.2.2.1 of the CMMP (ERM 2022a). The power analysis will be completed to determine the magnitude of changes in moose distribution that can be detected by initial monitoring data. Although 2023 marks the second year of monitoring, completion of a power analysis was delayed in anticipation of monitoring locations being adjusted as a result of the July wildfire.

FIGURE 3.1-1 UNGULATE PELLET COUNT TRANSECT LOCATIONS, 2023

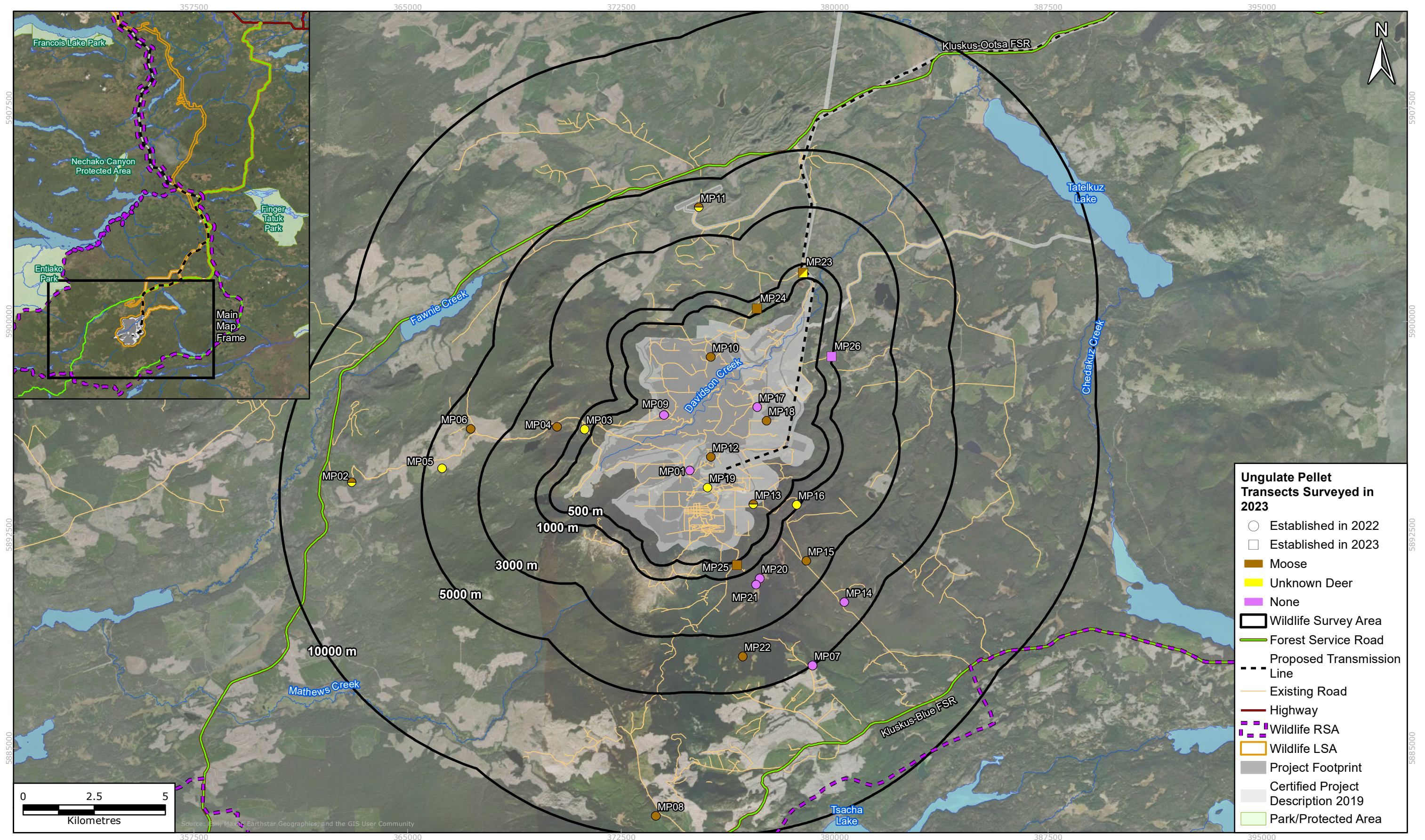


TABLE 3.1-1 UNGULATE PELLET COUNT SAMPLING DISTRIBUTION AND DETECTION RATE, 2023

Distance from Mine Footprint	# of Transects	# of Sample Points	Moose Pellets			Unspecified Deer Pellets		
			# of Transects Present	# of Pellet Groups	% of Transects Present	# of Transects Present	# of Pellet Groups	% of Transects Present
< 500 m	8	80	4	5	50%	2	3	25%
500 m–1 km	6	60	3	6	50%	3	10	50%
1–3 km	4	40	2	11	50%	0	0	0%
3–5 km	6	60	3	8	50%	2	5	30%
5–10 km (Control)	2	20	2	11	100%	1	2	50%
Total	26	260	14	41	54%	8	20	31%

3.1.2.2 SNOW TRACK SURVEYS

The snow track survey monitoring program was completed for the first time in 2023 to evaluate whether the Mine is adversely affecting ungulates. Monitoring was completed following guidelines in the CMMP and provided in Resource Inventory Committee (RIC) guidelines (ERM 2022a; RIC 2006, 2002). The objective of the snow track surveys for ungulates is to determine whether there is a temporal change in relative abundance relative to the Mine site due to Mine activity (ERM 2022a).

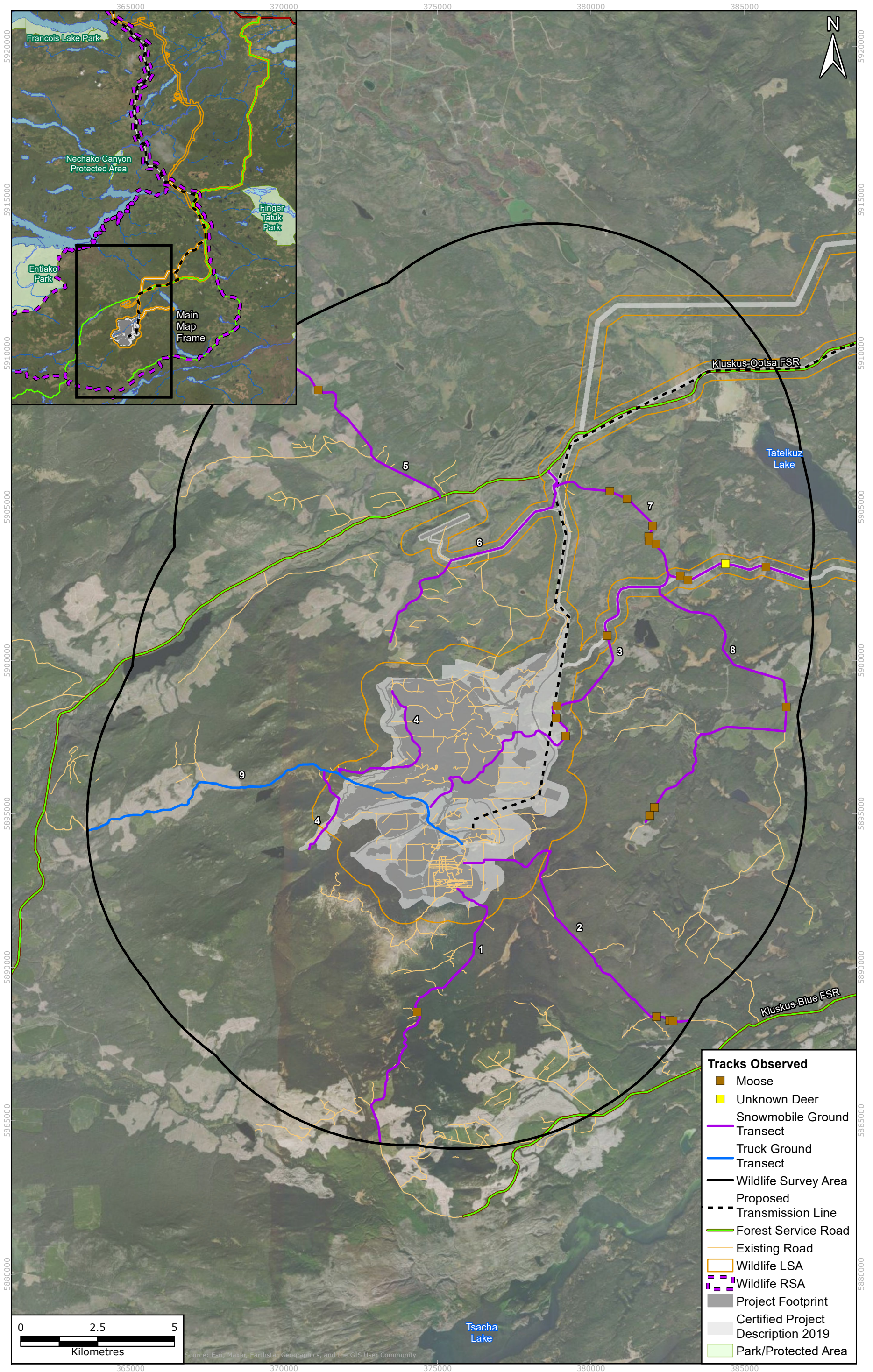
Both ground and aerial-based snow track surveys were completed in 2023 to test whether one method is more effective in detecting moose and caribou. According to previously collected data (ERM 2022a), aerial surveys may be more successful in detecting caribou tracks compared to ground-based surveys. The survey area for snow track surveys encompassed the Mine footprint and an 8 km buffer around the footprint.

Further data analysis including a power analysis and BACI analysis will be completed as the ungulate snow track surveys continue, as described in the Section 6.2.2.2 of the CMMP (ERM 2022a). The power analysis will be completed to determine the magnitude of changes in moose distribution that can be detected by initial monitoring data.

Ground Surveys

Ground snow track surveys were completed along nine pre-determined transects following protocols outlined in *Ground-based Inventory Methods for Ungulate Snow-track Surveys* (RIC 2006; Figure 3.1-2). Transects were stratified across the 8 km survey area and were approximately 1 km in length. Transect orientation radiated outward from the Mine site (Figure 3.1-2). Surveys were completed by snowmobile (n = 8) and truck (n = 1) and utilized pre-existing trails, roads, and seismic lines. Any tracks that were visible from the transects were recorded. Ground snow track surveys differed from aerial surveys by following pre-existing trails, roads, and seismic lines while aerial survey transects did not.

FIGURE 3.1-2 GROUND-BASED UNGULATE SNOW TRACK SURVEY TRANSECTS, 2023



Aerial Surveys

Aerial surveys were completed for 30 linear transects, each 1 km apart and intersecting directly with the mine footprint (Figure 3.1-3). Surveys were conducted following protocols outlined in *Aerial-based Inventory Methods for Selected Ungulates: Bison, Mountain Goat, Mountain Sheep, Moose, Elk, Deer and Caribou* (RIC 2002). Transects evenly stratified the entire 8 km survey area and bisected all habitat types the transect crossed. Survey timing was based on the Traditional Knowledge of caribou movement from UFN and LDN, and an analysis of caribou collar data to determine when caribou were most likely to overlap the Mine. Ungulate observations and signs located along the transects were recorded.

3.1.3 RESULTS

3.1.3.1 UNGULATE PELLETT COUNT SURVEYS

In total, 26 ungulate pellet count transects were surveyed at varying distances from the proposed Mine footprint from June 11 to 19, 2023 (Table 3.1-1; Figure 3.1-1; Appendix M). Ten sample points were completed along each transect, with a total of 260 sample points completed (Table 3.1-1; Figure 3.1-1; Appendix M).

Moose pellets were detected at over half of the transects surveyed (n = 14 transects) and were mostly winter pellets (n = 32 pellet groups), with some spring pellets (n = 3 pellet groups) and summer pellets (n = 6 pellet groups; Appendix N). Deer pellets were detected at 31% of transects (n = 8 transects; Table 3.1-1; Appendix N). No caribou pellets were observed.

Moose pellets were present at half of the of 24 transects completed within the impact zones, and at both of the transects completed within the control zone, although the control sample size is small (Table 3.1-1Table 3.1-1). In comparison, deer pellets were present at 25% of transects in the < 500 m impact zone, half of the transects in the 500 m–1 km impact zone, and 30% of transects in the 3–5 km impact zone. No deer pellets were found in the 1–3 km impact zone and deer pellets were only present in one of the two transects in the control zone.

No fresh pellets (< 1 year old) were recorded at any of the new transects established in 2023. Although all pellet groups recorded along the transects established in 2022 were removed per the SOP (Appendix L), estimates from the 2023 surveys show that half of the recorded pellet groups were potentially more than one year old (Appendix N). The centre of each sample point was not physically marked in 2022, with GPS accuracy error likely causing slight variations in the locations surveyed in 2022 compared to 2023.

3.1.3.2 SNOW TRACK SURVEYS

Ground Surveys

Ground snow track surveys were completed on March 3 and 4, 2023 along nine transects and included 101 km of survey effort by a combination of snowmobile (n = 8 transects) and truck (n = 1 transect; Appendix O). Ungulate tracks were detected along seven transects and included 21 locations with moose tracks and one location with unknown deer tracks (Figure 3.1-2; Table 3.1-2Table 3.1-2 ; Appendix P). No caribou tracks were observed.

FIGURE 3.1-3 AERIAL UNGULATE SNOW TRACK SURVEY OBSERVATIONS AND TRANSECT, 2023

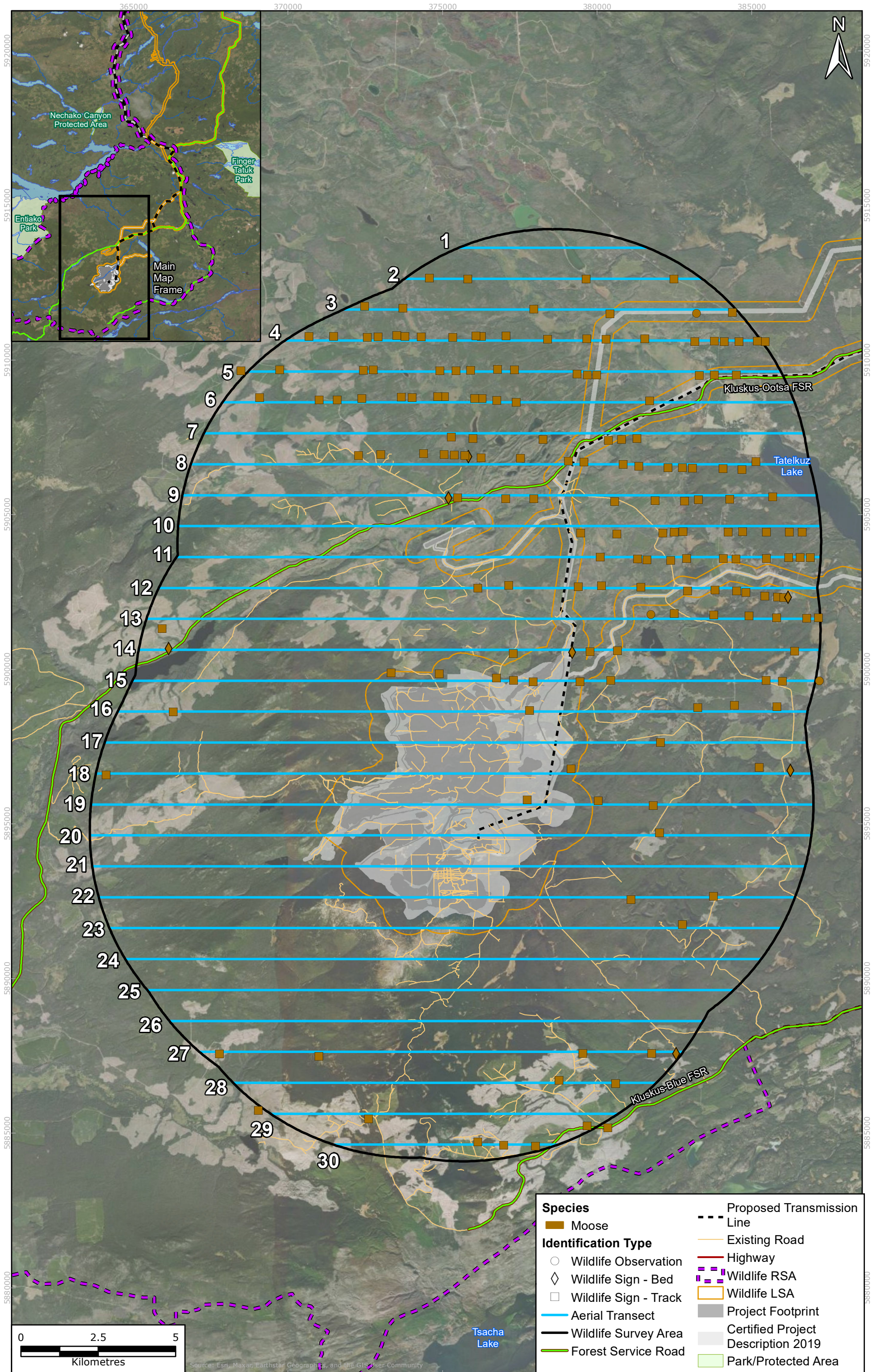


TABLE 3.1-2 UNGULATE GROUND SNOW TRACK SURVEY OBSERVATIONS AND DETECTIONS, 2023

Transect ID	Moose		Unspecified Deer
	# Individuals	# Tracks	# Tracks
1	1	-	-
2	3	-	-
3	7	-	1
4	-	-	-
5	1	-	-
6	-	-	-
7	6	-	-
8	3	1	-
9	-	-	-
Total	20	1	1

Transect 3 had the highest number of ungulate tracks, with 36% of all ungulate track detections (Figure 3.1-2). The majority of ungulate tracks were located in the northwestern portion of the survey area (Table 3.1-2; Figure 3.1-2). Three ground transects (Transects 4, 6 and 9) had zero ungulate tracks (Figure 3.1-2). All three transects with zero ungulate tracks are in the central western portion of the survey area.

Aerial Surveys

Aerial surveys were completed on March 5, 2023, along 100% transects and included 555 km of survey effort (Appendix Q). Moose signs recorded during the aerial surveys included 377 moose tracks, and 13 moose beds (Table 3.1-3; Appendix R). Moose tracks were detected along 87% transects (Figure 3.1-3). Additionally, surveys recorded 12 moose across eight detection events (Table 3.1-3 Table 3.1-3). No caribou tracks were observed.

TABLE 3.1-3 UNGULATE AERIAL SNOW TRACK SURVEY OBSERVATIONS AND DETECTIONS, 2023

Transect ID	# Moose Individuals	# Moose Tracks	# Moose Beds
1	-	-	-
2	-	12	-
3	3	11	-
4	-	53	-
5	-	32	-
6	-	25	-
7	2	20	-

Transect ID	# Moose Individuals	# Moose Tracks	# Moose Beds
8	2	34	1
9	-	20	1
10	-	17	-
11	-	17	-
12	-	34	1
13	-	12	-
14	-	16	7
15	1	16	-
16	-	7	-
17	-	3	-
18	-	5	1
19	-	6	-
20	-	4	-
21	-	-	-
22	-	3	-
23	-	3	-
24	-	-	-
25	-	-	-
26	1	4	-
27	-	8	2
28	-	3	-
29	-	7	-
30	-	5	-
Total	9	377	13

Transect 4 had the highest number of ungulate tracks, with 14% of all detections. The majority of ungulate signs were located in the northwestern portion of the survey area (Table 3.1-3 Table 3.1-3 ; Figure 3.1-3). Four aerial transects (Transects 1, 21, 24 and 25) had zero observations or signs of ungulate presence (Figure 3.1-3). Three of the transects with zero detections were in the southern portion of the survey area, while the fourth was in the far north (though this was also one of the shortest transects; Figure 3.1-3). In areas where aerial and ground transects overlapped, survey observations were representative of each other.

3.1.3.3 INCIDENTAL OBSERVATIONS

In total, 27 moose were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.1-4; Appendix H). Moose were recorded on 19 occasions, with at least 70% of these events occurring within the RSA. Additionally, one mule deer, one unspecified deer species ungulates, and tracks from one unspecified deer species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.1-4; Appendix H). An additional six ungulate observations were incidentally recorded in 2021 and 2022 from the site wildlife camera monitoring and baseline caribou offsetting camera monitoring programs. Observations included mule deer (n = 1), white-tailed deer (n = 2), and an unknown ungulate species (n = 3; Appendix H).

In total, 27 moose, two mule deer, two white-tailed deer, and one unspecified deer were incidentally recorded by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log in June 2023 (Appendix G). Incidental observations provided in the Wildlife Sighting Log are not included on Figure 3.1-4as only the general location of the observation was provided.

3.1.4 DISCUSSION

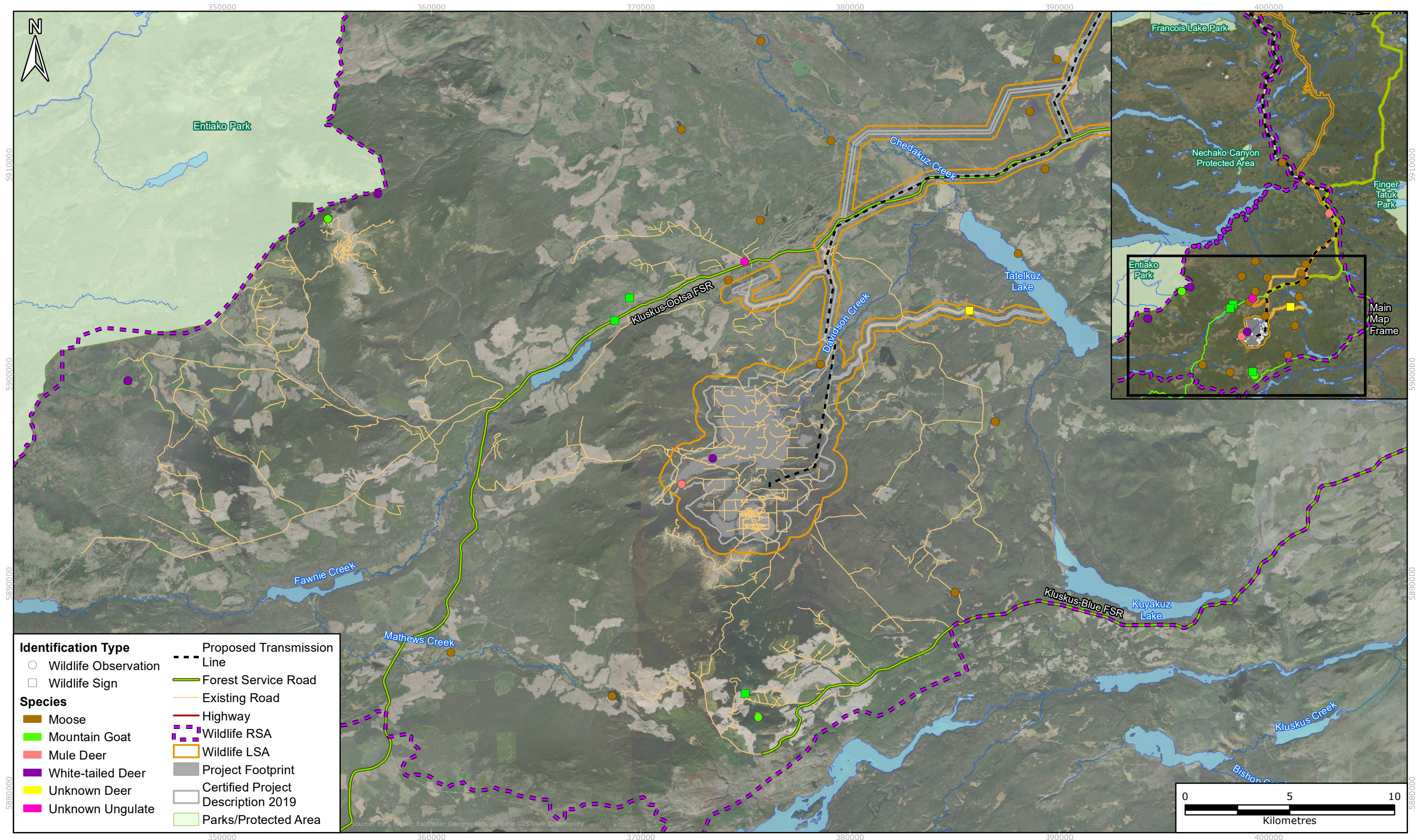
In the EIS, the Mine was predicted to have a not significant, minor magnitude potential effect for change in movement patterns and population dynamics of moose (Vol 4, Section 5.4.10.4; New Gold 2015; ERM 2017). The follow-up programs to monitor ungulate winter distribution and relative density include ungulate pellet count surveys and snow track surveys. Monitoring is also conducted to determine if there is a change in the relative abundance of moose by proximity to the Mine site and to compare the effectiveness of ungulate survey methods, which are required by DS condition 6.14. Monitoring for moose conducted in 2023 included the second year of ungulate pellet count surveys and the first year of ungulate snow track surveys.

Additionally, wildlife cameras deployed to detect moose presence and habitat use within the Mine footprint as part of the site wildlife camera monitoring program are reported in Section 2.6. Moose were the most commonly detected species and were detected frequently at all five cameras deployed in the mine site LSA. The camera with the highest number of moose detected was noted to be near a rut rub during deployment. Overall, the frequency and consistency of moose detections suggest they regularly use wildlife trails and features within the mine site LSA.

Ungulate Pellet Count Survey

Ungulate pellet count surveys were completed for the second year in June 2023. Both the quadrat sampling and distance sampling methods were conducted during the first year of surveys in 2022 to determine which methodology was optimal for identifying ungulate pellets, specifically for moose and caribou. The comparison identified that distance sampling method was the most effective method based on level of field effort and pellet detection rates. Therefore, only the distance sampling method was used in 2023 and will plan to be used in future years.

FIGURE 3.1-4 INCIDENTAL UNGULATE OBSERVATION, 2023



The ungulate pellet survey area included the proposed Mine footprint and the surrounding area within 10 km, divided into four potential impact zones and one control zone (ERM 2022a). The 2023 surveys were conducted along 26 transects in June at varying distances from the proposed Mine footprint following the distance sampling method. Surveys included 22 transects established in 2022, and four newly established transects. Moose pellet groups were present at 54% of transects and deer pellet groups were present at 31% of transects. Results suggest that the survey area is primarily being used by moose in the winter, with 78% of moose pellet groups estimated to be deposited during the winter, compared to 15% estimated to be deposited in the summer and 7% in the spring.

During the first year of surveys, all counted pellet groups were removed from each transect sampling locations to allow for future years of data to reflect accurate relative density and distribution data for a single year. However, in 2023 half of the pellet groups counted within the transects established in 2022 were estimated to be more than one year old based on qualitative observations of freshness. This is likely due to slight variations in the transect sample points due to GPS accuracy error of up to 15 m as sites were not physically marked in 2022 (Garmin Ltd. 2024). Potential overlap between the 2022 and 2023 sample points may have impacted number of pellet groups recorded in 2023, as all counted pellet groups were removed from transects in 2022. In future years, it is recommended to physically mark site centres with coloured stakes to ensure consistency in site locations.

As over half of the pellet groups were over a year old and the potential variance and overlap in sample points, the 2023 survey results count surveys cannot provide a density estimate or accurately be compared to the 2022 survey results. Additionally, it is anticipated that pellet survey transects will be adjusted in response to the July wildfire that occurred in 2023. As a result, data from the second year of sampling provided an additional baseline impression of moose distribution and relative density. Multiple years of monitoring of physically marked transects will be required before a density estimate or accurate comparison of survey results across years can be completed.

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.1.2.1 and the CMMP Section 6.2.2.1 (ERM 2022a).

Ungulate Snow Track Surveys

Ungulate snow track surveys were completed for the first year in March 2023 to determine whether there is a temporal change in relative ungulate abundance relative to the Mine site (ERM 2022a). Both aerial and ground-based snow track surveys were completed to determine whether one method is more effective in detecting ungulates, specifically moose and caribou.

Ground snow track surveys only detected moose tracks whereas aerial surveys detected moose tracks, beds, and individuals (Table 3.1-2; Table 3.1-3Table 3.1-3). Survey effort for the aerial survey was five times that of ground surveys. Accounting for the difference in survey effort, aerial surveys still detected three times the moose tracks detected by ground surveys. Aerial surveys were able to cover a wider variety of habitat types that ground surveys could not access. Caribou sign or observations were not recorded during either survey method.

While neither survey method observed caribou sign, aerial snow track surveys produced a higher occurrence of ungulate sightings and signs (average of 14 locations per transect) than ground snow track surveys (average of two locations per transect). Both surveys demonstrated that ungulate sign and individuals were concentrated in the northwestern portion of the survey area (Figure 3.1-2; Figure 3.1-3).

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.1.2.2 and the CMMP Section 6.2.2.2 (ERM 2022a).

3.2 CARIBOU

DS conditions addressed: 8.9

EAC conditions addressed: 22.p

Caribou in BC are divided into various populations, each with their own conservation status and risks. The Mine is on the eastern edge of the southern mountain caribou Tweedsmuir Local Population Unit, with approximately half of the site occurring within the Local Population Unit boundaries. The southern mountain caribou population in BC is Red-listed (endangered/threatened; BC CDC 2023), has been assessed as endangered by COSEWIC (2014), and is listed as threatened under Schedule 1 of SARA (Government of Canada 2023). The Mine is within the historic range of the Tweedsmuir caribou based on Traditional Knowledge from UFN and LDN and includes areas mapped as winter caribou habitat. The Mine is outside of the current annual range (1980–2020) used by collared female caribou but is still used intermittently by caribou based on historical baseline data including aerial surveys, snow track surveys, and incidental observations.

Pre-clearing surveys are required year-round for mineral licks, which are considered sensitive features for ungulates including caribou (Section 2.1). The sensitive timing window for caribou is January 15–July 15, during the winter calving into the post-calving period (ERM 2023a). Mitigation measures for caribou are designed to reduce disturbances (e.g., noise, light) which may cause caribou to avoid the Mine.

As described in Section 4.3 of the WMMP (ERM 2023a) and the predicted residual effects of the Mine on caribou as identified in the EIS, Vol 4 Section 5.4.11.3 (New Gold 2015; ERM 2017) are:

- Habitat loss and alteration (not significant, moderate magnitude);
- Changes in caribou population dynamics (not significant, minor magnitude);
- Changes in caribou movement patterns (not significant, negligible magnitude); and
- Mortality risk (not significant, negligible magnitude).

Monitoring programs for caribou included baseline caribou offsetting wildlife use monitoring and ungulate distribution monitoring which are presented in this report. The caribou offset monitoring program had not yet begun in 2023; however, camera monitoring in the two proposed caribou offset areas (Johnny Lake and Capoose) was started in October 2021 to provide baseline data on wildlife use. Additional reporting for caribou, including the official caribou offset monitoring program, is presented in the CMMP Compliance Report (Appendix S).

As described in Section 6.2.2 of the CMMP (ERM 2022a), the monitoring programs developed for caribou include:

- Habitat Loss Monitoring (Section 2.2);
- Mortality Risk Monitored through Wildlife Interactions and Incidents (Section 2.3);
- Ungulate Distribution Monitoring via:
 - Pellet Counts (Sections 3.1.2.1 and 3.1.3.1),
 - Winter Track Surveys (Sections 3.1.2.2 and 3.1.3.2); and
- Caribou Offset Monitoring Program (Appendix S; Section 3).
 - Baseline Caribou Offsetting Wildlife Use Monitoring (Sections 3.2.2.3 and 3.2.3.1).

3.2.1 OBJECTIVES

The objectives of the follow-up monitoring programs for caribou included in this section of the report are to:

- Monitor potential change in caribou distribution due to the Mine (DS conditions 6.14 and 8.18, EAC condition 22.c).
- Evaluate the effectiveness of the Caribou Offset Program as per CMMP (ERM 2022a; EAC condition 22.p).

3.2.2 METHODS

The caribou offset monitoring program consists of four separate monitoring programs: road restoration monitoring, access monitoring, sight lines monitoring, and wildlife use monitoring, which are presented in the CMMP Compliance Report (Appendix S). The caribou offset monitoring program had not yet begun in 2023. However, baseline camera monitoring in the two proposed caribou offset areas (Johnny Lake and Capoose) started in October 2021 to provide baseline data on wildlife use is presented in this report. Monitoring sites were chosen based on sign and habitat for focal mammals (caribou, moose, bear, and wolf) and do not align with the final monitoring locations required for the caribou habitat wildlife use monitoring program.

3.2.2.1 UNGULATE PELLETT COUNT SURVEYS

Monitoring methods for the Ungulate Pellet Count Surveys conducted in 2023 are outlined in Section 3.1.2.1.

3.2.2.2 UNGULATE SNOW TRACK SURVEYS

Monitoring methods for the Ungulate Snow Track Surveys conducted in 2023 are outlined in Section 3.1.2.2.

3.2.2.3 BASELINE CARIBOU OFFSETTING WILDLIFE USE MONITORING

Baseline wildlife use monitoring was initiated in the two proposed caribou offset areas (Johnny Lake and Capoose) in October 2021. Remote cameras were deployed in the two proposed caribou offset areas to record wildlife activity, with sites chosen based on sign and habitat for focal mammals, including caribou, moose, bear, and wolf.

Cameras were deployed at 15 locations within the Johnny Lake (n = 6) and Capoose (n = 9) Caribou offset areas in October 2021 (Figure 3.2-1). Camera distribution was based on the size of the area, with more cameras deployed in the Capoose offset area than the Johnny Lake offset area. Camera locations were chosen based on the 2021 habitat suitability survey site results, i.e., where moose and caribou activity were previously recorded and/or within suitable habitat areas. In 2023, camera servicing was completed on May 20 and September 25. Camera deployment is further described in the *Blackwater Gold Project Pre-Construction Wildlife Baseline 2021* (ERM 2022b).

Cameras were programmed and analysed following the methods described for site wildlife camera monitoring in Section 2.6.2. Analysis was completed for camera data collected from October 15, 2021, to September 27, 2023.

3.2.3 RESULTS

Results from the 2023 Ungulate Pellet Count Surveys and Ungulate Snow Track Surveys are presented in Sections 3.1.3.1 and 3.1.3.2, respectively. Additionally, the CMMP Compliance Report (Appendix S) includes results for the caribou offset monitoring program, however this program had not yet begun in 2023.

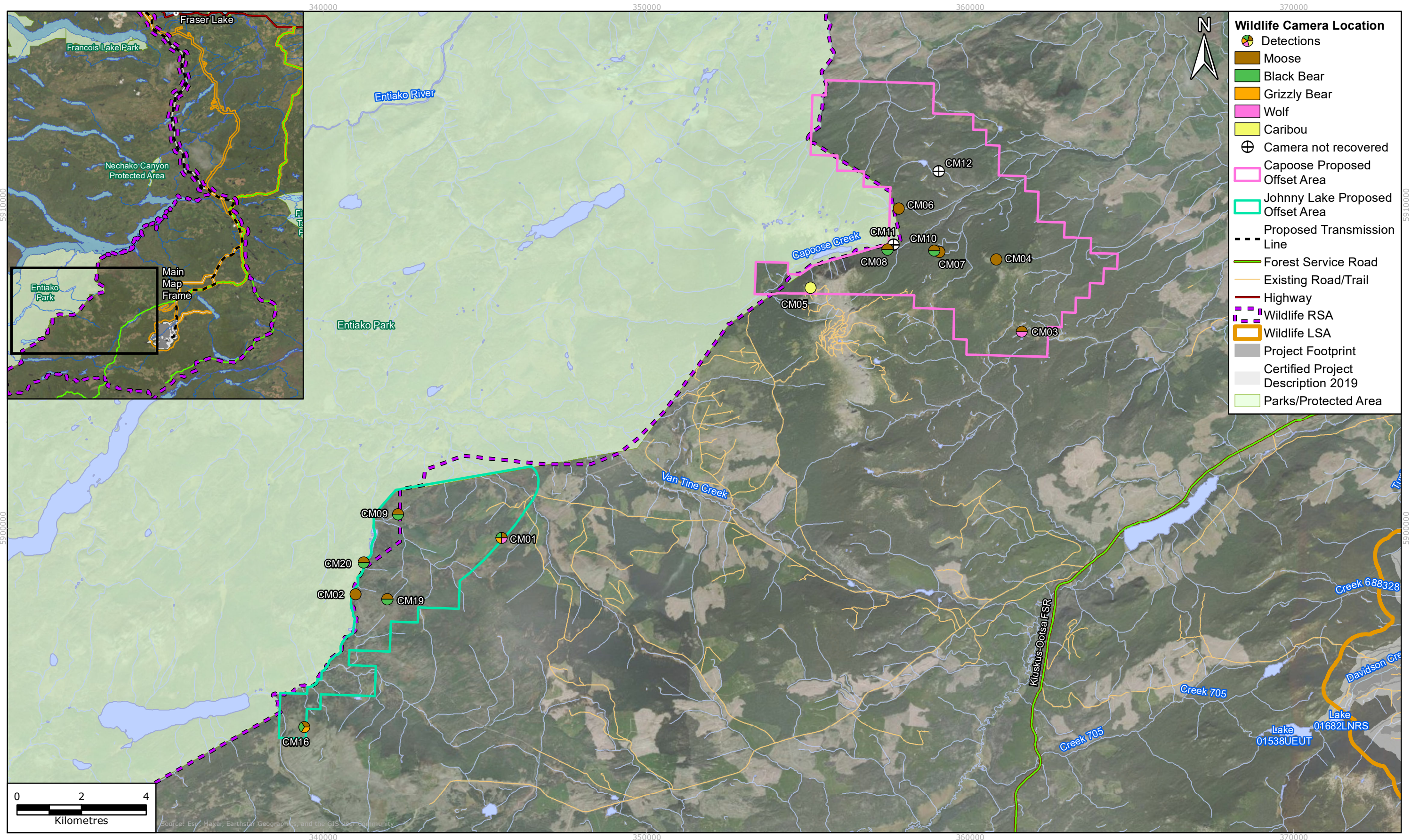
3.2.3.1 BASELINE CARIBOU OFFSETTING WILDLIFE USE MONITORING

Fifteen cameras were deployed between October 14–15, 2021 in the two caribou offset areas as part of ongoing baseline data collection (nine in the Capoose offset area and six in the Johnny Lake offset area; Figure 3.2-1; Appendix T).

Camera Effort

In total, four cameras were removed from the program in 2023 due to being lost or the area being deemed unsafe to access for future servicing. No data were retrieved from two cameras (CM11 and CM12) deployed in the Capoose offset area as they were unable to be located during either of the 2023 servicing events and are assumed to be lost. Only partial data were retrieved from two cameras (CM02 and CM19) in the Johnny Lake offset area. Camera CM02 and CM19 were removed in May as they had fallen on May 27, 2022 (225 days after deployment), and November 30, 2021 (46 days after deployment), respectively. Both units were not redeployed as access was determined to be unsafe due to risk of deadfall.

FIGURE 3.2-1 BASELINE CARIBOU OFFSETTING WILDLIFE CAMERA LOCATIONS AND DETECTIONS



The average number of days the cameras were deployed was 688 days, with an average camera effort of 5824 days (Table 3.2-1). Camera effort is represented by the number functional days for each camera in each month between October 2021 and September 2023. Camera effort was determined by total functional days to account for days when the camera is obstructed by elements such as snow, fog, vegetation, or when the camera has been knocked down. The overall average camera effort was 92% of deployment days in the Capoose offset area and 77% of deployment days in the Johnny Lake offset area. Average camera effort for Capoose offset area locations was lowest from November 2022 to January 2023 (73%) and December 2021 to January 2022 (80%) and was highest from June to September 2023 (100%) and February to October 2022 (98%). Johnny Lake offset area average camera effort was lowest from June 2022 to May 2023 (65%) and December 2021 to May 2022 (79%) and was highest from June to September 2023 (100%) and October to November 2021 (99%).

Wildlife Activity

Three of the five focal species were detected in both proposed offset areas including: black bear, moose, and wolf (Appendix U). Additionally, caribou were only detected in the Capoose offset area and grizzly bear were only detected in the Johnny Lake offset area (Appendix U).

Caribou were detected on three occasions between November and December 2022 in the Capoose offset area, with seven individuals detected in total (Table 3.2-1). All caribou detections were at camera CM05 which is located near a Mine road on the southwest edge of the Capoose offset area, bordering Entiako Provincial Park (Figure 3.2-1). CM05 is located in a subalpine opening near trees and alpine parkland (Appendix T). Of the three detection events, two were of a single caribou and one was a group of five individuals (Photo 3.2-1).



Photo 3.2-1 Caribou recorded feeding at CM05, December 15, 2022.

TABLE 3.2-1 BASELINE CARIBOU OFFSETTING WILDLIFE USE CAMERA DETECTIONS, 2023

Offset Area	Camera	Camera Effort ¹	Caribou		Grizzly Bear		Black Bear		Moose		Wolf		Total Detection Events ²
			Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	Detection Events ²	Total Individuals	
Capoose	CM03	660 (51)	-	-	-	-	-	-	7	8	1	1	8
	CM04	680 (31)	-	-	-	-	-	-	1	1	-	-	1
	CM05	681 (30)	3	7	-	-	-	-	-	-	-	-	3
	CM06	683 (28)	-	-	-	-	-	-	4	5	-	-	4
	CM07	679 (32)	-	-	-	-	-	-	3	3	-	-	3
	CM08	620 (90)	-	-	-	-	1	1	23	29	-	-	24
	CM10	543 (134)	-	-	-	-	3	3	28	46	-	-	31
Johnny Lake	CM01	705 (5)	-	-	2	2	28	30	42	46	1	1	73
	CM02	203 (379)	-	-	-	-	-	-	2	2	-	-	2
	CM09	710 (0)	-	-	-	-	1	1	43	53	-	-	44
	CM16	685 (24)	-	-	2	2	1	1	22	32	-	-	25
	CM19	46 (537)	-	-	-	-	1	1	3	3	-	-	4
	CM20	673 (37)	-	-	-	-	2	2	76	93	-	-	78
Total		7,568 (1,378)	3	7	4	4	37	39	254	321	2	2	300

¹ Camera effort is determined as total functional days excluding days obstructed. Days obstructed in shown in parenthesis.

² Detection events are where an animal is detected through either motion-triggered or timed photograph.

Overall, the most common species detected was moose, with 67 detection events in the Capoose offset area and 186 detection events in the Johnny Lake offset area. In the Johnny Lake offset area, moose were detected in every month between October 2021 and September 2023, except March and April 2023. In the Capoose offset area, moose were primarily detected in the summer and fall (June–October 2022 and June–September 2023).

Black bear were the second most detected species (4 detections at Capoose and 33 at Johnny Lake). Black bears were detected throughout their active seasons in the Johnny Lake offset area (May–October 2022 and May–August 2023), but only detected occasionally through the summer and fall in the Capoose offset area (October 2021, August 2022, June 2023, and August 2023). Across all cameras, four grizzly bears and two wolves were detected. Grizzly bears were recorded in the Johnny Lake offset area in October 2021, June 2022, and October 2022. No grizzly bears were detected on cameras deployed in the Capoose offset area. One wolf was detected in April 2022 in Johnny Lake offset area, and one was recorded in Capoose offset area in June 2023.

3.2.3.2 INCIDENTAL OBSERVATIONS

No incidental caribou observations or signs were recorded in 2023.

3.2.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, minor magnitude potential effect for changes in caribou population dynamics and not significant, moderate magnitude potential effects for caribou habitat loss and alteration (Vol 4 Section 5.4.11.3; New Gold 2015; ERM 2017). The follow-up programs to monitor caribou includes ungulate distribution monitoring (reported in Section 3.1) and the caribou offset monitoring program.

In 2023, ungulate pellet count surveys were completed for a second year, ungulate snow track surveys were completed for the first year, and analysis of baseline wildlife cameras deployed in the caribou offset areas was completed for the first year. No caribou pellets or tracks were detected during ungulate pellet count or ungulate snow track surveys in 2023 (see Section 3.1 for details).

Baseline wildlife use monitoring was conducted using remote cameras deployed in the two proposed caribou offset areas: Johnny Lake and Capoose. Cameras were deployed at 15 locations in October 2021. In total, 11 cameras remained deployed as of September 2023, four in the Johnny Lake offset area and seven in the Capoose offset area (Figure 3.2-1). The average number of detection events per 100 days was over three times higher in the Johnny Lake offset area (6.7 events per 100 days) compared to the Capoose offset area (1.8 events per 100 days). Overall, camera effort was high for both the Capoose and Johnny Lake offset areas. Johnny Lake offset area cameras detected grizzly bear, black bear, moose, and wolf, whereas Capoose offset area cameras detected black bear, moose, wolf, and caribou.

One wildlife camera deployed within the Capoose offset area detected caribou in November and December of 2022. Caribou were detected on three occasions, once in a group of five (Photo 3.2-1) and twice a single individual was detected. Caribou were observed to be feeding, which suggests that the location is providing habitat for caribou browsing.

The most common species detected was moose, detected at 92% of cameras and accounting for 85% of detections. Year-round moose detections were recorded at Johnny Lake offset area cameras, whereas Capoose offset area cameras sporadically detected moose in summer and fall months. These data suggest there is both summer and winter habitat suitable for moose in the Johnny Lake offset area. Since moose were only detected between May and November in the Capoose offset area, it is likely that this area best represents summer and fall habitat for moose. The Capoose offset area is high in elevation and it is likely that moose cannot access this area in the winter due to high snow depths.

Caribou predators were detected at low rates in both offset areas although predator abundance was higher at the Johnny Lake offset area. Black bear detections were three times higher in the Johnny Lake offset area than Capoose offset area. Detections of black bear only occurred between May and August, which is consistent with bear hibernation habits. Grizzly bear and wolves were rarely detected. Grizzly bears were only detected on cameras deployed at Johnny Lake offset area between and a single wolf was detected once in each offset area.

The baseline caribou offsetting wildlife use monitoring program will continue to monitor the Johnny Lake and Capoose offset areas to establish presence of caribou, moose, and predator species including grizzly bear, black bear, and wolves. Once the offsetting is completed, comparisons can be made to determine whether there is an increase in caribou use in these areas.

3.3 MOUNTAIN GOAT

DS conditions addressed: none

EAC conditions addressed: none

Mountain goats are a robust species tolerant of wide-ranging climatic conditions and present throughout majority of mountain ranges in mainland BC (Government of BC 2023a). Mountain goats have not been formally assessed by COSEWIC and are not federally listed under Schedule 1 of SARA (Government of Canada 2023). Provincially, mountain goats are Blue-listed (special concern) within British Columbia due to declines and threats from anthropogenic disturbances (BC CDC 2023). Mountain goats are protected under the provincial *Wildlife Act* as they are culturally important to Aboriginal groups and regionally as a harvest species.

Mountain goats were not detected within the RSA during the baseline or pre-construction surveys and were not assessed in the EIS. During the 2022 summer caribou surveys, a small area of spring and summer mountain goat habitat was identified on Mount Davidson. Additionally, in 2022 a mineral lick with tracks and pellets was identified on the northwest side of Mount Davidson, located 1,071 m from the footprint. Wildlife access trails to the mineral lick were noted to potentially intersect with an infrequently used trail and the Blackwater Access Road. As a result, mountain goats were added to the WMMP in 2023 (ERM 2023a).

Mitigation measures require pre-clearing surveys for mountain goat trails and mineral licks. The sensitive window for mountain goats is from January 15 to July 15 during which time mountain goats are in winter calving and spring kidding (post-calving) periods.

As described in Section 4.5 of the WMMP (ERM 2023a) the monitoring programs developed for mountain goat include:

- Pre-clearing (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Mountain Goat-vehicle Collision Monitoring (Section 2.3.1);
- Incidental observations, including from aircrafts (Section 2.3); and
- Site Wildlife Camera Monitoring (Section 2.6).

3.3.1 OBJECTIVES

The objective of the monitoring programs for mountain goat is to confirm mitigative measures for mountain goats are effective, including identifying and avoiding mineral licks and sensitive habitat.

3.3.2 METHODS

An aerial assessment was completed in May 2023 to confirm the location of the mineral lick identified on the northwest side of Mount Davidson.

3.3.3 RESULTS

Additional verification of a mineral lick identified on Mount Davidson in 2022, primarily used by mountain goats, was completed in May 2023. Areas of potential trails around the mineral lick were investigated, and coordinates for the lick were confirmed. The location of the mineral lick is shown in Photo 3.3-1.



Photo 3.3-1 The mineral lick located on Mount Davidson from the helicopter (circled in red), May 19, 2023.

3.3.3.1 INCIDENTAL OBSERVATIONS

In 2023, 34 mountain goats were incidentally observed, 33 were detected by CM05 in the Capoose offset area as part of the baseline caribou offsetting wildlife use monitoring program and one was observed south of the Mine, near of the end of the Kluskus-Blue FSR (Figure 3.1-4; Appendix H). Additionally, CM05 detected 58 incidental mountain goat individuals in 2021 (n = 2) and 2022 (n = 56; Figure 3.1-4; Appendix H). In total, 26 detection events, totaling 91 individuals, were recorded at CM05 between October 15, 2021 to September 27, 2023. All detections were recorded between June and October, with August and September accounting for 77% of detection events and being the only months with detections in 2022 and 2023. Nearly 30% of all individuals captured by CM05 were of juveniles.

In addition to these incidental observations, 10 tracks and four individual mountain goats were recorded by the 2023 aerial ungulate snow track surveys, which are further described in Section 3.1.3.2 (Figure 3.1-4; Appendix H). Mountain goat tracks were detected at one location along three transects; two in the northwest (Transects 11 and 12) and one in the southern (Transect 30) portion of the survey area. All four individuals, including three adults and one kid, were detected together after tracks were identified leading to a rocky outcrop along Transect 11 (Figure 3.1-4).

3.3.4 DISCUSSION

Mountain goats were not included in the EIS, baseline, or pre-construction work for the Mine as no suitable mountain goat habitat was detected during the baseline assessment of the RSA. In 2022, a small area of spring and summer mountain goat habitat was identified on Mount Davidson as well as a mineral lick that overlaps with the Mine footprint. The WMMP was updated in 2023 to include mountain goats to manage potential impacts the Mine may have on mountain goats. The follow-up programs to monitor mountain goat habitat use and distribution within the Mine area include ungulate snow track surveys and wildlife camera deployment at sensitive features.

Incidental detections of mountain goat correlated with three locations outside of the LSA, none of which were near Mount Davidson. Most incidental detections were made by a wildlife camera deployed in the Capoose offset area near Entiako Park as part of the baseline caribou offsetting wildlife use monitoring program. Camera data from October 2021 to September 2023 suggest that mountain goat generally use this area between June and October, with the majority of activity occurring in August and September. During aerial track surveys, two areas with tracks and four individuals were detected northwest of the Mine, in higher elevation forested terrain with some rocky outcrops near the Kluskus FSR, north of Top Lake. This area is on the north side of the Kluskus FSR and does not occur near any Mine roads. Additionally, aerial track surveys identified tracks south of the Mine, in a previously disturbed higher elevation area just north of the end of the Kluskus-Blue FSR. Later during the spring waterbird surveys one individual was detected in this same area. This suggests frequent use of this area by mountain goats in the spring of 2023.

A mineral lick located on Mount Davidson was observed in 2022 and was further assessed in 2023 to determine the exact location and use of the area by ungulates. The mineral lick was determined to be primarily used by mountain goats and has many wildlife trails leading to and from the area.

Wildlife cameras will be deployed in 2024 at the mineral lick and associated potential wildlife access trails to assess use as part of the site wildlife camera monitoring (Section 2.6).

3.4 GRIZZLY BEAR

DS conditions addressed: 8.9, 8.10

EAC conditions addressed: 23.c, 23.h

Grizzly bear is a Blue-listed (special concern) species in BC (BC CDC 2023) and is federally assessed as special concern by COSEWIC (2012a) and listed as special concern on Schedule 1 of SARA (Government of Canada 2023). Grizzly bears are year-round residents within the LSA and RSA. Grizzly bear prefer mature and old growth coniferous forests, although deciduous and mixed forests also contribute to their life requisites. Grizzly bear are most sensitive to disturbance in their dens during winter hibernation and cub birthing. Their dens are protected when occupied, by the BC *Wildlife Act* (1996). The predicted residual effects of the Mine on grizzly bear as identified in the EIS, Vol 4 Section 5.4.12.4 are (New Gold 2015; ERM 2017):

- Habitat loss and alteration (Not significant, minor magnitude);
- Wildlife mortality (not significant, minor magnitude);
- Changes in grizzly bear movement patterns (not significant, negligible magnitude);
- Changes in grizzly bear population dynamics (not significant, negligible magnitude); and
- Changes in grizzly bear health (not significant, negligible magnitude).

As described in Section 4.7 of the WMMP (ERM 2023a), the monitoring programs developed for grizzly bear includes:

- Pre-clearing surveys for grizzly bear dens (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Grizzly Bear-vehicle Collision Monitoring (Section 2.3.1);
- Monitoring of Den Site Mitigation Effectiveness (Section 3.4.2.1);
- Monitoring of Kokanee Spawning Streams (Section 3.4.2.2); and
- Site Wildlife Camera Monitoring (Section 2.6).

3.4.1 OBJECTIVES

The objectives of the follow-up monitoring program for grizzly bear are to:

- Verify that setbacks around probable dens sites have been maintained (EAC condition 23.h).
- Verify ongoing use of kokanee spawning streams by bears (MT 11-5).

3.4.2 METHODS

3.4.2.1 MONITORING DEN SITE MITIGATION EFFECTIVENESS

Pre-clearing survey methods and results for grizzly bear dens, and all subsequent monitoring, are reported in Appendix B.

3.4.2.2 MONITORING OF KOKANEE SPAWNING STREAMS

Monitoring of kokanee spawning streams in the RSA was planned to be initiated in 2023 but was not completed due to the July wildfire and subsequent site access issues. Monitoring is expected to begin in 2024 to monitor the streams for ongoing grizzly bear use. Monitoring will be completed via remote cameras deployed in areas with known bear activity from baseline surveys at Davidson Creek, Creek 661, and Chedakuz Creek upstream of Tatelkuz Lake.

3.4.3 RESULTS

Pre-clearing survey methods and results for grizzly bear dens, and all subsequent monitoring, are reported in Appendix B. Monitoring grizzly bear use at kokanee spawning streams is expected to begin in 2024.

3.4.3.1 INCIDENTAL OBSERVATIONS

In total, five grizzly bears were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.4-1; Appendix H). Three bears were observed in Chedakuz Creek, north of the LSA, during fall waterbird surveys. Two other bears were observed at unknown locations during breeding bird surveys in June and during the Country Foods surveys in September.

In total, 16 grizzly bear were incidentally recorded by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log in June 2023 (Appendix G). Incidental observations provided in the Wildlife Sighting Log are not included on Figure 3.4-1 as only the general location of the observation was provided. Observations made by Blackwater on-site personnel were recorded from August to October and seven of these observations were recorded along the Blackwater Access Road. Grizzly bear signs were recorded once near the Transmission Line and the FSR during Country Foods surveys in September.

3.4.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, negligible magnitude effect on movement patterns and population dynamics for grizzly bear (Vol 4 Section 5.4.12.4; New Gold 2015; ERM 2017). Monitoring related to these predictions includes a camera program for grizzly bear activity at kokanee salmon spawning streams (required by the Mine MT 11-5), as well as verification that mitigation for buffered den sites is effective (EAC condition 23.h).

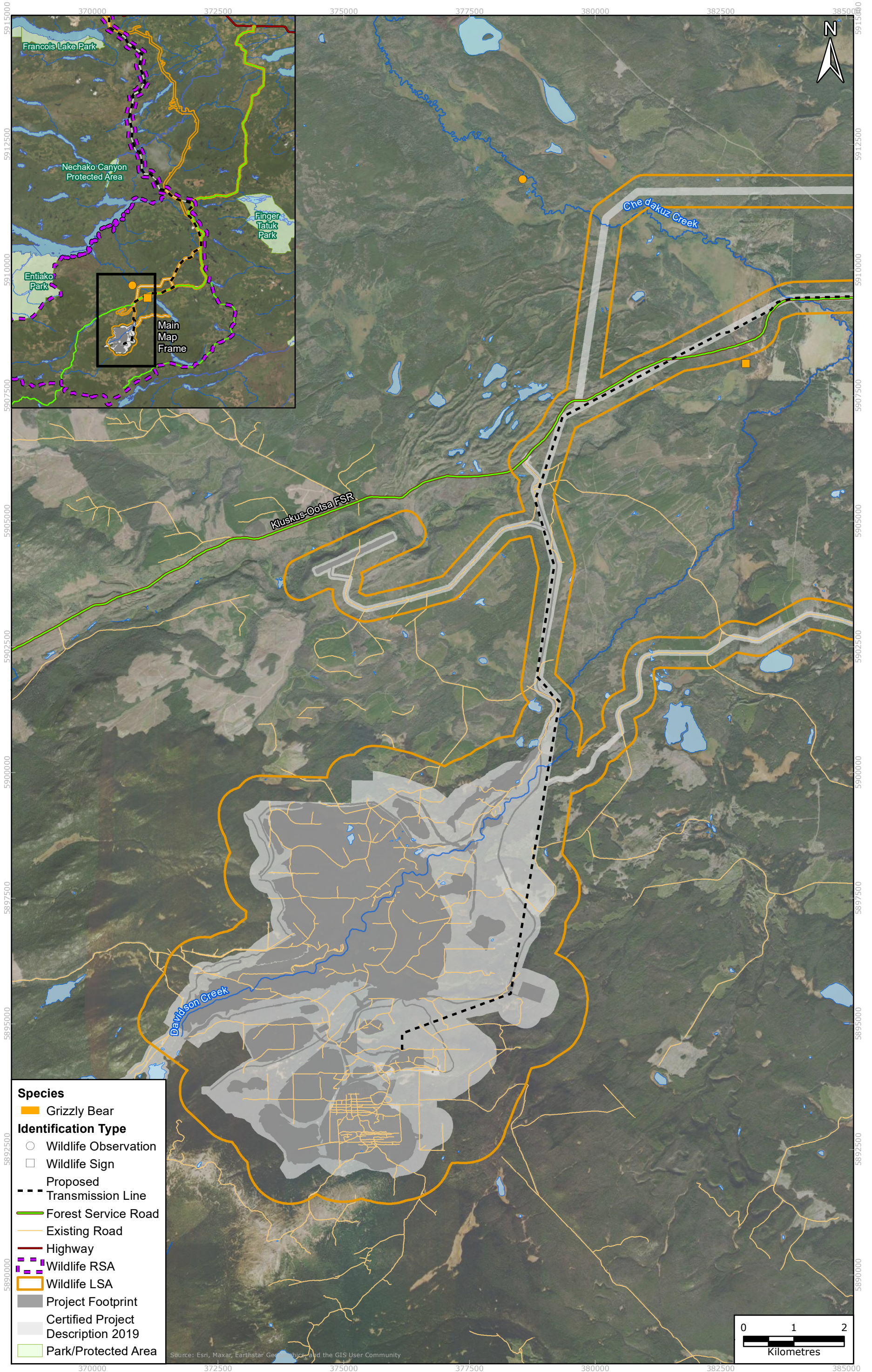
Monitoring at kokanee spawning streams was planned to be initiated in 2023 but was not completed due to the July wildfire and subsequent site access issues. Monitoring is expected to begin in 2024.

The majority of incidental grizzly bear observations were recorded in September and October along the Blackwater Access Road by Blackwater on-site personnel.

Additionally, wildlife cameras deployed to detect wildlife presence and habitat use within the Mine footprint as part of the site wildlife camera monitoring program are reported in Section 2.6. No grizzly bear were detected from October 2021 to September 2023. One camera (CM13) was deployed near a previous grizzly bear den location noted during baseline surveys in 2021 (ERM 2022b). Lack of detections suggest this den was not active in 2021 or 2022.

Pre-clearing surveys and subsequent follow up monitoring completed for potential grizzly bear dens in 2023 are reported in Appendix B.

FIGURE 3.4-1 INCIDENTAL GRIZZLY BEAR OBSERVATIONS, 2023



3.5 FURBEARERS

DS conditions addressed: 8.9, 8.10

EAC conditions addressed: 23.c, 23.h

Furbearers are species frequently harvested for their fur and include wolverine, American marten, fisher, and black bear. Wolverine are Blue-listed (special concern) in BC (BC CDC 2023), federally assessed as special concern by COSEWIC (2003), and listed as special concern on Schedule 1 of SARA (Government of Canada 2023). American marten are not federally listed and are Yellow-listed (secure) in BC (BC CDC 2023), but are an important species for social and economic value, including to Aboriginal groups and trappers. Fisher were recently re-assessed in BC and are listed according to different populations; the Columbian Population around the LSA and RSA is Red-listed (threatened/endangered; BC CDC 2023). Black bear maintain the status of Not-at-Risk federally and are provincially Yellow-listed (secure; BC CDC 2023). Furbearer species are most sensitive to disturbance at their dens, when they are raising young through the late winter and spring (or overwinter for black bears). Their dens are protected when occupied, by the BC *Wildlife Act* (1996).

The predicted residual effects of the Mine furbearers (excluding beaver; *Castor canadensis*) as identified in the EIS, Vol 4, Section 5.4.13.4 (New Gold 2015; ERM 2017) are:

- Habitat loss and alteration (not significant, minor magnitude).

As described in Section 4.6 of the WMMP (ERM 2023a), the monitoring programs developed for furbearers includes:

- Pre-clearing surveys for furbearers (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Facility Water Structure Monitoring (Section 2.4);
- Monitoring Den Site Mitigation Effectiveness (Section 3.5.2.1); and
- Site Wildlife Camera Monitoring (Section 2.6).

3.5.1 OBJECTIVES

The objective of monitoring for furbearers is to verify that setbacks around buffered dens sites have been maintained (EAC condition 23.h).

3.5.2 METHODS

3.5.2.1 MONITORING DEN SITE MITIGATION EFFECTIVENESS

Pre-clearing survey methods and results for furbearer dens, and all subsequent monitoring, are reported in Appendix B.

3.5.3 RESULTS

3.5.3.1 INCIDENTAL OBSERVATIONS

In total, 36 individuals from eight furbearer species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.5-1; Appendix H). Black bears were the most frequently observed furbearer, with 14 individuals recorded across 11 detection events. Beaver were observed twice along the transmission line. Fox were observed three times, with observations primarily occurring around Blackwater camp. One wolf and one unspecified bear species were recorded north of the mine site LSA within the RSA, when both were heard fighting over moose carcass. Cameras deployed in the two proposed caribou habitat offset areas as part of the baseline caribou offsetting wildlife use monitoring program detected one American marten, eight Canada lynx, one coyote, and one wolf in 2023. Additionally, cameras detected five Canada lynx and one coyote in 2022 (Figure 3.5-1; Appendix H). All coyote and Canada lynx detections were in the Johnny Lake Offset area, with all detections occurring at CM01, except for one Canada lynx detected at CM09. Detections in the Capoose offset area included wolverine at CM06 and American marten at CM07.

Signs of furbearers including two wolf beds, one beaver dam, and a total of 179 tracks from five species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.5-1; Appendix H). All incidental track and bed observations were recorded during the aerial and ground winter track surveys. Canada lynx were the most commonly detected tracks, accounting for 36% (n = 65) of tracks, with detections of tracks evenly distributed across the snow track survey area. Wolf tracks were the second most commonly recorded, accounting for 31% (n = 56) of tracks, with tracks generally localized in the northern half of the survey area. River otter tracks, accounting for 20% tracks, were typically identified in the eastern portion of the survey area. Additionally tracks associated with coyote (n = 21) and porcupine (n = 1) were recorded.

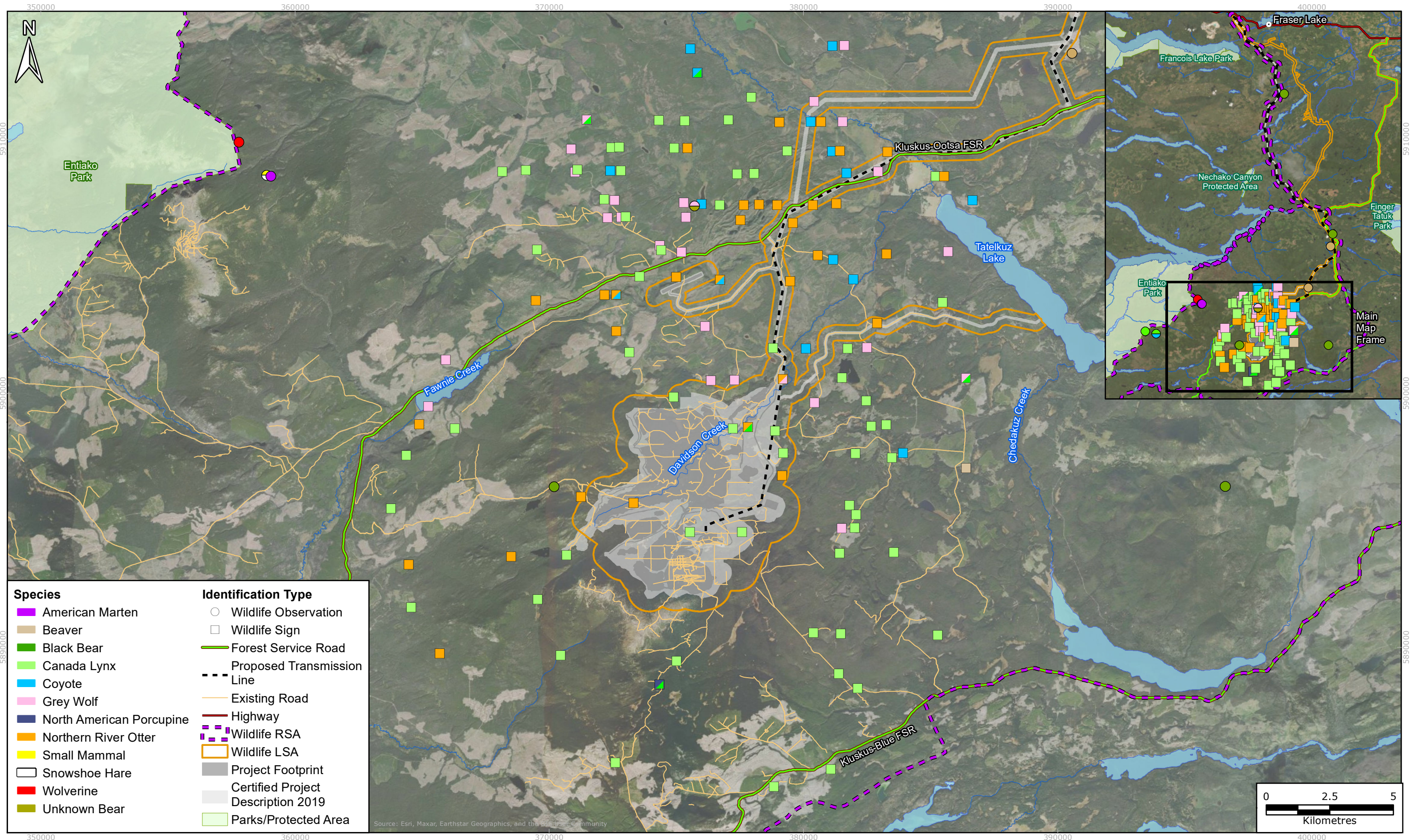
In total, 97 individuals from four furbearer species were incidentally observed by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log (Appendix G). Incidental observations provided in the Wildlife Sighting Log are not included on Figure 3.5-1 due to the fact that typically only the general location of the observation was provided. Black bears were the most frequently observed furbearer, with 63 individuals recorded across 52 detection events. Additionally, 17 individuals recorded across 10 detection events of an unspecified bear species were recorded and were likely black bears, based on the abundance of black bears in the area. Additionally, incidental observations were made of 13 fox, four wolves, and one Canada Lynx. The majority of all incidental observation events were recorded along Mine roads, accounting for over 80% of detection events.

Two beavers were trapped and dispatched on April 17, 2023, under a Nuisance Beaver Trapping Permit (#SM23-808181). Both individuals were located and trapped from a beaver dam in the Davidson Creek near the Mine Creek confluence. Trapping occurred ahead of beaver dam removal in order to assist with fish salvaging efforts completed in the area. The beaver dam was removed on August 25, 2023.

3.5.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, minor magnitude effect of habitat loss for furbearers (Vol 4 Section 5.4.13.4; New Gold 2015, ERM 2017). Monitoring related to these predictions includes verification that mitigation for buffered den sites is effective (EAC condition 23.h). Pre-clearing surveys and subsequent follow up monitoring for potential furbearer dens and habitat completed in 2023 are reported in Appendix B. Additionally, wildlife cameras deployed to detect general wildlife presence and habitat use within the Mine footprint as apart of the site wildlife camera monitoring program are reported in Section 2.6.

FIGURE 3.5-1 INCIDENTAL FURBEARERS OBSERVATIONS, 2023



3.6 BATS

DS conditions addressed: 8.14, 8.15, 8.22

EAC conditions addressed: 23.h

All bat species in BC are insectivorous mammals that fill an ecological role in pest control. Five bat species of conservation concern occur in the RSA (Table 3.6-1). Conservation risk to some species, including little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*), is largely due to White Nose Syndrome, a pathogenic fungus that affects groups of hibernating bats. Bat surveys have been conducted using call detection methods, which cannot always confirm species occurrence with complete accuracy. Due to this, some species have not been reliably detected within the RSA and their presence is considered unconfirmed (Table 3.6-1).

TABLE 3.6-1 BAT SPECIES AT RISK WITH POTENTIAL TO OCCUR IN THE REGIONAL STUDY AREA

Common Name	Scientific Name	Provincial Designation	Federal Designation		Previously Observed in RSA
		BC List ¹	SARA ²	COSEWIC ²	
Little brown myotis	<i>Myotis lucifugus</i>	Blue	Endangered	Endangered	Yes (LSA)
Northern myotis	<i>Myotis septentrionalis</i>	Blue	Endangered	Endangered	Yes (LSA)
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Blue	-	-	Unconfirmed
Western small-footed myotis	<i>Myotis ciliolabrum</i>	Blue	-	-	Yes (LSA)
Yuma myotis	<i>Myotis yumanensis</i>	Blue	-	-	Unconfirmed

¹ BC List: Yellow (Least Risk), Blue (Special Concern), Red (Threatened, Endangered, or Extirpated); BC CDC (2023)

² Schedule 1 of SARA and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status: Non-active, Not at Risk, Special Concern, Threatened, Endangered, or Extirpated; Government of Canada (2023)

Bats are sensitive to disturbance at their roosts and hibernation sites (hibernacula), which are protected when occupied by the BC *Wildlife Act* (1996). Bats roost in varying group sizes from mid-spring through mid-fall, foraging for insects nocturnally and using roosts to rest and raise pups. Potential roost features vary by species and may include mature and old growth trees, snags, stumps, rootwads, cracks, crevices, and caves. Bats may migrate south to hibernate in winter or hibernate locally if suitable hibernacula are present. Hibernacula must maintain specific temperatures and humidity suitable for bats during the winter. There is no evidence of hibernacula occurring within the RSA to support hibernating bats.

The predicted residual effects of the Mine on bats as identified in the EIS, Vol 4 Section 5.4.14.4 are (New Gold 2015; ERM 2017):

- Habitat loss and alteration (not significant, negligible magnitude); and
- Wildlife mortality (not significant, negligible magnitude).

The monitoring programs developed to verify predicted effects and the effectiveness of the mitigation measures outlined in Section 4.2 of the WMMP for bats include (ERM 2023a):

- Buffer Zone Monitoring (Sections 3.6.2, 3.6.2.2, and 3.6.3);
- Bat Roosting Habitat Offset (Section 3.6.2.3); and
- North American Bat Monitoring Program (NABAT) Monitoring (Section 3.6.2.4).

Additionally, ongoing discussion with ECCC regarding monitoring for bats at the Mine may result in a collaborative study with University of Northern British Columbia (UNBC) researchers, ECCC, and BW Gold. Details on the study goals and design have not yet been decided but will be incorporated into the bat monitoring program in future (see Section 4.2.3.3 in the WMMP; ERM 2023a).

3.6.1 OBJECTIVES

The objectives of the follow-up monitoring program for little brown myotis and northern myotis are to:

- Evaluate bat species composition and distribution within the LSA including use of buffered roosts and hibernacula (EAC condition 23.h, DS condition 8.22);
- Evaluate effectiveness of bat roosting structure offsets; and
- Monitor bats in the area surrounding the RSA using the NABAT program.

3.6.2 METHODS

3.6.2.1 BAT DISTRIBUTION MONITORING

Bioacoustic surveys using Autonomous Recording Units (ARUs) were completed for the second year in 2023 to evaluate bat species composition and distribution within the LSA and improve baseline data quality. ARUs were scheduled to be deployed in the summer and fall when bats are active on a nightly basis, following Resource Inventory Committee (RIC) protocols (RIC 1998b). ARUs were unable to be deployed in the summer due to the July wildfire, and therefore were only deployed in September 2023.

Nine wildlife Acoustics SM-mini bat recorders were deployed in suitable habitat near 2023 disturbance areas to monitor potential construction-related disturbances on bat presence and distribution (Figure 3.6-1).

Call Analysis

Recorded bat calls (sonogram files) were analysed for detection of 12 species known to be present or potentially present in the RSA, based on species ranges and previous baseline work (Table 3.6-2). Analysis of sonogram files was conducted using the software program Kaleidoscope Pro, version 5.6.3 (Wildlife Acoustics 2019). The call library used was Bats of North America version 5.4.0, and files were processed on the "0 Balanced (Neutral)" setting. Other signal parameters were left at default values. Kaleidoscope has a built-in call library for North American bat species which runs auto-identification on recorded calls, based on clustering analyses. Auto-ID is a first step of analysis and provides likely occurrences, reducing manual analysis time. While auto-ID is both efficient and generally accurate, variation in recording quality and overlap in species calls requires additional manual review to assess confidence in species presence.

FIGURE 3.6-1 BAT ARU LOCATIONS, 2023

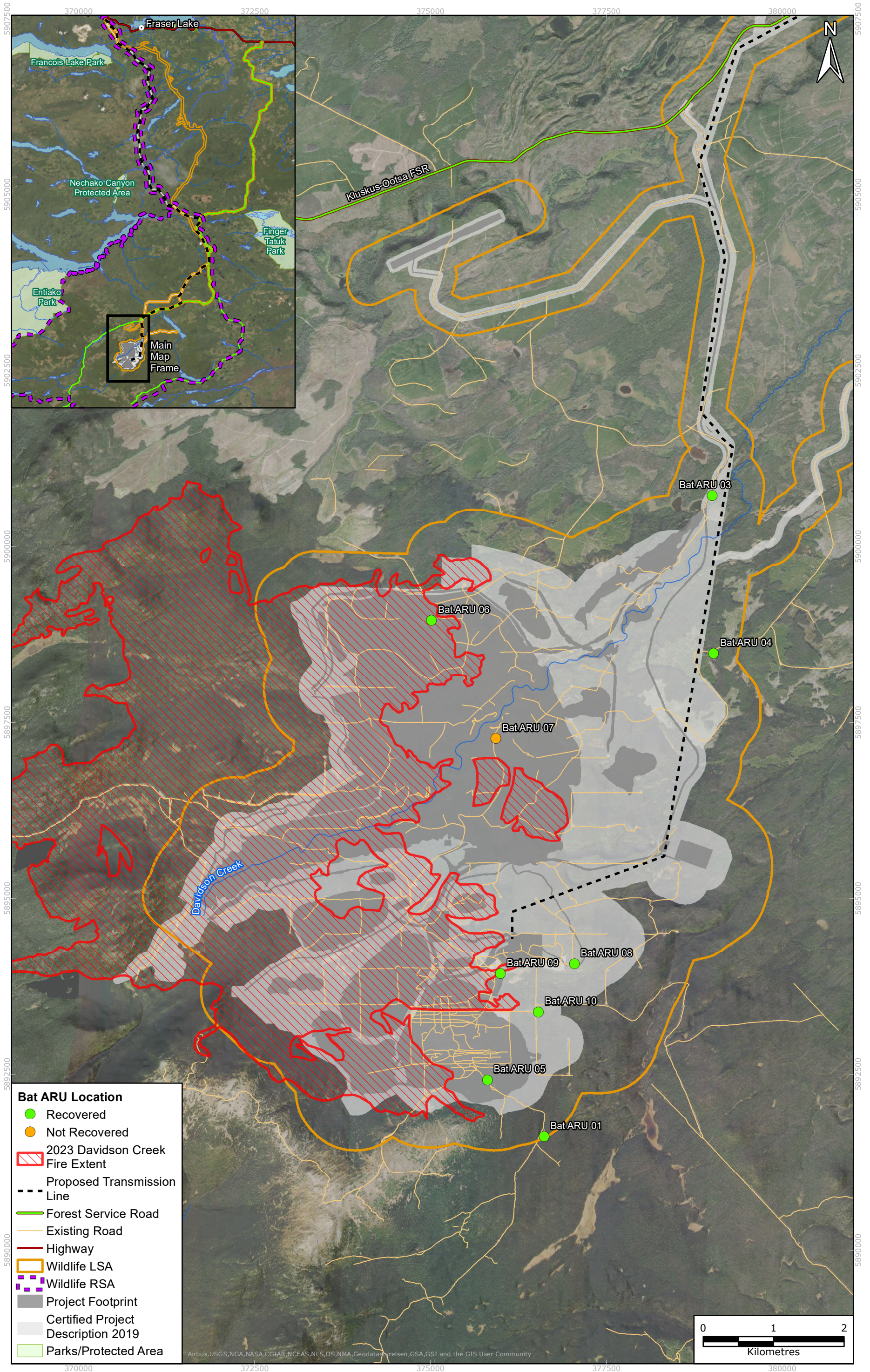


TABLE 3.6-2 LIST OF BAT SPECIES POTENTIALLY OCCURRING WITHIN THE REGIONAL STUDY AREA

Likelihood of Occurrence	Common Name	Scientific Name	Characteristic Frequency (Fc) ¹	Call ID Notes ²
Confirmed ²	Big brown bat	<i>Eptesicus fuscus</i>	22–30 kHz	May have sharper incline on call shape and lower Fc
	Eastern red bat	<i>Lasiurus borealis</i>	38–50 kHz	May have a variable Fc within a sequence and a slight uptick at the end
	Hoary bat	<i>Lasiurus borealis</i>	18–22 kHz	Fc typically lowest (< 22 kHz), very flat call shape
	Little brown myotis	<i>Myotis lucifugus</i>	40–45 kHz	Typically less steep call shape and lower maximum frequency (typically 70–80 kHz)
	Long-legged myotis	<i>Myotis volans</i>	40–45 kHz	Diagnostic hook at top of call, but rarely seen; calls exhibit large variety and overlap with other <i>Myotis</i> species
	Northern long-eared myotis	<i>Myotis septentrionalis</i>	40–45 kHz	Calls have large bandwidth range, with maximum frequency often over 90 kHz and on loud calls exceeding 100 kHz; calls are typically quiet
	Silver-haired bat	<i>Lasionycteris noctivagans</i>	22–30 kHz	May have longer pulse break and higher Fc (> 26 kHz)
	Western long-eared myotis	<i>Myotis evotis</i>	30–35 kHz	Low Fc distinguishes from other <i>Myotis</i>
	Western small-footed myotis	<i>Myotis ciliolabrum</i>	40–45 kHz	May have a smooth sweeping curve call shape with a downward ending tail. Lower Fc than <i>M. Californicus</i>
Possible/ Probable	California myotis	<i>Myotis californicus</i>	44–50 kHz	Higher Fc than most <i>Myotis</i> , Steeper call shape than <i>M. yuma</i>
	Yuma myotis	<i>Myotis yumanensis</i>	44–50 kHz	Higher Fc than most <i>Myotis</i> ; Less steep call shape than <i>M. californicus</i>
Unlikely	Townsend's big eared bat	<i>Corynorhinus townsendii</i>	32–35 kHz	May have a low intensity call with a linear downward sweep

¹ Lausen (2011); Lausen and Livengood (2011); Maxell et al. (2015).

² Presence confirmed during the 2013 baseline studies (ERM 2017), 2021 Pre-Construction baseline (ERM 2022b), or the 2022 WMMP compliance monitoring (ERM 2023b).

Reliable differentiation between species based on recorded calls can be challenging. In particular, several species in the genus *Myotis* have overlapping characteristics of echolocation calls around the 40 kHz frequency range (Table 3.6-2; RIC 1998b; Maxell et al. 2015). Additionally, big brown bats (*Eptesicus fuscus*) and silver-haired bats (*Lasionycteris noctivagans*) have very similar call characteristics and are not always possible to identify to species (Table 3.6-2; Maxell et al. 2015).

In situations where a given recording could belong to more than one species, identification was left as a list of two or more possible species.

Calls are not always identifiable to species, depending on the frequency and diagnostic features of the species calls, and the clarity of the recording. Therefore, species are reported according to confidence in occurrence to account for uncertainty in call assessment.

3.6.2.2 BUFFER ZONE MONITORING

Pre-clearing survey methods and results for bat roosts and hibernacula are reported in Appendix B.

3.6.2.3 BAT ROOSTING STRUCTURES

Loss of bat roosting habitat must be offset with artificial roosting structures, as part of federal DS condition 8.15. Upon further discussion with ECCC, use of BrandenBark structures (Brandenburg 2013), were recommended instead of standard bat boxes (see WMMP Section 4.2.2 for details; ERM 2023a).

Three BrandenBark structures were installed at Lake 15/16 on December 19 2023 (Figure 3.5-2). Prior to the onset of Construction, three BrandenBark structures were installed in the Matthews Creek Wetland offset area in September 2022. Locations were selected to represent semi-open and closed habitat types. BrandenBark was installed on existing trees with branches cut to accommodate the BrandenBark wrapping around the trees.

Deployment of additional BrandenBark in open, semi-open, and closed habitat types is planned to begin in 2024. The roosting structures will be monitored for bat use and activity and will include temperature loggers installed within BrandenBark structures to analyse microclimate suitability for bats (ERM 2023a).

3.6.2.4 NABAT MONITORING

The initiation of the NABAT monitoring program at the Mine was delayed due to disruptions from the July wildfire in 2023. The design and implementation of the NABAT monitoring program will be included with the first year of monitoring in the 2024 WMMP Compliance Report.

3.6.3 RESULTS

3.6.3.1 BAT DISTRIBUTION MONITORING

A total of nine ARUs were deployed on September 12 and 13, 2023 in suitable unburnt bat foraging habitats near 2023 disturbance areas (Figure 3.6-1; Table 3.6-3; Appendix V). Bat ARU deployment was aimed at monitoring potential disturbance effects on neighboring bat presence and distribution throughout the Construction phase. Eight ARUs were retrieved from September 23 to 27, 2023. Unit ARU 07 was lost due to forestry clearing activity. ARU data for all retrieved units were analyzed for consistency between unit survey effort and to follow ARU deployment window protocols (RIC 1998b).

After analysis of ARU files using the Kaleidoscope Pro auto-ID function and manual vetting, four species were detected with high or moderately high confidence (i.e., had many clear diagnostic calls recorded) in the mine site LSA: little brown myotis, silver-haired bat, western long-eared myotis (*Myotis evotis*), and western small-footed myotis (*Myotis ciliolabrum*; Table 3.6-3; Appendix W). Little brown myotis and western small-footed myotis are species of conservation concern (Table 3.6-1).

FIGURE 3.6-2 BAT BRANDENBARK LOCATIONS

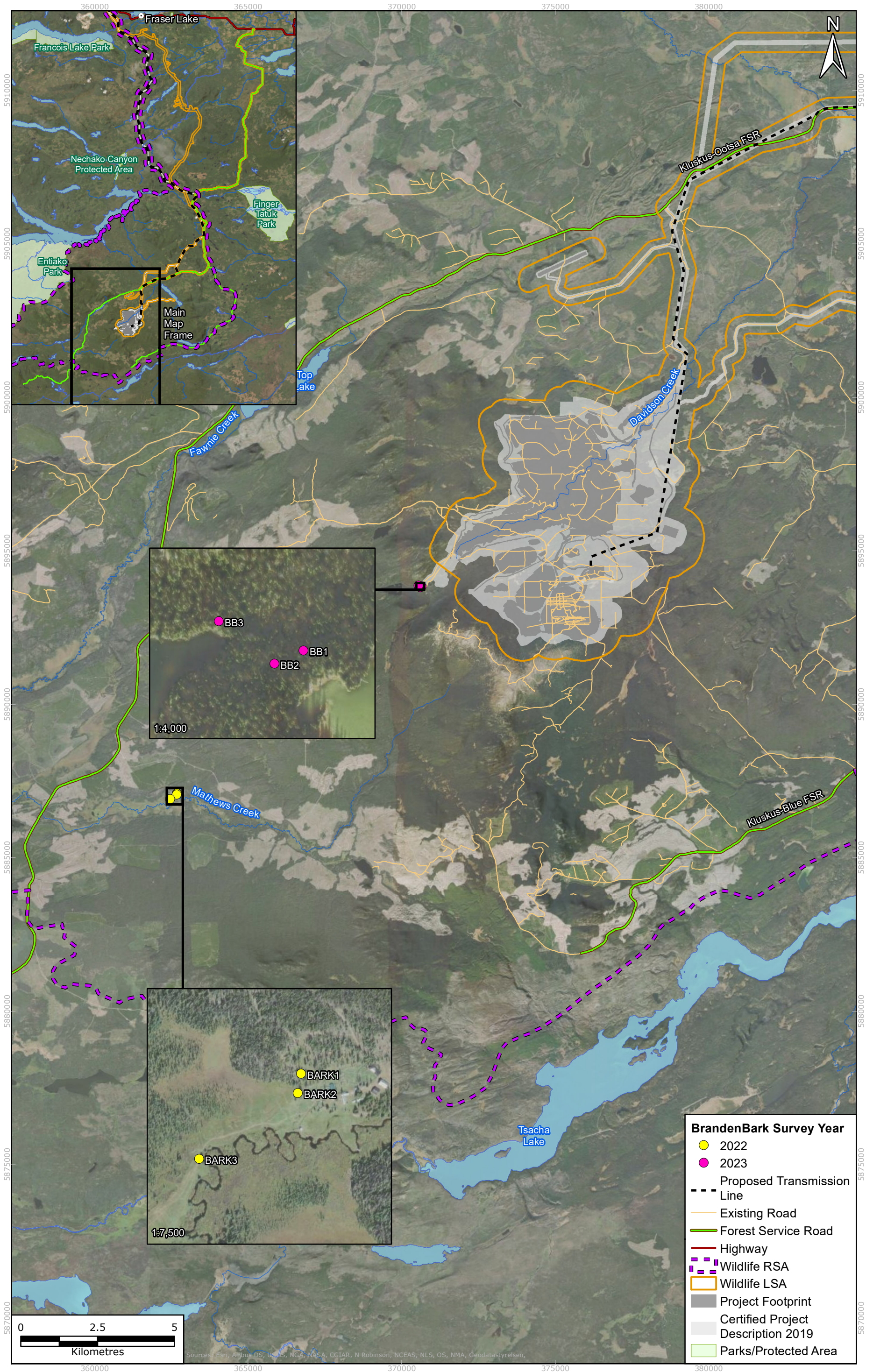


TABLE 3.6-3 BAT SPECIES DETECTED BY ARU SURVEYS, 2023

Common Name	Relative Confidence in Detection			
	2021	2022		2023
	Mine Site LSA	Mine Site LSA	Matthew's Creek	Mine Site LSA
Big brown bat	Moderate High	Moderate Low	Low	Moderate Low
California myotis	Moderate Low	Low	Low	Low
Eastern red bat	Low	Moderate Low	Low	Moderate Low
Hoary bat	Moderate High	Moderate Low	Low	Moderate
Little brown myotis*	High	High	High	High
Long-legged myotis	Moderate Low	Low	Low	Low
Northern myotis*	Moderate Low	Low	Low	Low
Townsend's big eared bat*	Low	Low	Low	Low
Silver-haired bat	High	High	Moderate	High
Western long-eared myotis	High	Moderate	Low	Moderate High
Western small-footed myotis*	Low	Moderate High	Low	High
Yuma myotis*	Moderate Low	Low	Low	Low

* Indicates a species of conservation concern, see Table 3.6-1.

All of these species have been detected in the mine site LSA in the past, with little brown myotis, western long-eared myotis, and silver-haired bat also detected with high confidence during baseline studies in 2021 (Table 3.6-1; Table 3.6-3). Nine species have been detected in the mine site LSA during previous baseline studies completed in 2011-2013, and 2021 (ERM 2023a).

3.6.3.2 BAT ROOSTING STRUCTURES

In total, six BrandenBark bat roosting structures have been installed at the site (Figure 3.6-2; Appendix X). Three BrandenBark bat roosting structures were installed at Lake 15/16 on December 19, 2023. In 2022, three were installed within the Matthews Creek Wetland offset area boundary. All bat-roosting structures were installed in open, semi-open, and closed habitat types (Figure 3.6-2). Each structure was attached to a tree approximately 3.5 m from the ground. Suitable locations for additional structure installations were identified for 2024.

3.6.3.3 INCIDENTAL OBSERVATIONS

No incidental bat observations or detections were recorded in 2023.

3.6.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, negligible magnitude effect of habitat loss/alteration and mortality for bats (Vol 4 Section 5.4.14.4; New Gold 2015; ERM 2017).

Bat roosting habitat loss is required to be offset with artificial roosting structures by federal DS condition 8.15, with an additional follow-up program to participate in NABAT monitoring (detailed in the WMMP; ERM 2023a). Monitoring of buffered bat roosts and hibernacula is required by EAC condition 23.h to verify the effectiveness of buffering bat habitat features. Pre-clearing survey methods and results for bat roosts and hibernacula are reported in Appendix B.

Monitoring for bats conducted in 2023 included the installation of three BrandenBark bat roosting structures and the first year of the bat distribution monitoring program as 2022 surveys were completed as part of additional baseline collection for bat species presence and distribution. The bat distribution monitoring program was only completed in September because effects from the July wildfire prevented ARU deployment during the summer. The NABAT monitoring program for bats was not initiated in 2023 and is under ongoing discussion with ECCC to finalize methods and approach.

A total of nine ARUs were deployed in September 2023 within suitable habitat to collect data of bat species presence and distribution in the mine site LSA during Construction activity in 2023 (Figure 3.6-1). Eight ARUs were retrieved for data analysis as one unit was cleared by forestry and lost.

Units Bat ARU 05 and 09 accounted for 58% of all bat recordings in 2023. Both units were located near construction in the lower portion of the LSA, with Bat ARU 05 located at the top of the ore body and Bat ARU 09 at a small wetland between the new construction camp and the plant site. Detections at both locations were made over multiple nights, suggesting frequent use of the area.

Results from the bioacoustic survey indicated high confidence in the presence of silver-haired bat and two bat species of conservation concern, little brown myotis and western small-footed myotis (Table 3.6-3). These species were also detected with higher confidence during surveys in 2021 and 2022. Inversely, the big brown bat and California myotis (*Myotis californicus*) which were detected with moderately high confidence during the 2021 baseline surveys, were unconfirmed in 2022 and 2023 surveys, although this may be due to low survey effort and the late season monitoring in 2023. All other species have been detected with similar confidence from 2021 to 2023 in the mine site LSA. Data collected in 2023 mark the onset of Construction monitoring for bat species presence and distribution. Results assist in identifying species potentially occurring at the Mine but does not represent overall bat abundance or confirm species absence.

Although little brown myotis are listed federally and provincially as a species of conservation concern, this species has consistently had some of the highest numbers of bioacoustic files recorded across monitoring sites and years (ERM 2023a). Little brown myotis and northern long-eared myotis populations underwent sharp declines across North America due to White Nose Syndrome infecting large groups of hibernating bats. To date, no cases of White Nose Syndrome have been detected in BC (Government of BC 2023b). No features which are suitable for large group hibernacula have been identified within the LSA or RSA, reducing the likelihood that White Nose Syndrome will spread in the region. Healthy bat populations can be sustained in the Mine

area through maintenance of habitat, including adequately identifying and buffering bat roosts and hibernacula, and offsetting lost roosting habitat (as per the WMMP; ERM 2023a).

Monitoring in 2023 provides additional baseline data but was not conducted as a comprehensive survey covering the LSA, as was done in previous years (e.g., 20 ARUs deployed in 2021). Up to nine species of bat have been previously confirmed in the LSA and RSA. Although monitoring completed in 2023 only detected three species with high reliability and one with moderately high reliability, this may be attributed to ARUs being deployed late in the season due to delays associated with the July wildfire.

In total, six BrandenBark bat roosting structures have been installed since 2022. Three structures were installed at the Matthews Creek Wetland offset area prior to the onset of Construction in 2022. In December 2023, three additional roosting structures were deployed at Lake 15/16. Additional roosting structures will be installed in 2024 at locations identified in 2023, and the monitoring program on the offset effectiveness will be initiated (following details in the WMMP; ERM 2023a).

3.7 RAPTORS

DS conditions addressed: 4.1, 4.5

EAC conditions addressed: 23.c, 23.h

Raptors (i.e., falcons, hawks, eagles, and owls) are long-lived predators that require large home ranges and use a variety of habitats throughout the year. Common raven is considered a functional raptor by this report based on similar nesting preferences to other true raptor species. The landscape surrounding the Mine has few areas that can support cliff-nesting raptors, making mature forest the primary raptor nesting habitat. Raptor nests are protected year-round by the BC *Wildlife Act* (1996).

Four raptor species of conservation concern have potential to occur in the RSA, two of which have been confirmed (Table 3.7-1). Short-eared owl was detected during 2011-2013 baseline surveys prior to the EIS; however habitat assessments and follow-up baseline studies indicate there is limited large open areas which can provide suitable breeding habitat for short-eared owl within both the LSA and RSA. One Swainson's hawk was incidentally detected along the transmission line in 2022. The individual was observed during fall waterbird surveys and was therefore likely migrating through the Mine area. Due to the lack of available nesting habitat, limited species observations, and/or lack of breeding evidence, no additional monitoring or management is planned for short-eared owl or Swainson's hawk.

The predicted residual effects of the Mine on raptors as identified in the EIS assessment, Vol 4, Section 5.4.9.4 are (New Gold 2015; ERM 2017):

- Habitat loss and alteration (not significant, negligible magnitude).

As described in Section 4.8 of the WMMP (ERM 2023a), the monitoring programs developed for raptors includes:

- Pre-clearing surveys for birds (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Transmission Line Monitoring (Section 2.5); and
- Nest Success Surveys (Section 3.7.2.1).

TABLE 3.7-1 RAPTOR SPECIES AT RISK WITH POTENTIAL TO OCCUR IN THE REGIONAL STUDY AREA

Common Name	Scientific Name	Provincial Designation			Federal Designation		Previously Observed in RSA
		BC List ¹	SARA ²	COSEWIC ²			
Gyr Falcon	<i>Falco rusticolus</i>	Blue	-	Not at Risk	No		
Peregrine falcon, <i>anatum</i> ssp. ³	<i>Falco peregrinus anatum</i>	Red	-	Non-active	No		
Short-eared owl	<i>Asio flammeus</i>	Blue	Special Concern	-	Yes (RSA)		
Swainson's hawk	<i>Buteo swainsoni</i>	Red	-	-	Yes (Transmission Line)		

¹ BC List: Yellow (Least Risk), Blue (Special Concern), Red (Threatened, Endangered, or Extirpated); BC CDC (2023)

² Schedule 1 of SARA and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status: Non-active, Not at Risk, Special Concern, Threatened, Endangered, or Extirpated; Government of Canada (2023)

³ Species with migration paths overlapping the RSA but which do not breed or overwinter in the area.

3.7.1 OBJECTIVES

The objective of the follow-up monitoring program for raptors is to evaluate the success of nesting raptors within setback buffers established during construction and vegetation clearing (DS condition 4.5, EAC condition 23.h).

3.7.2 METHODS

3.7.2.1 NEST SUCCESS SURVEYS

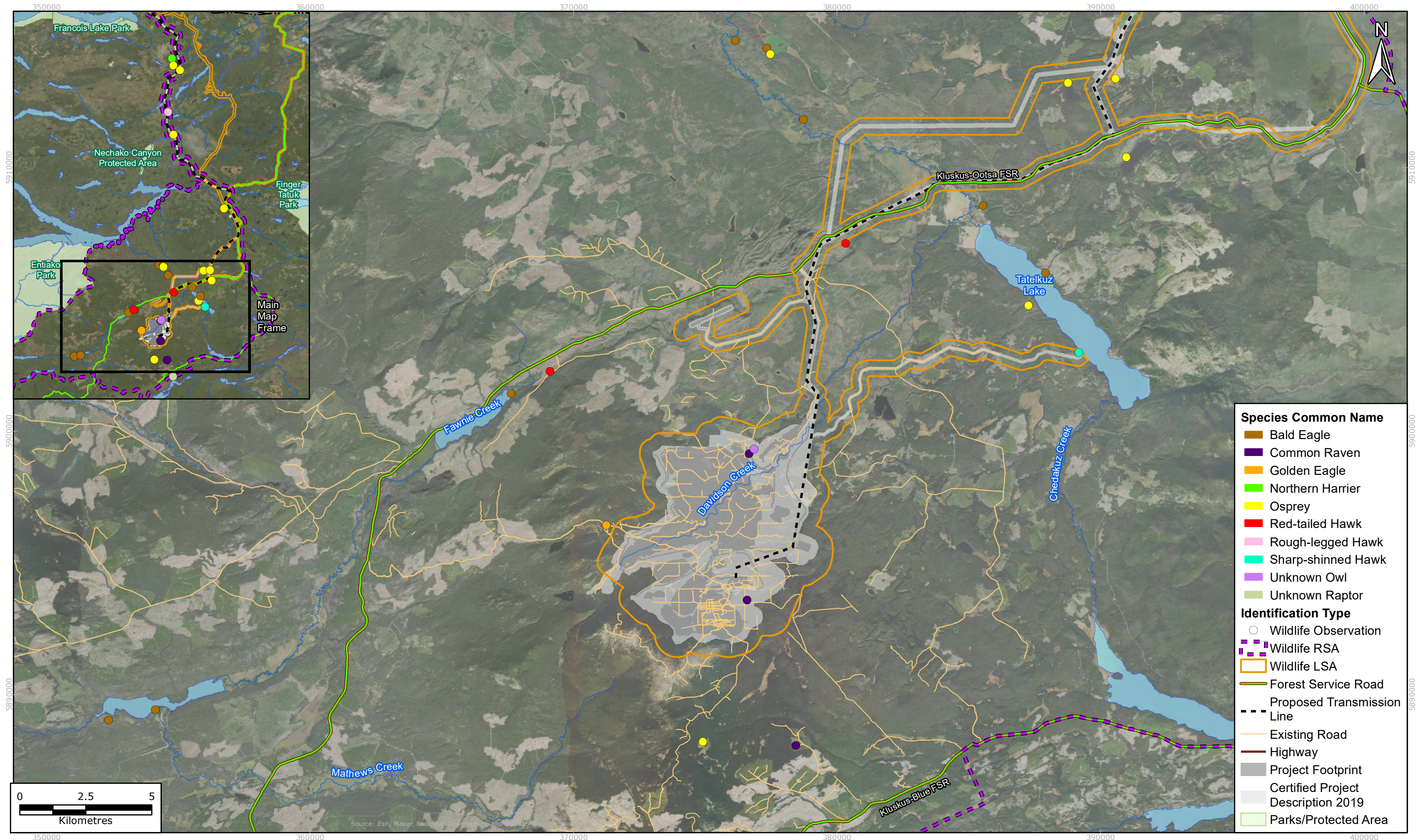
Pre-clearing survey methods and results for raptor stick nests, and all subsequent monitoring, are reported in Appendix B.

3.7.3 RESULTS

3.7.3.1 INCIDENTAL OBSERVATIONS

In total, 38 individuals from nine raptor species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.7-1; Appendix H). Two of the incidentally observed individuals were associated with unspecified species, including one unspecified raptor and one unspecified owl species. Approximately 60% of incidentally detected individuals were recorded during the fall waterbird surveys, this included 11 osprey (*Haliaeetus leucocephalus*), seven bald eagle (*Haliaeetus leucocephalus*), one golden eagle, two red-tailed hawk, one sharp-shinned hawk, and one unspecified raptor species. The remaining individuals incidentally recorded during the 2023 field season included four bald eagle, three common raven, one red-tailed hawk, two northern goshawks, two northern harrier, one osprey, one rough-legged hawk, and one unspecified owl species.

FIGURE 3.7-1 INCIDENTAL RAPTOR OBSERVATIONS, 2023



The most frequently observed species were osprey, accounting for 32% (n = 12) of all raptor observations, and bald eagle, accounting for 29% (n = 11) of all raptor observations. No raptor species of conservation concern were incidentally observed.

One bald eagle was incidentally recorded by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log on October 2023 at KM14.75 of the Blackwater Access Road (Appendix G). Incidental observations provided in the Wildlife Sighting Log are not included on Figure 3.7-1 due to the fact that typically only the general location of the observation was provided.

3.7.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, negligible magnitude effect on habitat loss and alterations for raptors (Vol 4 Section 5.4.9.4; New Gold 2015; ERM 2017). Monitoring for raptors focuses on measuring the success of mitigation measures, including implementation of pre-clearing surveys and outcomes of buffered active nests, which are required by EAC conditions 23.c and 23.h, and DS condition 4.5. Monitoring for raptors related to potential effects of the transmission line are reported in Section 2.5.

Pre-clearing surveys and subsequent follow up monitoring for potential raptor nests completed in 2023 are reported in Appendix B.

3.8 WATERBIRDS

DS conditions addressed: 4.1, 4.5

EAC conditions addressed: 23.c, 23.h

The term waterbird is used to encompass all birds that primarily use aquatic habitats for foraging, breeding, or migratory staging during the year. This includes dabbling and diving ducks, loons, gulls, geese, swans, and shorebirds. Waterbirds require aquatic habitats for most of their life cycle, in addition to adjacent terrestrial and wetland habitats for nesting and sometimes feeding. Within the RSA, waterbirds may use wetlands (fens, bogs, or swamps), as well as lakes, rivers, and ponds. Both migratory waterbirds and their nests are protected federally under the *Migratory Birds Convention Act* (1994) while additional protections may be afforded under the *Species at Risk Act* (Government of Canada 2023). Waterbird species of conservation concern potentially occurring within the RSA are listed in Table 3.8-1.

The predicted residual effects of the Mine on waterbirds as identified in the EIS, Vol 4, Section 5.4.8.4 (New Gold 2015; ERM 2017) are:

- Habitat loss and alteration (not significant, minor magnitude);
- Mortality risk (not significant, negligible magnitude); and
- Change in population dynamics (not significant, negligible magnitude).

The predictions in the EIS included the potential for reduced bird density within 100 m of the Mine footprint due to habitat alteration and potential for increased predator access to alter population dynamics near the Mine (EIS Application, Vol 4, Section 5.4.8; New Gold 2015; ERM 2017). The effectiveness of mitigation measures will be evaluated through monitoring waterbird population dynamics within the LSA and RSA, as well as behavioural responses to the Mine.

TABLE 3.8-1 WATERBIRD SPECIES AT RISK WITH POTENTIAL TO OCCUR IN THE REGIONAL STUDY AREA

Common Name	Scientific Name	Provincial Designation			Federal Designation		Previously Observed in RSA
		BC List ¹	SARA ²	COSEWIC ²			
American bittern	<i>Botaurus lentiginosus</i>	Blue	-	-	-	-	No
American golden plover	<i>Pluvialis dominica</i>	Blue	-	-	-	-	No
American white pelican	<i>Pelecanus erythrorhynchos</i>	Red	-	-	Not at Risk	-	Yes (RSA)
Brant ³	<i>Branta bernicla</i>	Blue	-	-	-	-	No
California gull ³	<i>Larus californicus</i>	Red	-	-	-	-	No
Eared grebe ³	<i>Podiceps nigricollis</i>	Blue	-	-	-	-	No
Great blue heron	<i>Ardea herodias</i>	Blue	-	-	-	-	Yes (RSA)
Horned grebe	<i>Podiceps auritus</i>	Yellow	Special Concern	-	-	-	Yes (Transmission Line LSA)
Killdeer	<i>Charadrius vociferus</i>	Blue	-	-	-	-	Yes (RSA)
Lesser yellowlegs	<i>Tringa flavipes</i>	Blue	-	-	Threatened	-	Yes (RSA)
Long-tailed duck ³	<i>Clangula hyemalis</i>	Blue	-	-	-	-	No
Red-necked phalarope ³	<i>Phalaropus lobatus</i>	Blue	Special Concern	-	Special Concern	-	Yes (Transmission Line LSA)
Surf scoter ³	<i>Melanitta perspicillata</i>	Blue	-	-	-	-	No
Western grebe	<i>Aechmophorus occidentalis</i>	Red	Special Concern	-	Special Concern	-	Yes (Transmission Line LSA)

¹ BC List: Yellow (Least Risk), Blue (Special Concern), Red (Threatened, Endangered, or Extirpated); BC CDC (2023)

² Schedule 1 of SARA and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status: Not at Risk, Special Concern, Threatened, Endangered, or Extirpated; Government of Canada (2023)

³ Species with migration paths overlapping the RSA but which do not breed or overwinter in the area.

As described in Section 4.8 of the WMMP (ERM 2023a), the monitoring programs developed for waterbirds include:

- Pre-clearing surveys for waterbirds (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Mortality Risk Monitored through Wildlife Interactions and Incidents (Section 2.3);
- Facility Water Structure Monitoring (Section 2.4);
- Transmission Line Monitoring (Section 2.5);
- Waterbird Population Monitoring (Section 3.8.2.1); and
- Nest Success Surveys (Section 3.7.2.1).

3.8.1 OBJECTIVES

The objectives of the follow-up monitoring program for waterbirds are to:

- Detect changes in bird population dynamics in the Mine area (DS conditions 4.1, 4.5); and
- Evaluate the success of nesting waterbirds within setback buffers established during construction and vegetation clearing (DS condition 4.5, EAC condition 23.h).

3.8.2 METHODS

3.8.2.1 WATERBIRD POPULATION MONITORING

Waterbird population monitoring was completed for the second year in 2023 to evaluate changes in waterbird population dynamics in the Mine areas. Two of three separate surveys for waterbirds were completed in 2023 following RIC standards (RIC 1998c): spring pairing and fall migration. Summer brooding surveys were planned in 2023 but were not completed due to the July wildfire.

Waterbird aerial surveys were conducted for all wetlands and waterbodies across the LSA instead of ground surveys at a subset of ponds, as described in the WMMP, due to lack of accessible ponds close to the Mine footprint. The mine site LSA has few waterbodies within the intended potential effect zone, i.e., within 200 m of the Mine footprint (ERM 2023a), and most sites were inaccessible for ground surveys due to being surrounded by forest on all sides and without options for nearby road access or helicopter landing sites. Therefore, all waterbodies in the LSA were surveyed by helicopter in 2022 and 2023. The WMMP will be updated to reflect this program change, along with any other program changes (WMMP Section 4.8; ERM 2023a).

Two biologists were present for each aerial survey, one in the front of the helicopter to navigate and identify waterbirds and the other in the back to record notes. Environmental conditions such as weather, wind, and visibility were recorded at the start of each survey. Survey routes and bird observations were georeferenced and data on species, number of individuals, sex, age, and habitat were recorded for each observation, when possible. The habitat associated with each observation was classified as pond, lake, river, creek, swamp, or wetland habitats.

Waterbird data were summarized by relative abundance and species richness. Relative abundance is the number of individuals counted, while species richness is the total number of species observed during each survey period. These estimates included only those data that were collected during formal waterbird surveys (i.e., no incidental observations).

Further data analysis including a power analysis and BACI analysis will be completed as the waterbird population monitoring program continues, as described in the WMMP Section 4.8.3.5 (ERM 2023a). A Power analysis will be completed after additional years of data collection when data is sufficient to determine long-term trends. Although 2023 marks the second year of monitoring, completion of a power analysis was delayed due to interruptions in the program caused by the July wildfire.

3.8.2.2 NEST SUCCESS SURVEYS

Pre-clearing survey methods and results for waterbird nests, and all subsequent monitoring, are reported in Appendix B.

3.8.3 RESULTS

3.8.3.1 WATERBIRD POPULATION MONITORING

Waterbird population surveys were completed for two periods in 2023: spring pairing (May 17 to 19) and fall migration (September 9 to 11; Figure 3.8-1; Figure 3.8-2; Appendix Y). Waterbird distribution was relatively consistent across the transmission line LSA, while very few waterbirds were recorded in either spring or fall in the mine site LSA (Figure 3.8-1; Figure 3.8-2). This is reflective of the lack of waterbodies present in the mine site LSA and suitable habitat along the Transmission Line (ERM 2023a).

Surveys detected a total of 25 species and 1,636 individuals from 7 waterbird groups (Table 3.8-2; Appendix Z): dabbling ducks (species = 6; individuals = 515), diving ducks (species = 9; individuals = 860), geese and swans (species = 3; individuals = 104), gulls and terns (species = 1; individuals = 26), loons and grebes (species = 4; individuals = 85), riverine birds (species = 1; individuals = 3), shorebirds (individuals = 31), and other birds (species = 1; individuals = 12). Nine unspecified species were also recorded during surveys (Appendix Z). Most unspecified species are records of individuals which were not reliably identifiable, typically due to the birds flushing or hiding. Some species are also similar in appearance which makes identification during aerial surveys challenging (e.g., scaup species, sandpiper species, and yellowlegs species).

The most commonly observed waterbird species were mallard (n = 305; *Anas platyrhynchos*), ring-necked duck (n = 226; *Aythya collaris*), lesser scaup (n = 194; *Aythya affinis*), and bufflehead (n = 172; *Bucephala albeola*). There were 11 species that were only observed during one of the survey periods (spring = 7, fall = 4; Table 3.8-2). The spring pairing had more observations of waterbirds overall (58%).

Waterbird groups were detected across a variety of potential habitat types present in the LSA including pond, lake, wetland, river, creek, sedge meadow, and other. Detections were most common in lakes (58%), followed by wetlands (17%) and ponds (17%; Figure 3.8-3). Some groups had strong associations with certain habitats, such as dabbling ducks (67%), diving ducks (55%), and loons and grebes (88%), being most strongly associated with lakes (Figure 3.8-3).

Spring pairing surveys recorded 164 breeding pairs. Additionally, spring surveys identified four nests, each from a different species: Bonaparte's gull (*Chroicocephalus Philadelphia*), sandhill crane (*Grus canadensis*), trumpeter swan (*Cygnus buccinator*), and common loon (*Gavia immer*). None of the nests were in locations where avoidance or mitigation due to Mine activities was required. No juveniles were identified in either the spring pairing or the fall migration surveys which is expected as juveniles are typically only observed during the summer brooding period.

Two species of conservation concern were recorded during the 2023 waterbird surveys, both only being recorded during spring pairing surveys: surf scoter (n = 55; *Melanitta perspicillata*), and horned grebe (n = 3; *Podiceps auratus*; Table 3.8-2). Surf scoters have not been previously recorded in the RSA (Table 3.8-1). The Mine is located further south than the breeding range of surf scoters although they have been known to migrate through the area. Surf scoters were observed six times during spring pairing surveys in group ranging from 3 to 24 individuals. All surf scoters detections were in lake habitats. Horned grebes were detected twice during the spring pairing surveys in pond and lake habitats.

FIGURE 3.8-1 WATERBIRD DISTRIBUTION DURING SPRING PAIR SURVEYS, 2023

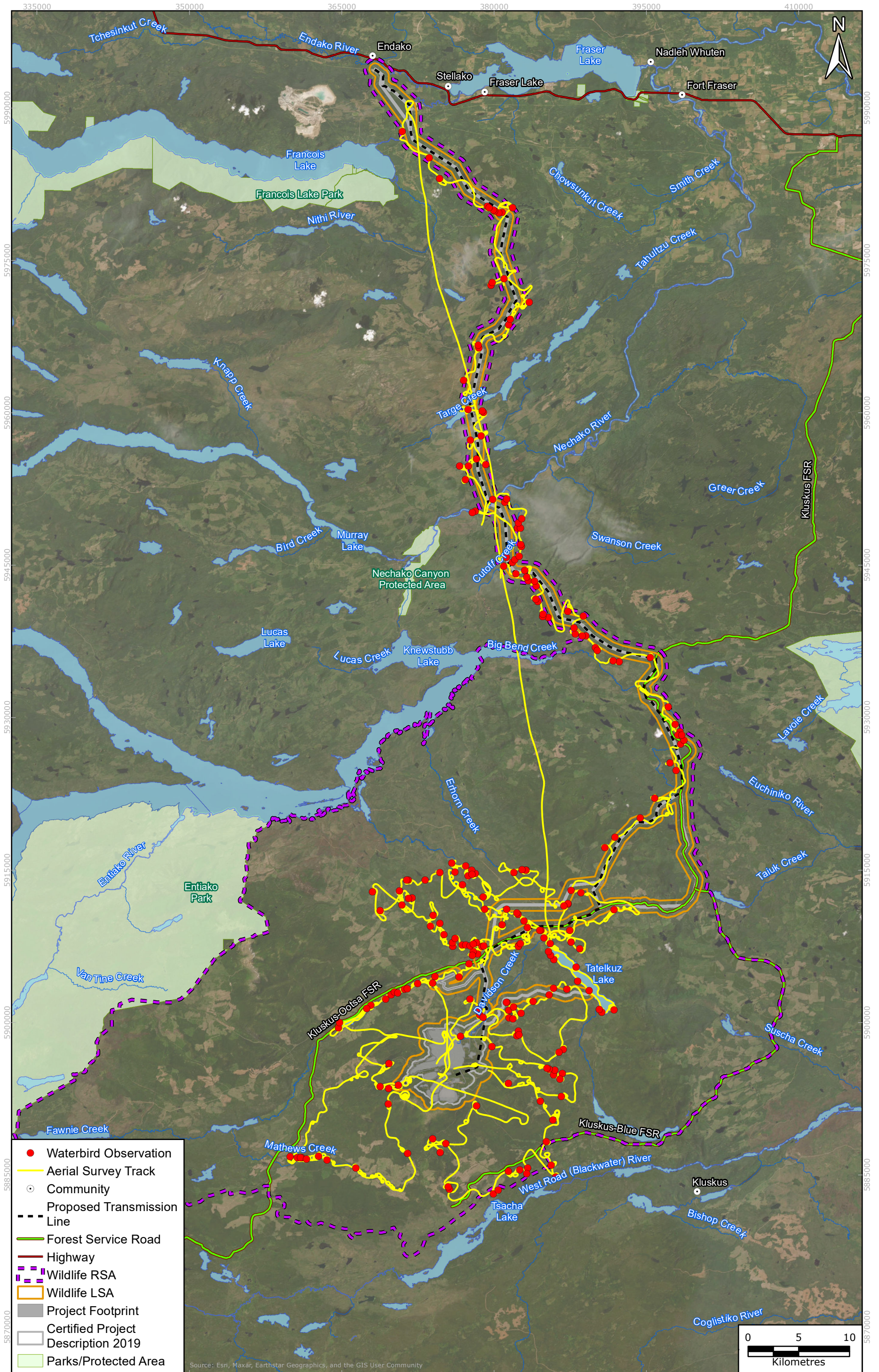


FIGURE 3.8-2 WATERBIRD DISTRIBUTION DURING FALL MIGRATION SURVEYS, 2023

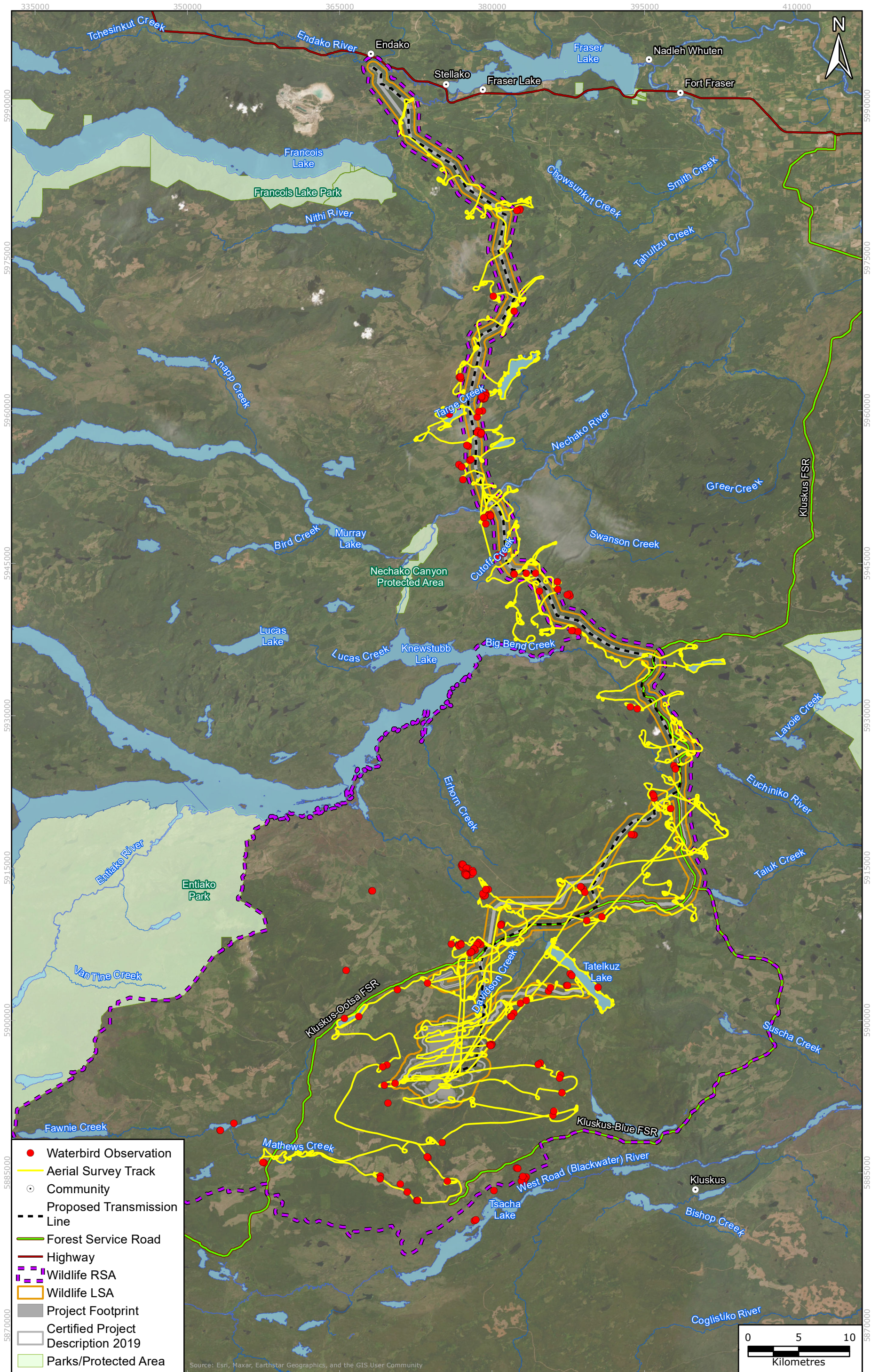


FIGURE 3.8-3 WATERBIRD HABITAT ASSOCIATIONS, 2023

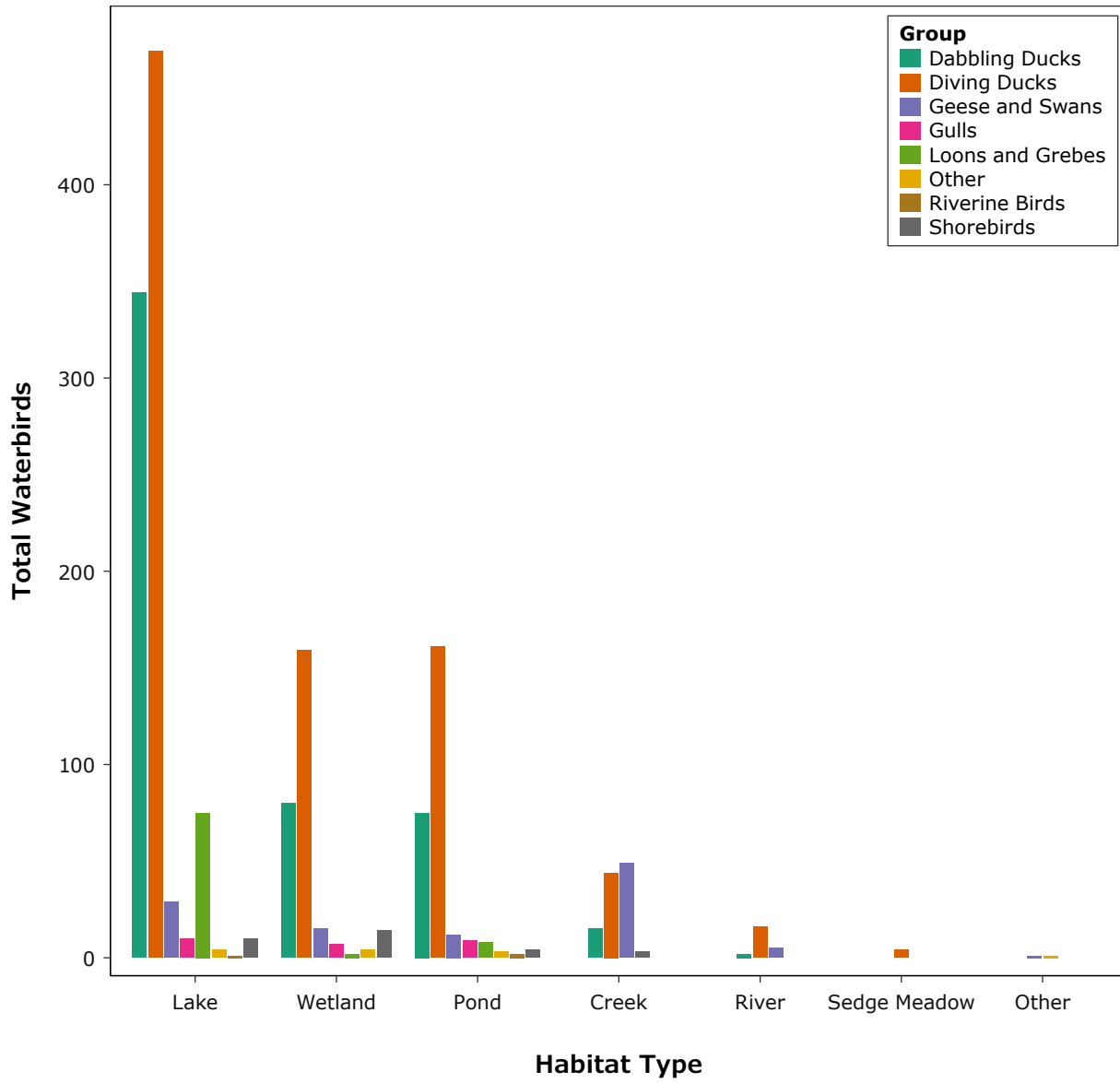


TABLE 3.8-2 TOTAL WATERBIRD OBSERVATIONS BY SURVEY, 2023

Species Group	Species		Spring Pairing	Fall Migration	Total
	Common Name	Scientific Name			
Dabbling Ducks	American Wigeon	<i>Anas americana</i>	4	1	5
	Blue-Winged Teal	<i>Spatula discors</i>	14	110	124
	Gadwall	<i>Mareca strepera</i>	1	2	3
	Green-Winged Teal	<i>Anas carolinensis</i>	4	3	7
	Mallard	<i>Anas platyrhynchos</i>	104	200	305
	Northern Shoveler	<i>Anas clypeata</i>	4	16	20
	Unspecified Dabbling	-	-	24	24
	Unspecified Teal	-	1	27	28
	Group Total			132	383
Diving Ducks	Barrow's Goldeneye	<i>Bucephala islandica</i>	94	1	95
	Bufflehead	<i>Bucephala albeola</i>	115	57	172
	Common Goldeneye	<i>Bucephala clangula</i>	-	34	34
	Common Merganser	<i>Mergus merganser</i>	28	13	41
	Hooded Merganser	<i>Lophodytes cucullatus</i>	7	-	7
	Lesser Scaup	<i>Aythya affinis</i>	189	5	194
	Ring-Necked Duck	<i>Aythya collaris</i>	119	107	226
	Ruddy Duck	<i>Oxyura jamaicensis</i>	-	3	3
	Surf Scoter*	<i>Melanitta perspicillata</i>	55	-	55
	Unspecified Diver	-	4	18	22
	Unspecified Goldeneye	-	-	7	7
	Unspecified Scaup	-	-	4	4
	Group Total			611	249
Geese and Swans	Canada Goose	<i>Branta canadensis</i>	82	8	90
	Snow Goose	<i>Anser caerulescens</i>	1	-	1
	Trumpeter Swan	<i>Cygnus buccinator</i>	4	9	13
	Group Total			87	17
Gulls and Terns	Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	21	-	21
	Unspecified Gull	-	5	-	5
	Group Total			26	-

Species Group	Species		Spring Pairing	Fall Migration	Total
	Common Name	Scientific Name			
Loons and Grebes	Common Loon	<i>Gavia immer</i>	37	28	65
	Horned Grebe*	<i>Podiceps auritus</i>	3	-	3
	Pied-Billed Grebe	<i>Podilymbus podiceps</i>	3	-	3
	Red-Necked Grebe	<i>Podiceps grisegena</i>	13	1	14
	Group Total		56	29	85
Riverine Birds	Belted Kingfisher	<i>Megaceryle alcyon</i>	-	3	3
	Group Total		-	3	3
Shorebirds	Unspecified Sandpiper	-	5	-	5
	Unspecified Shorebird	-	14	1	15
	Unspecified Yellowlegs	-	11	-	11
	Group Total		30	1	31
Other	Sandhill Crane	<i>Grus canadensis</i>	2	-	2
	Unspecified Duck	-	4	6	10
	Group Total		6	6	12
TOTAL			948	688	1,636

* Indicates a species of conservation concern, see Table 3.8-1.

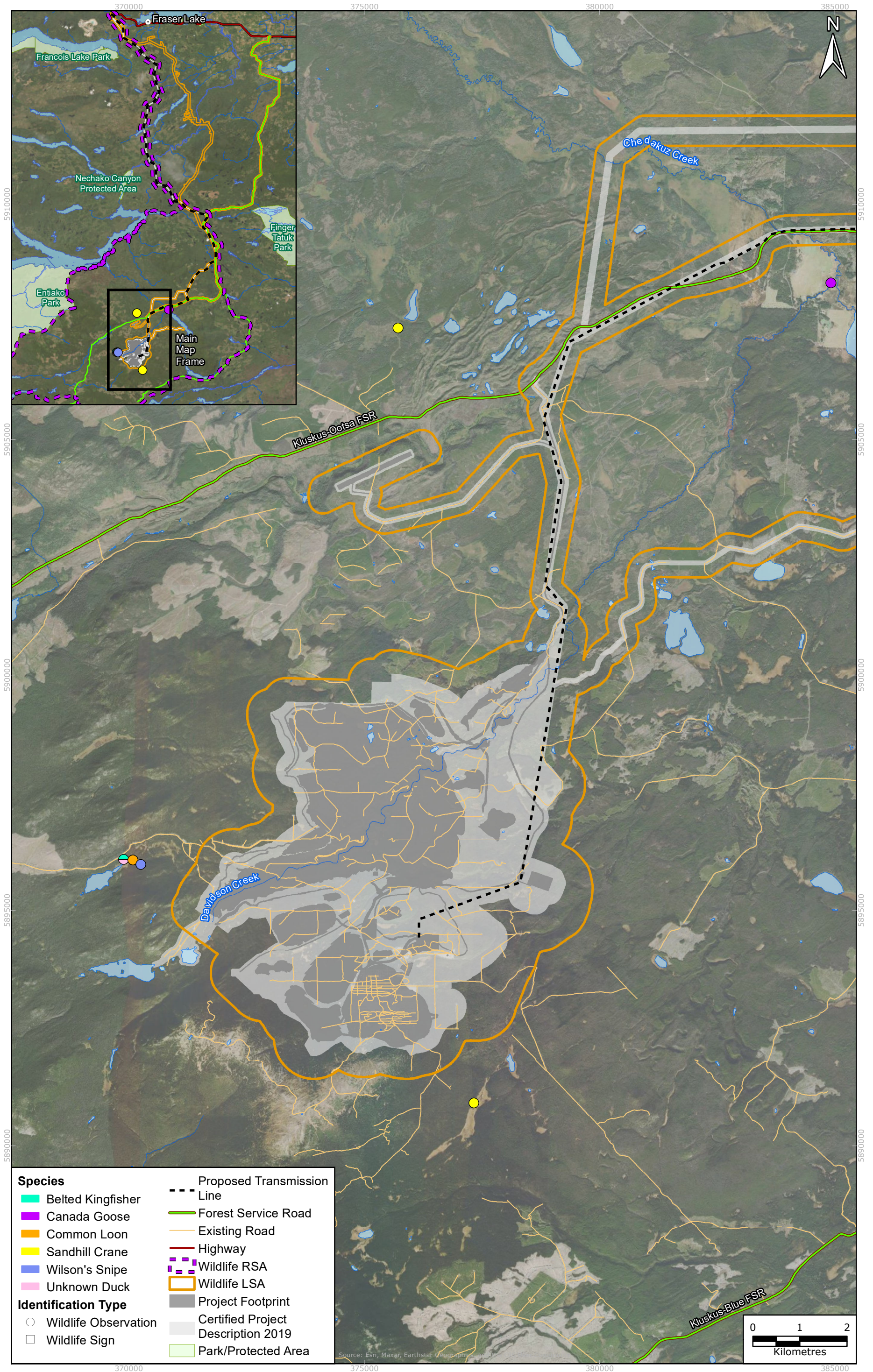
3.8.3.2 INCIDENTAL OBSERVATIONS

In 2023, 326 individual waterbirds from five species were incidentally observed (Figure 3.8-4; Appendix H). The most commonly observed incidental waterbird species was sandhill crane (n = 320). Wilson's snipe was the only incidentally observed species that was not also observed during waterbird surveys. No waterbird species of conservation concern were observed incidentally.

3.8.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, minor magnitude effect of habitat loss and alteration, and a not significant negligible magnitude effect of mortality and change in population dynamics for waterbirds (Vol 4 Section 5.4.8.4, New Gold 2015, ERM 2017). A waterbird population monitoring program is required to confirm the prediction in the EIS that waterbirds may avoid the Mine by up to 100 m (DS conditions 4.1 and 4.5). Monitoring is also conducted to confirm the success of mitigation measures, including pre-clearing surveys and outcomes of buffered active nests, which are required by EAC condition 23.h and DS condition 4.5. Pre-clearing surveys and subsequent follow up monitoring for potential waterbird nests completed in 2023 are reported in Appendix B. Additionally, transmission line monitoring for potential effects on waterbirds is reported in Section 2.5.

FIGURE 3.8-4 INCIDENTAL WATERBIRD OBSERVATIONS, 2023



The 2023 waterbird aerial population monitoring program was only completed in the spring and fall periods, as the July wildfire prevented the completion of the summer brooding surveys. Aerial waterbird population surveys were conducted for all wetlands and waterbodies across the LSA in May and September 2023 (Figure 3.8-1; Figure 3.8-2). During waterbird population surveys, very few waterbirds were recorded in the mine site LSA, which generally has very few waterbodies. Waterbirds were consistently present across the transmission line LSA during all survey periods.

The 2023 surveys detected a total of 25 waterbird species and 1,637 individuals. Waterbird abundance in 2023 was slightly higher in the spring pairing period (n = 949) than the fall migration period (n = 688). However, results from the 2022 surveys found that nearly 50% of waterbird abundance was accounted for in the fall migration surveys. Lower species detection in the fall of 2023 is likely attributed to variation in the peak migration period and whether survey timing aligned with peak migration. The most commonly observed waterbird species were consistent between 2022 and 2023: mallard, ring-necked duck, lesser scaup and bufflehead. Four species recorded during the 2023 surveys were not recorded in 2022: gadwall (*Mareca strepera*), surf scoter, snow goose (*Anser caerulescens*), and horned grebe. Where as, 12 species recorded during the 2022 surveys were not recorded in 2023 including six species at risk: American white pelican (*Pelecanus erythrorhynchos*), great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferus*), lesser yellowlegs (*Tringa flavipes*), red-necked phalarope (*Phalaropus lobatus*), and western grebe (*Aechmophorus occidentalis*; ERM 2023b).

In 2023, the spring pairing surveys identified four nests from four species: Bonaparte's gull, sandhill crane, trumpeter swan, and common loon. No nests were identified during the fall migration surveys and no juveniles were observed in either the spring pairing or the fall migration surveys. None of the nests identified in 2023 were in locations where avoidance or mitigation due to Mine activities was required.

Across all surveys in 2023, two species of conservation concern were recorded: surf scoter and horned grebe. Surf scoters are provincially Blue-listed and horned grebes are provincially Yellow-listed and federally listed as Special Concern on Schedule 1 of SARA (BC CDC 2023; Government of Canada 2023). Surf scoters have not previously been recorded at the Mine (i.e., during surveys in 2011–2013, 2017, 2021, or 2022; ERM 2022b; ERM 2023b) and are not known to overwinter or breed in the RSA, although the migration path of surf scoters does overlap the RSA (Table 3.8-1). Horned grebes were not observed in 2022 but were recorded along the transmission line LSA during pre-construction baseline studies in 2021 (ERM 2022b). No nests or young of either species were recorded.

Further data analysis including a power analysis and BACI analysis will be completed once additional years of monitoring has been completed, as described in Section 3.8.2.1 and the WMMP Section 4.8.3.5 (ERM 2023a).

3.9 UPLAND BIRDS

DS conditions addressed: 4.1, 4.5, 8.2

EAC conditions addressed: 23.c, 23.h

Upland birds (sometimes referred to as forest and grassland birds) are a diverse group of species, which from a practical standpoint include all birds that are not raptors or waterbirds. Upland birds and their nests are protected by the *Migratory Bird Convention Act* (1994) and the provincial *Wildlife Act* (1996), with additional conservation measures for species of conservation concern under SARA (Government of Canada 2023). Several upland bird species of conservation concern are known to occur in the RSA (Table 3.9-1). Two upland bird species of conservation concern which are known to occur in the LSA, barn swallow (*Hirundo rustica*) and common nighthawk (*Chordeiles minor*), are not likely to be detected through the standard point count survey method, and therefore have species-specific monitoring programs. Several other species of conservation concern which have potential to occur in the RSA do not currently have targeted monitoring programs due to a lack of suitable habitat in the LSA (bank swallow [*Riparia riparia*], black swift [*Cypseloides niger*], and sharp-tailed grouse [*Tympanuchus phasianellus columbianus*]). Clark's nutcracker is not a species of conservation concern, but it has an obligate mutualist relationship with whitebark pine, a provincially Red-listed tree occurring in the RSA (BC CDC 2023), by dispersing the seeds through caching. Clark's nutcracker is therefore monitored in relation to whitebark pine management (DS condition 8.2).

The predicted residual effects of the Mine on upland birds as identified in the EIS, Vol 4, Section 5.4.9.4 are (New Gold 2015; ERM 2017):

- Habitat loss and alteration (not significant, negligible magnitude).

The prediction in the EIS stated that there may be habitat alteration and reduced bird density within 100 m of the Mine footprint (EIS, Volume 4, Section 5.4.9; New Gold 2015, ERM 2017). The effectiveness of mitigation measures will be evaluated through monitoring upland bird population dynamics within the LSA and RSA, as well as behavioural responses to the Mine.

As described in Section 4.8.3 of the WMMP (ERM 2023a), the monitoring programs developed for upland birds include:

- Pre-clearing surveys for birds (Section 2.1);
- Habitat Loss Monitoring (Section 2.2);
- Mortality Risk Monitored through Wildlife Interactions and Incidents (Section 2.3);
- Transmission Line Monitoring (Section 2.5);
- Upland Bird Population Monitoring (Section 3.9.2.1);
- Common Nighthawk Monitoring (Sections 3.9.2.2 and 3.9.3.2);
- Swallow and Swift Monitoring (Section 3.9.2.3 and 3.9.3.3);
- Clark's Nutcracker Monitoring (Sections 3.9.2.4 and 3.9.3.4); and
- Nest Success Surveys (Section 3.9.2.5).

TABLE 3.9-1 UPLAND BIRD SPECIES AT RISK WITH POTENTIAL TO OCCUR IN THE REGIONAL STUDY AREA

Common Name	Scientific Name	Provincial Designation	Federal Designation		Previously Observed in RSA
		BC List ¹	SARA ²	COSEWIC ²	
Band-tailed pigeon	<i>Patagioenas fasciata</i>	Blue	Special Concern	-	No
Bank swallow	<i>Riparia riparia</i>	Yellow	Threatened	Threatened	No
Barn swallow	<i>Hirundo rustica</i>	Yellow	Threatened	Special Concern	Yes (LSA)
Black swift	<i>Cypseloides niger</i>	Blue	Endangered	Endangered	No
Bobolink	<i>Dolichonyx oryzivorus</i>	Red	Threatened	Special Concern	No
Common nighthawk	<i>Chordeiles minor</i>	Blue	Special Concern	Special Concern	Yes (LSA)
Horned lark, merrilli ssp.	<i>Eremophila alpestris merrilli</i>	Red	-	-	No
Olive-sided flycatcher	<i>Contopus cooperi</i>	Yellow	Special Concern	-	Yes (LSA)
Pine grosbeak, carlottae ssp.	<i>Pinicola enucleator carlottae</i>	Blue	-	-	No
Rusty blackbird	<i>Euphagus carolinus</i>	Blue	Special Concern	Special Concern	Yes (Transmission Line LSA)
Sharp-tailed grouse, columbianus ssp.	<i>Tympanuchus phasianellus columbianus</i>	Blue	-	-	Yes (RSA)

¹ BC List: Yellow (Least Risk), Blue (Special Concern), Red (Threatened, Endangered, or Extirpated); BC CDC (2023)

² Schedule 1 of SARA and COSEWIC status: Non-active, Not at Risk, Special Concern, Threatened, Endangered, or Extirpated; Government of Canada (2023)

3.9.1 OBJECTIVES

The objectives of the follow-up monitoring programs for upland birds are to:

- Evaluate changes in bird population dynamics in the Mine area, including listed species of conservation concern (DS condition 4.1, 4.5);
- Monitor the Clark's nutcracker relative abundance and use of whitebark pine critical habitat (DS condition 5.2); and
- Evaluate the success of nesting upland birds within setback buffers established during construction and vegetation clearing (DS condition 4.1).

3.9.2 METHODS

3.9.2.1 UPLAND BIRD POPULATION MONITORING

Upland bird population monitoring was completed for the second year in June 2023 to evaluate changes in upland bird population dynamics in the Mine area. Surveys were completed during the breeding bird period in June following the standard RIC protocols (RIC 1999).

The upland birds monitoring zone included the proposed Mine footprint and the surrounding area within 5 km, divided into zones of potential impact versus control (Figure 3.9-1; ERM 2023a). The potential impact zone was within 200 m from the proposed Mine footprint, while the control zone was 200 m–5 km from the proposed Mine footprint. Point count transects were established with roughly even occurrence between the two zones, and in a range of distances out to a maximum of 5 km from the proposed Mine footprint. The WMMP indicated that the control zone would be established within 2 km from proposed Mine footprint, however due to limits in accessibility, the control zone was extended to within 5 km of the proposed Mine footprint (ERM 2023a).

Surveys were completed using a 100 m radius Variable Range Point Count (VRPC) survey protocol, a common technique used to estimate species richness and relative abundance of forest birds (Ralph et al. 1995). Surveys were conducted for transects consisting of up to five VRPC locations spaced at 200 m intervals. A total of 15 survey transects were established during the first year of monitoring completed in 2022. During the second year of sampling in 2023, a total of 13 transects were surveyed, with 12 transects established in 2022 being resurveyed and one transect being relocated and renamed (Figure 3.9-1). Transect UB01, established in 2022, was located within the planned footprint, and therefore was relocated in 2023 and renamed UB01_2023. Additionally, in 2023 four point count sites established in 2022 were renamed and moved to alternate locations along their transect due to overlapping the planned footprint (UB02_S3_2023, UB02_S4_2023, and UB02_S5_2023) or being located too close to another point count site (UB12_S2_2023; Figure 3.9- 2).

Due to time constraints caused by unseasonable cold and wet weather in June 11 transects were surveyed in June, and two were surveyed in July (see Table 3.9-2 in Section 3.9.3.1; Appendix AA). However, time constraints in July prevented survey being completed for two transects established in 2022 (UB03 and UB13). Of the 13 transects surveyed in 2023, six were located within the impact zone and seven were within the control zone (Figure 3.9-1; Table 3.9- 2).

Surveys followed standard RIC protocols (RIC 1999), occurring within four hours after sunrise during the breeding bird period in June. VRPC surveys were conducted for five minutes during which all bird species seen and heard were recorded. Detections before or after the survey were recorded as incidental observations. Bird detections were estimated according to distance from the observer and binned into 0–50 m and 50–100 m distances. Surveys were not completed when wind speeds exceeded approximately 30 km/h (greater than four on the Beaufort scale) or when precipitation exceeded a light, intermittent drizzle. All crews that completed VRPCs had at least one qualified observer who is experienced in identifying birds by sight and sound.

Upland bird data were summarized by relative abundance and species richness. Relative abundance is the number of individuals counted, while species richness is the total number of species observed during each survey period. These estimates included only those data that were collected during VRPC surveys (i.e., no incidental observations).

FIGURE 3.9-1 VRPC SURVEY LOCATIONS AND CLARK'S NUTCRACKER CALL PLAYBACK LOCATIONS, 2023

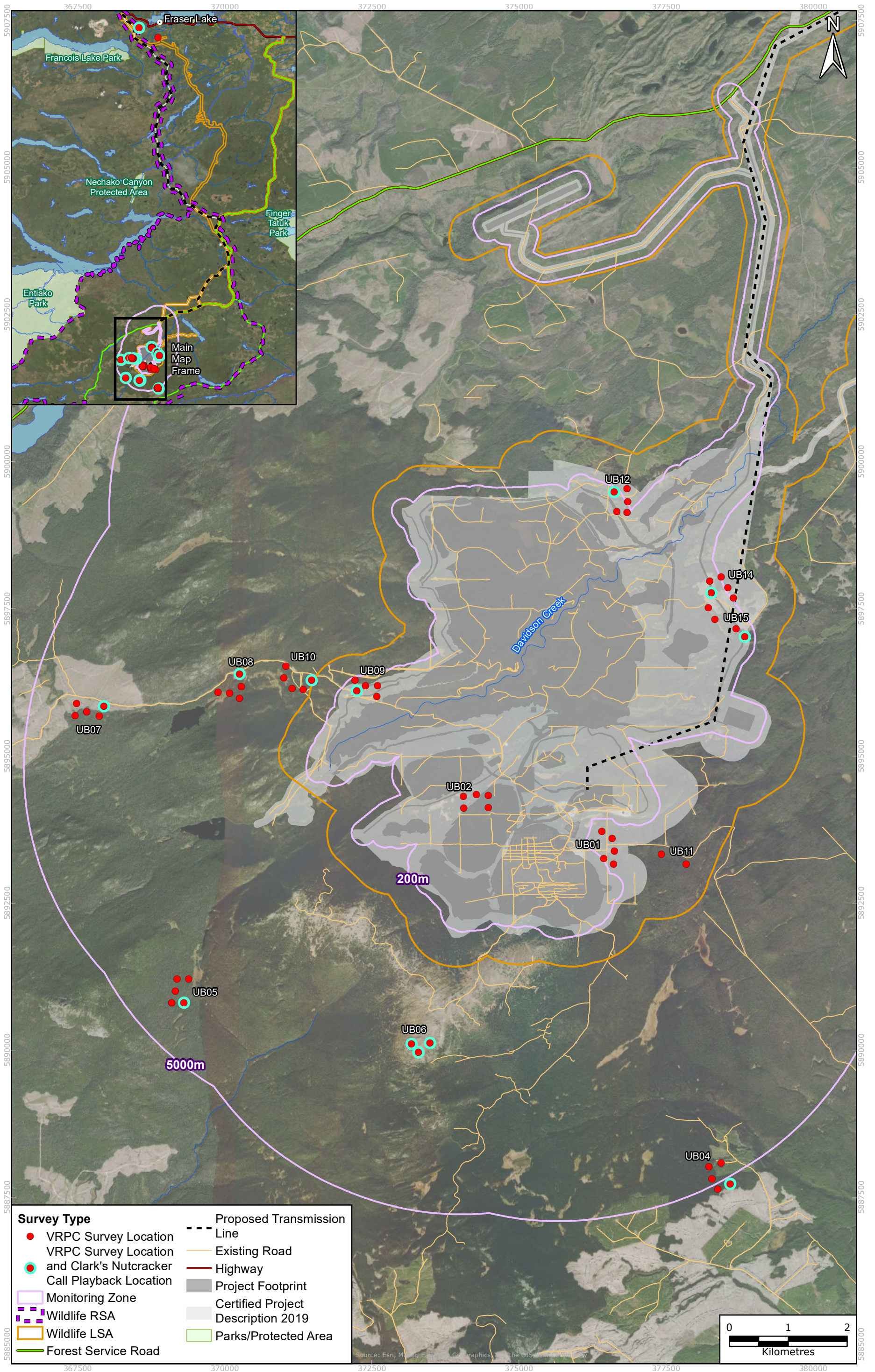
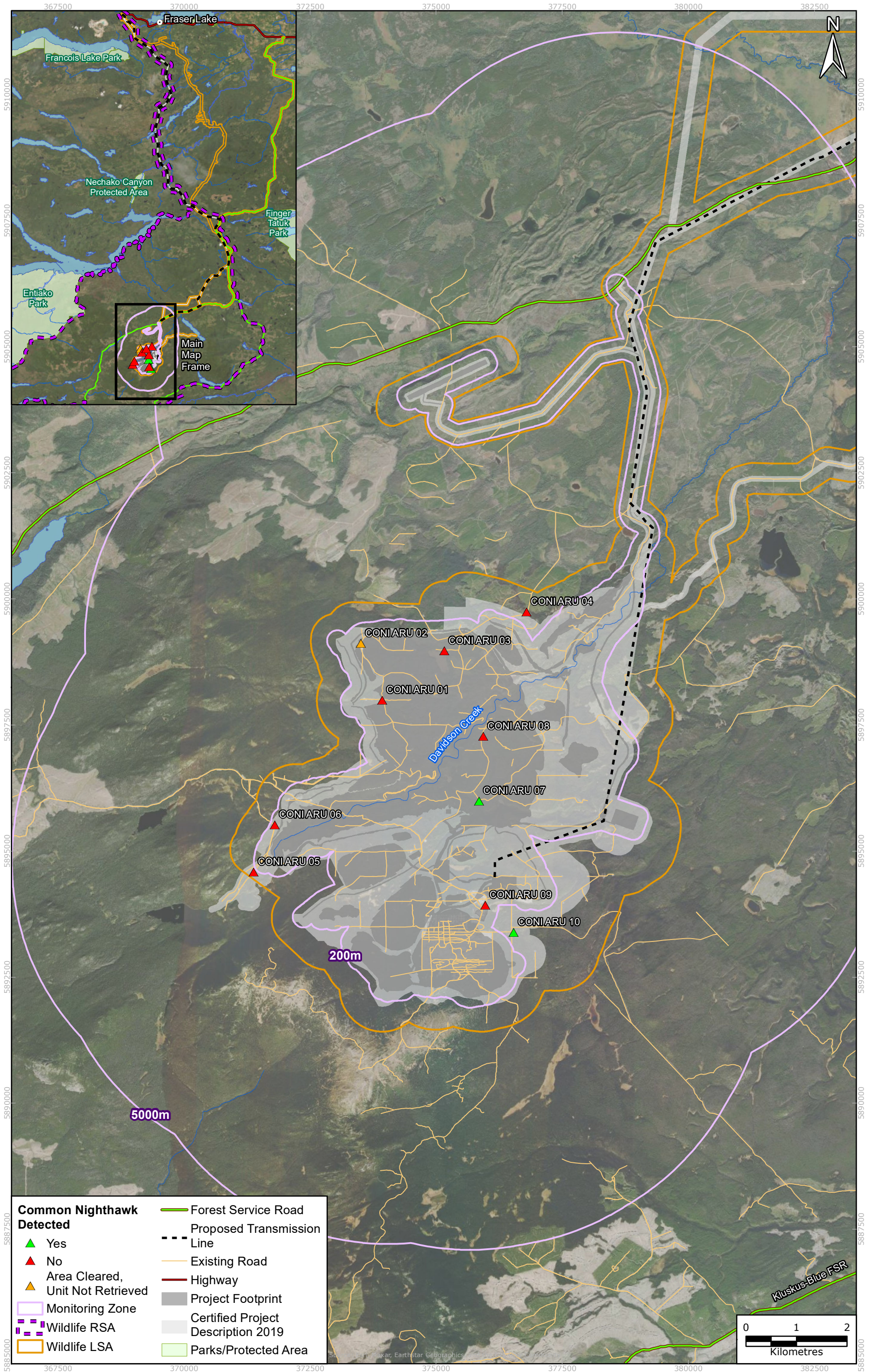


FIGURE 3.9-2 COMMON NIGHTHAWK ARU LOCATIONS, 2023



Further data analysis including a power analysis and BACI analysis will be completed as the upland bird population monitoring program continues, as described in the WMMP Section 4.8.3.2 (ERM 2023a). Following the first few years of monitoring, a power analysis will be completed to determine the magnitude of changes in population that can be detected by initial monitoring data. Although 2023 marks the second year of monitoring, completion of a power analysis was delayed in anticipation of monitoring locations requiring adjustment because of the July wildfire.

3.9.2.2 COMMON NIGHTHAWK MONITORING

Common nighthawk compliance monitoring was initiated in 2023 to evaluate changes in common nighthawk population dynamics in the Mine area. Monitoring was completed using ARUs, informed by the *Canadian Nightjar Survey Protocol* (Knight et al. 2019). Surveys were conducted from mid-June to mid-July 2023 to correspond with the nighthawk breeding period when individuals are most likely to be calling and males performing territorial displays (noted by distinct “boom” sounds made with their tail feathers).

The common nighthawk monitoring zone included the proposed Mine footprint and the surrounding area within 5 km, divided into zones of potential impact versus control (Figure 3.9-2; ERM 2023a). The WMMP indicated that the control zone would be established within 2 km from proposed Mine footprint, however due to limited suitable habitat, the control zone was extended to within 5 km of the proposed Mine footprint (ERM 2023a). The potential impact zone was within 200 m from the proposed Mine footprint, while the control zone was more than 200 m from the proposed Mine footprint.

Common nighthawk ARUs were programmed and deployed based on Knight et al. (2019) protocols in suitable breeding or foraging habitat, including natural clearings, cutblocks, wetlands, and gravel pits. Common nighthawks are crepuscular, leading them to be the most active before sunrise and after sunset (Brigham and Fenton 1991; Brigham et al. 2011), therefore each ARU was recording for a minimum of five nights to detect common nighthawk calls. Units were programmed to record for 10-minute intervals for three hours before sunrise and three hours after sunset. Seven ARUs were deployed in the within the impact zone and three ARUs were deployed just outside of the 200 m buffer in the control zone within suitable breeding habitat (Figure 3.9-2; Table 3.9-4 in Section 3.9.2.2).

ARU data were processed using the Wildlife Acoustic Kaleidoscope Pro program version 5.6.3 (Wildlife Acoustics 2019). Auditory data were run through a cluster analysis, including an advanced classifier trained to separate common nighthawk call and boom sounds. The results were manually reviewed by a biologist trained in the identification of common nighthawk sonograms.

Further data analysis including a power analysis and BACI analysis will be completed once additional years of monitoring has been completed, as described in the WMMP Section 4.8.3.3 (ERM 2023a). Following the first few years of monitoring, a power analysis will be completed to determine the magnitude of changes in population that can be detected by initial monitoring data.

3.9.2.3 SWALLOW AND SWIFT MONITORING

Swallow and swift monitoring was completed for the second year in 2023 to evaluate changes in population dynamics and nesting success of swallow and swift species in the Mine area. Surveys were completed following RIC standards (RIC 1998e). Due to lack of suitable habitat identified in the LSA and RSA for bank swallow and black swift, monitoring was aimed at identification of barn swallow (ERM 2023a). Monitoring for swallows and swifts was completed for a 5 km monitoring zone that included both impact sites around infrastructure or buildings suitable for barn swallow nesting and control sites in undeveloped portions of the Mine footprint. Surveys for barn swallows were completed within the monitoring zone in mid-June and early-July 2023.

Surveys were completed using an Unlimited Radius Point Count (URPC) survey protocol following RIC standards (RIC 1998e), a common technique that increases bird detections and is used to assess the effects of landscape changes on bird populations (Matsuoka et al., 2014). URPCs were completed for three minutes per site during daytime hours (10:00 to 15:00). Surveys were completed in low wind conditions (< 10 km/hr) and with no precipitation, corresponding to ideal conditions for swallows to actively forage for insects. All individuals detected during the survey time were recorded. Detections before or after the survey were recorded as incidental observations. A total of 25 survey sites were established during the first year of monitoring in 2022. In 2023, the second year of monitoring, 24 of the survey sites were re-surveyed, with one site not being surveyed due to time constrictions (Figure 3.9-3).

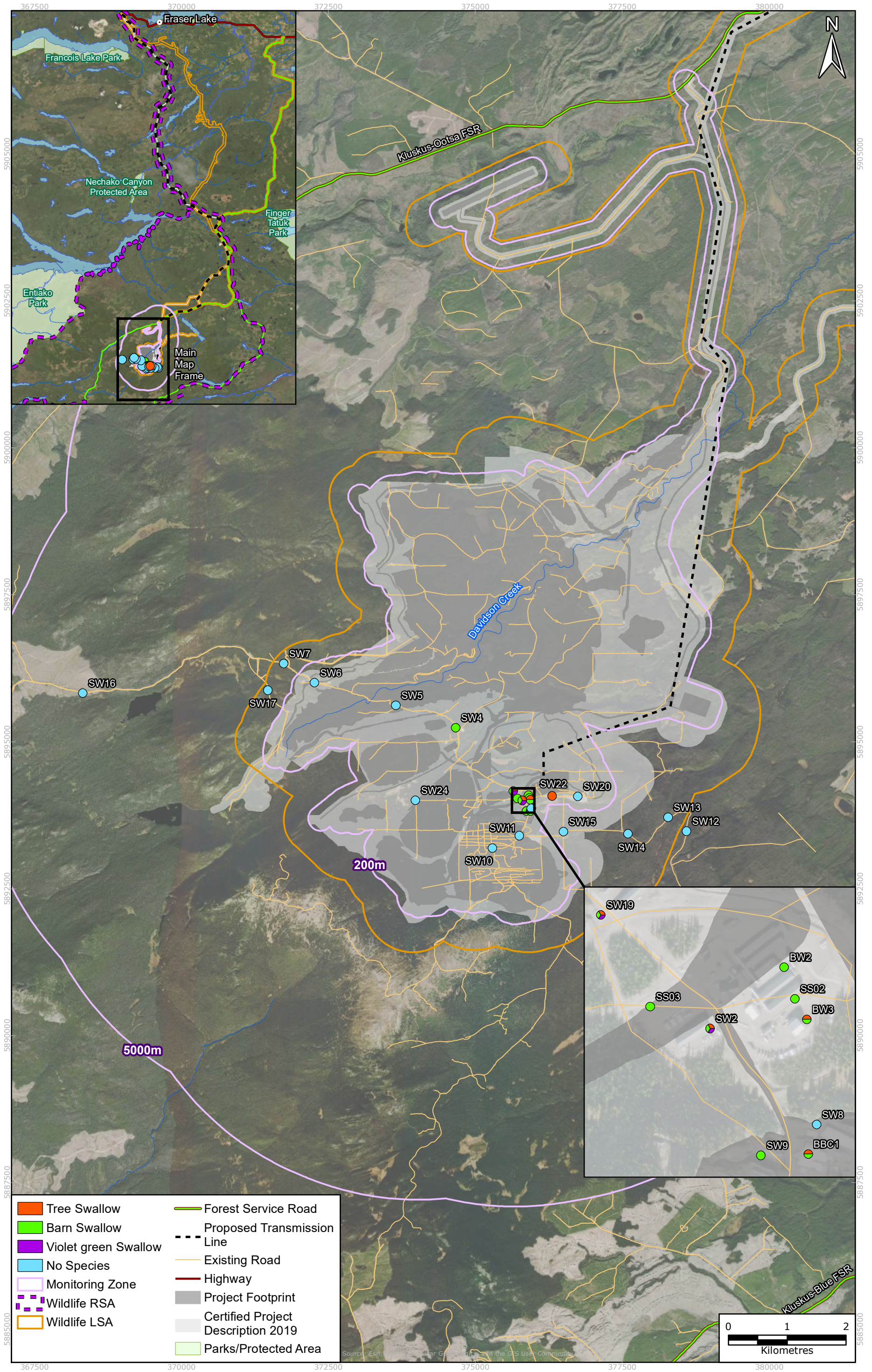
Further data analysis including a power analysis and BACI analysis will be completed once additional years of monitoring has been completed, as described in the WMMP Section 4.8.3.4 (ERM 2023a). Following the first few years of monitoring, a power analysis will be completed to determine the magnitude of changes in population that can be detected by initial monitoring data. Although 2023 marks the second year of monitoring, completion of a power analysis was delayed in anticipation of monitoring locations requiring adjustment because of the July wildfire.

3.9.2.4 CLARK'S NUTCRACKER MONITORING

Monitoring of Clark's nutcracker was completed to support the implementation of the Whitebark Pine Management Plan (DS 8.20, MT 9-8). Clark's nutcracker call playback surveys were completed for the first year in 2023 in conjunction with the upland bird population monitoring described in Section 3.9.2.1. This program is aimed at monitoring Clark's nutcracker population and utilization of whitebark pine critical habitat. The Clark's nutcracker call playback surveys were completed at select VRPC survey locations both outside of and within the whitebark pine critical habitat, including Mount Davidson (Figure 3.9-1; ERM 2023a).

Call playback surveys followed methods standardized for other species groups (raptors and waterbirds) with a 20-second duration sound clip played three times, including 30 second pauses in between each clip (RIC 2001). The number of Clark's nutcracker responses (i.e., number of individuals present) was recorded for each playback site. A total of 15 call playbacks were completed along 11 upland bird point count transects in 2023. Of the transects monitored, UB06 was the only transect located within the whitebark pine critical habitat; however, transects UB01, UB02, UB05, and UB11 were within 2 km of whitebark pine critical habitat.

FIGURE 3.9-3 SWALLOW SURVEY LOCATIONS, 2023



Further data analysis including a power analysis and BACI analysis will be completed once additional years of monitoring has been completed, as described in the WMMP Section 4.8.3.7 (ERM 2023a). Following the first few years of monitoring, a power analysis will be completed to determine the magnitude of changes in population that can be detected by initial monitoring data.

Whitebark Pine and Clark’s Nutcracker Presence Surveys

Whitebark pine and Clark’s nutcracker presence survey transects were established in 2022 to support the implementation of the Whitebark Pine Management Plan (ERM 2022c). Five survey transects were established within the mine site LSA and RSA in whitebark pine critical habitat on and near Mount Davidson. A second year of monitoring along the established transects was planned for 2023 but was not completed due to the July wildfire. This portion of monitoring is not required by the WMMP or Project conditions (EAC or federal DS; ERM 2023a).

3.9.2.5 NEST SUCCESS SURVEYS

Pre-clearing survey methods and results for upland bird nests, and all subsequent monitoring, are reported in Appendix B.

3.9.3 RESULTS

3.9.3.1 UPLAND BIRD POPULATION MONITORING

Upland bird VRPC monitoring was completed for 13 transects and 62 sites within the upland bird monitoring zone (Figure 3.9-1; Appendix AA)

. Eleven transects (n = 55 sites) were surveyed from June 11 to 18 and two transects (n = 7 sites) were surveyed on July 7, due to unseasonably cold and wet weather which restricted completing the surveying in June (Table 3.9-2; Appendix AA).

A total of 255 individual upland birds were recorded across 26 species and one unknown species (Table 3.9-2; Appendix BB). The most commonly observed upland bird species were dark-eyed junco (n = 55; *Junco hyemalis*), yellow-rumped warbler (n = 27; *Setophaga coronata*), American robin (n = 25; *Turdus migratorius*), Swainson’s thrush (n = 22; *Catharus ustulatus*) and varied thrush (n = 18; *Ixoreus naevius*; Table 3.9-3; Appendix BB).

TABLE 3.9-2 VARIABLE RADIUS POINT COUNT SURVEYS EFFORT, SPECIES RICHNESS, AND BIRD ABUNDANCE, 2023

Site Type	Transect ID	Date	Species Richness ^{1,2}	Bird Abundance ^{1,3}
Impact	UB01_2023	2023-07-07	10	23
	UB02	2023-06-16	9	13
	UB09	2023-06-15	10	31
	UB12	2023-06-18	6	13
	UB14	2023-06-17	7	10
	UB15	2023-06-17	4	11

Site Type	Transect ID	Date	Species Richness ^{1,2}	Bird Abundance ^{1,3}
Control	UB04	2023-06-15	5	10
	UB05	2023-06-14	7	15
	UB06	2023-06-15	6	13
	UB07	2023-06-11	11	36
	UB08	2023-06-11	14	43
	UB10	2023-06-14	12	32
	UB11	2023-07-07	4	5

¹ Unidentifiable species are not reported in the number of species or individuals observed at each transect. Only one individual from one unidentified sparrow species was recorded in 2023 (Table 3.9-3).

² Total number of unique species recorded along each transect.

³ Total number of individual birds recorded along each transect.

TABLE 3.9-3 UPLAND BIRD SPECIES RECORDED DURING VARIABLE RADIUS POINT COUNT SURVEYS, 2023

Species Common Name	Scientific Name	Number of Individuals		
		Impact	Control	Total
Alder flycatcher	<i>Empidonax alnorum</i>	-	1	1
American redstart	<i>Setophaga ruticilla</i>	-	1	1
American robin	<i>Turdus migratorius</i>	8	17	25
American three-toed woodpecker	<i>Picooides dorsalis</i>	1	6	7
Boreal chickadee	<i>Poecile hudsonicus</i>	1	-	1
Canada jay	<i>Perisoreus canadensis</i>	11	4	15
Chipping sparrow	<i>Spizella passerina</i>	-	4	4
Clark's nutcracker	<i>Nucifraga columbiana</i>	-	6	6
Dark-eyed junco	<i>Junco hyemalis</i>	24	31	55
Golden-crowned kinglet	<i>Regulus satrapa</i>	6	3	9
Lincoln's sparrow	<i>Melospiza lincolnii</i>	4	8	12
Northern flicker	<i>Colaptes auratus</i>	1	-	1
Olive-sided flycatcher*	<i>Contopus cooperi</i>	-	4	4
Orange-crowned warbler	<i>Leiothlypis celata</i>	2	-	2
Pacific wren	<i>Troglodytes pacificus</i>	-	2	2
Pine siskin	<i>Spinus pinus</i>	7	6	13
Red-breasted nuthatch	<i>Sitta canadensis</i>	-	1	1
Ruby-crowned kinglet	<i>Corthylio calendula</i>	2	10	12
Savannah sparrow	<i>Passerculus sandwichensis</i>	-	2	2

Species Common Name	Scientific Name	Number of Individuals		
		Impact	Control	Total
Swainson's thrush	<i>Catharus ustulatus</i>	10	12	22
Townsend's warbler	<i>Setophaga townsendi</i>	2	1	3
Tree swallow	<i>Tachycineta bicolor</i>	-	1	1
Unknown sparrow	-	-	1	1
Varied thrush	<i>Ixoreus naevius</i>	7	11	18
White-winged crossbill	<i>Loxia leucoptera</i>	-	5	5
Wilson's warbler	<i>Cardellina pusilla</i>	1	5	6
Yellow-rumped warbler	<i>Setophaga coronata</i>	14	13	27
Total		101	155	256

* Indicates a species of conservation concern, see Table 3.9-1.

Overall, species richness varied between 4 and 14 species per transect (average = 8 species; Table 3.9-2 and Table 3.9-3). Bird abundance varied between 5 and 43 birds per transect (average = 20 individuals; Table 3.9-2). Species richness and bird abundance followed similar trends, i.e., transects with higher species richness also had high abundance (Table 3.9-2). Both metrics also varied between the control sites (average richness = 8.8 species; average abundance = 23.6 individuals) and the impact sites (average richness = 7.7 species; average abundance = 16.8 individuals). Transect UB08 in the western portion of the control zone had the highest bird abundance and highest species richness; sites in this transect had varied habitat including mature forest, pine plantation, and wetlands, likely contributing to the high species richness and bird abundance recorded.

Olive-sided flycatcher (n = 4; *Contopus cooperi*) was the only upland bird species of conservation concern recorded during 2023 surveys (Table 3.9-3; Appendix BB). Olive sided-flycatcher is provincially Yellow-listed and federally listed as a species of Special Concern on Schedule 1 of SARA (BC CDC 2023; Government of Canada 2023). Olive-sided flycatcher was detected within the control zone along transect UB07 at survey sites S3, S4, and S5 (Figure 3.9-1). Transect UB07 is within 100 m of the Blackwater Access Road and a cutblock (Figure 3.9-1), which provide suitable forest edge habitat for olive-sided flycatcher.

3.9.3.2 COMMON NIGHTHAWK MONITORING

A total of 10 ARUs were deployed on June 12, 2023, within suitable breeding habitat in the mine site LSA to detect the presence of common nighthawk at three control and seven impact sites (Figure 3.9-2). Seven units were collected on July 9, 2023 while two remaining units were left out until September 13 due to field access complications from the July wildfire (Table 3.9-4; Appendix CC). One unit (CONI ARU 02) was lost due to the area being cleared by forestry. Common nighthawk ARU data for all nine available units were analyzed from June 12 until July 9 for consistency between unit survey effort and to follow the species survey window protocols (Knight et al. 2019).

TABLE 3.9-4 COMMON NIGHTHAWK DETECTIONS BY ARU SURVEYS, 2023

Site Type	Site Name	ARU Card Name	Recording Start Date	Recording End Date	Common Nighthawk Detections		
					Boom	Call	Call and Boom
Impact	CONI ARU 01	SMU08992	2023-06-12	2023-07-09	0	0	0
	CONI ARU 03	SMU09783	2023-06-12	2023-07-09	0	0	0
	CONI ARU 06	SMU09777	2023-06-12	2023-07-09	0	0	0
	CONI ARU 07	SMU08998	2023-06-12	2023-07-09	0	187	9
	CONI ARU 08	SMU09741	2023-06-12	2023-07-09	0	0	0
	CONI ARU 09	SMU09747	2023-06-12	2023-07-09	0	0	0
Control	CONI ARU 04	SMU09748	2023-06-12	2023-07-09	0	0	0
	CONI ARU 05	SMU08994	2023-06-12	2023-07-09	0	0	0
	CONI ARU 10	SMU09743	2023-06-12	2023-07-09	0	2	0
TOTAL					0	189	9

A total of 198 recordings were confirmed as common nighthawk detections after cluster analysis and manual vetting by a trained biologist (Table 3.9-4; Appendix DD). Unit CONI ARU 07, located within the impact zone, comprised 98.9% of detections (n = 187) while the remaining were from unit CONI ARU 10 (n = 2; Table 3.9-4), located just outside of the impact zone. Although CONI ARU 07 was deployed for approximately 27 days, all common nighthawk detections occurred over a two-day period. Calling and booming sounds are frequently made by males during courting, this suggests that courting behaviours were being displayed near this site.

3.9.3.3 SWALLOW AND SWIFT MONITORING

A total of 24 sites were surveyed for barn swallows around the Mine site infrastructure from June 11 to 18, 2023 and on July 7, 2023 (Figure 3.9-3; Appendix EE). Of the sites surveyed, 15 were classified as impact sites near project infrastructure or disturbance and nine were control sites. No other suitable nesting habitat was found in the LSA or in accessible areas of the RSA. Of the 24 sites surveyed, 10 sites had at least one swallow species present, all of which were impact sites. Three species of swallow were observed, including barn swallow (n = 30), tree swallow (n = 5; *Tachycineta bicolor*), and violet-green swallow (n = 2; *Tachycineta thalassina*; Table 3.9-5; Appendix FF). All barn swallow activity was recorded at sites in the vicinity of camp buildings, while sites near undeveloped portions of the Mine footprint or in the control zone did not have barn swallows recorded (Figure 3.9-3). Activity was primarily associated with or near buildings with vaulted roof covers supported by wooden beams.

TABLE 3.9-5 SWALLOW OBSERVATIONS, 2023

Common Name	Scientific Name	Number of Individuals		
		Impact	Control	Total
Barn Swallow	<i>Hirundo rustica</i>	30	-	30
Tree Swallow	<i>Tachycineta bicolor</i>	5	-	5
Violet-green Swallow	<i>Tachycineta thalassina</i>	2	-	2
Total		37	0	37

3.9.3.4 CLARK'S NUTCRACKER MONITORING

Call playback surveys for Clark's nutcracker were completed in conjunction with the 2023 upland bird population monitoring described in Section 3.9.3.1. A total of 15 call playbacks were completed along 11 upland bird point count transects from June 11 to 18, 2023, with a call playback completed at a minimum of one survey site per transect, except for two transects (UB01 and UB11; Figure 3.9-1; Table 3.9-6; Appendix AA). Call playbacks were not completed for transects UB01 and UB11 as they were surveyed completed later in the season as described in Section 3.9.3.1. Call playbacks were completed for each survey site along transect UB06 because it is located in whitebark pine critical habitat.

Call playback surveys detected a total of four Clark's nutcrackers from three survey sites (Table 3.9-6; Appendix AA). All responses were along transects UB06 (within whitebark pine critical habitat) and UB08 (approximately 4 km away from whitebark pine critical habitat). Individuals were detected calling (n = 2) and visually (n = 2). Clark's nutcracker were recorded at adjacent sites along transect UB06, with two individuals visually detected at S1 and then one individuals detected calling 100m away at S2. Additional detections of Clark's nutcracker incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season are reported in Section 3.9.3.5.

TABLE 3.9-6 CLARK'S NUTCRACKER CALL PLAYBACK SURVEYS DETECTION SUMMARY, 2023

Site Name	Date Completed	Response	Number of Individuals
UB02-S5	2023-06-16	None	0
UB04-S1	2023-06-15	None	0
UB05-S5	2023-06-14	None	0
UB06-S1	2023-06-15	Visual	2
UB06-S2	2023-06-15	Calling	1
UB06-S3	2023-06-15	None	0
UB06-S4	2023-06-15	None	0
UB06-S5	2023-06-15	None	0
UB07-S5	2023-06-11	None	0
UB08-S5	2023-06-11	Calling	1

Site Name	Date Completed	Response	Number of Individuals
UB09-S5	2023-06-11	None	0
UB10-S1	2023-06-14	None	0
UB12-S1	2023-06-18	None	0
UB14-S1	2023-06-17	None	0
UB15-S5	2023-06-17	None	0
Total			4

3.9.3.5 INCIDENTAL OBSERVATIONS

In total, 60 individuals from 21 upland bird species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Figure 3.9-4; Appendix H). Nearly all of the 2023 incidental upland bird observations were made outside of the survey time during the upland bird population monitoring (91%) and during swift and swallow surveys (9%). Twenty-one upland bird species were incidentally observed, two of which were not observed during the VRPC surveys: golden-crowned kinglet (*Regulus satrapa*) and white-winged crossbill (*Loxia leucoptera*). The most commonly observed upland bird species were varied thrush (n = 8), dark-eyed junco (n = 7), Clark's nutcracker (n = 6), and yellow-rumped warbler (n = 5). Clark's nutcracker were incidentally observed five times: Two individuals were observed on transect UB05, two individuals were observed on transect UB08, and one individual was observed on transect UB01. Olive-sided flycatcher (n = 1) was the only upland bird species of conservation concern that was incidentally observed. One of the incidentally observed individuals was an unspecified flycatcher species.

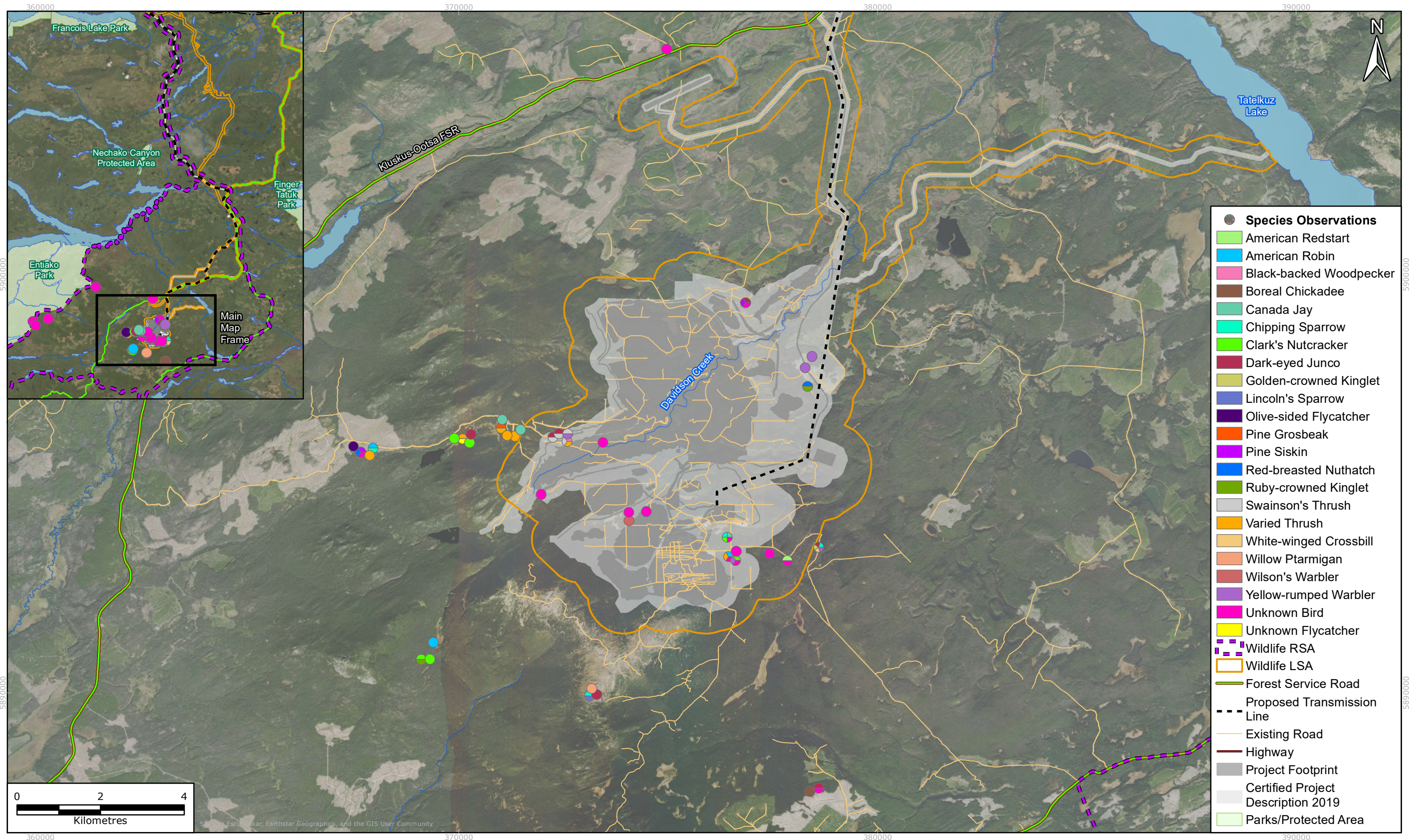
Additionally, 10 individuals from unspecified bird species were incidentally detected by wildlife cameras in the site and baseline caribou offsetting wildlife use camera monitoring programs in 2021 and 2022 (Figure 3.9-4; Appendix H).

Four individuals from unspecified upland bird species were incidentally recorded by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log in June 2023 (Appendix G). All individuals were seen flying around or sitting on infrastructure. Additionally, one old and empty upland bird nest was identified on September 16, 2023 near the reclaim tunnel. Incidental observations provided in the Wildlife Sighting Log are not included on Figure 3.7-1 due to the fact that typically only the general location of the observation was provided.

3.9.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, negligible magnitude effect of habitat loss and alteration for forest and grassland (i.e., upland) birds (Vol 4 Section 5.4.9.4; New Gold 2015; ERM 2017). An upland bird population monitoring program is required to confirm the prediction in the EIS that birds may avoid the Mine by up to 100 m (DS conditions 4.1 and 4.5). Species-specific survey programs were implemented for species of conservation concern known to occur within the LSA and which cannot be reliably surveyed through standard point count methods. Monitoring is also conducted to confirm the success of mitigation measures, including pre-clearing surveys and outcomes of buffered active nests, which are required by EAC condition 23.h and DS condition 4.5.

FIGURE 3.9-4 INCIDENTAL UPLAND BIRD OBSERVATIONS, 2023



Monitoring for upland birds conducted in 2023 included the second year of upland bird population monitoring, the first year of common nighthawk compliance monitoring, the second year of swallow and swift monitoring, and the first year of Clark's nutcracker call playback surveys. A second year of monitoring along the established whitebark pine and Clark's nutcracker presence transects was planned for 2023 but was not completed due to the July wildfire. Additional analysis will be completed as the upland bird population monitoring program continues, as outlined in Section 4.8.3 of the WMMP (ERM 2023a). Pre-clearing surveys and subsequent follow up monitoring for potential upland bird nests completed in 2023 are reported in Appendix B.

Upland Bird Population Monitoring

The upland birds monitoring zone included a potential impact zone within 200 m from mine infrastructure and a control zone 200 m–5 km from mine infrastructure. Upland bird VRPC surveys were completed at 13 transects and 62 sites in June and July 2023 (Figure 3.9-1). A total of 256 individual upland birds were recorded across 25 species and one unidentified species.

The most commonly observed upland bird species were consistent with 2021 baseline monitoring surveys (ERM 2022b) and the 2022 compliance monitoring (ERM 2023a): dark-eyed junco, yellow-rumped warbler, American robin, Swainson's thrush, and varied thrush. Six species were recorded during the 2023 surveys that were not recorded in 2022: alder flycatcher (*Empidonax alnorum*), American redstart (*Setophaga ruticilla*), Clark's nutcracker, Northern flicker (*Colaptes auratus*), red-breasted nuthatch (*Sitta canadensis*), and white-winged crossbill. However, 11 species recorded in 2022 were not recorded in 2023 (ERM 2023a). All species detected in only 2022 or 2023 have been previously recorded at the Mine (i.e., during surveys in 2011–2013, 2017, 2021, or 2022; ERM 2022b; ERM 2023b).

Species richness and bird abundance varied greatly between transects, but followed similar trends i.e., where one increased so did the other. Transect UB08 in the western portion of the control zone had the highest bird abundance and highest species richness; sites in this transect had varied habitat including mature forest, pine plantation, and wetlands, likely contributing to the high species richness and bird abundance recorded. This transect was also noted as having the highest bird abundance and second highest species richness in 2022. Although the average species richness and bird abundance was higher in control zones than impact zones in 2023, the variation in species richness and bird abundance across transects was approximately 60% lower at the impact sites. Habitat characteristics are generally similar across transects in the impact zone due to the mine site LSA being comprised of relatively uniform higher elevation forest. Whereas transects in the control zone cover various habitat types, such as wetlands, alpine and mature forest. Comparing general results between transects which were surveyed in both years show 2023 surveys had a higher average bird abundance (2023 = 18.8 individuals; 2022 = 10.0) and species richness (2023 = 7.6 species; 2022 = 6.2). Surveys completed in 2023 marks only the second year of data collection for the upland bird population monitoring program, and there is not yet enough data to establish overall trends in upland bird distribution.

The only upland bird species of conservation concern recorded during VRPC surveys was the olive-sided flycatcher which is provincially Yellow-listed and federally listed as a species of Special Concern on Schedule 1 of SARA (BC CDC 2023; Government of Canada 2023). Olive-sided flycatcher was detected at three sites along transect UB07 in the western portion of the control zone. In 2022, olive-sided flycatcher was detected in nearby areas along transects UB08 and UB07. All sites where detections occurred are within 100 m of the Blackwater Access Road and a cutblock, which provide suitable forest edge habitat for olive-sided flycatchers (COSEWIC 2018a).

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.9.2.1 and the WMMP Section 4.8.3.2 (ERM 2023a).

Common Nighthawk Monitoring

A total of 10 ARUs were deployed within suitable breeding habitat in the mine site LSA with recorded data for common nighthawk detections from June 12 to July 9, 2023 (Figure 3.9-2). Only nine ARUs were retrieved for data analysis as one unit was cleared by forestry and lost.

Common nighthawks were detected at two sites, one in the control zone and one in the impact zone. Unit CONI ARU 07 in the impact zone represented nearly 99% of detections, including call and boom sounds, with detections all occurring over a two-day period. Frequent calling and booming sounds are made by males during courting. Due to the limited date range that detections were recorded, results suggests that courting behaviours were being displayed at CONI ARU 07, but do not confirm nesting was actively completed at that site. Suitable common nighthawk nesting habitat consists of open areas, including disturbed areas such as forestry cutblocks or cleared sites (COSEWIC 2018b). Unit CONI ARU 07 was deployed in the central portion of the mine site LSA, in a mature coniferous forest between a creek and cleared areas used as a lay down by site personnel. Unit CONI ARU 10, which was the only other site to detect common nighthawk, was deployed in the southeastern portion of the mine site LSA in an area with multiple small ponds scattered around. Similarly, common nighthawk were detected at a wetland in southeastern portion of the mine site LSA during the 2021 baseline (ERM 2022b).

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.9.2.2 and the WMMP Section 4.8.3.2 (ERM 2023a).

Swallow and Swift Monitoring

A total of 24 point count surveys for swallow and swift species at risk, specifically barn swallow, were completed in suitable nesting habitat areas (infrastructure and buildings) in mid-June and early July 2023 (Figure 3.9-3). No other suitable nesting habitat for swallow or swift species at risk was found in the LSA or RSA (ERM 2022b). Three species of swallow were observed, including barn swallow, tree swallow, and violet-green swallow. All three swallow species were also detected during the 2022 surveys. The abundance of barn swallows showed a marked increase in 2023 ($n = 30$) compared to 2022 ($n = 6$), while the abundance of tree and violet-green swallow remained relatively constant between years.

In 2023, the addition of the New Construction Camp and the expansion of the Exploration Camp has added additional barn swallow nesting habitat in the roofing structures over the trailers.

Surveys in 2023 detected swallows at all seven sites with swallow detections in 2022 and three additional sites where no swallows were detected in 2022. Activity was recorded along camp buildings with vaulted roof covers supported by wooden beams which provide ideal anthropogenic nesting habitat. Sites near undeveloped portions of the Mine footprint or in the control zone did not have swallows present, with one exception. Tree swallows were also detected at a single undeveloped site, SS01, located in the not-yet cleared northern portion of the Mine footprint. Tree swallows were recorded at this site in both 2022 and 2023.

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.9.2.3 and the WMMP Section 4.8.3.2 (ERM 2023a).

Clark's Nutcracker Monitoring

In total, 15 Clark's nutcracker call playback surveys were completed along 11 upland bird VRPC transects in June and July 2023 to support the implementation of the Whitebark Pine Management Plan, as required by federal DS condition 8.2 (Figure 3.9-1). Clark's nutcracker were detected along two transects (UB06 and UB08) during call playback surveys. Transect UB06 detected the highest number of individuals and is the only survey transect located within whitebark pine critical habitat; however, a higher survey effort was conducted at this transect (five playbacks) due to its location within whitebark pine habitat. Clark's nutcracker were recorded at adjacent sites along transect UB06, with two individuals visually detected at S1 and then one individuals detected calling 100 m away at S2.

Transect UB08, which is located along the Blackwater Access Road, approximately 4 km away from whitebark pine critical habitat, also elicited a call playback response.

Additionally, three transects detected Clark's nutcracker during the upland bird VRPC surveys; auditory detections were recorded along transects UB01, UB06, and UB08 and visual detections were recorded along UB06 (Section 3.9.3.1). Five incidental detections of Clark's nutcracker were recorded along three transects (UB01, UB05, and UB08). Transects UB01 and UB05 are within 2 km of the whitebark pine critical habitat while UB08 is further than 2 km away from whitebark pine critical habitat. Whitebark pine is dependent upon Clark's nutcracker for dispersal and regeneration within a region (Hutchins and Lanner 1982). However, Clark's nutcracker foraging activity relies upon a wider variety of pine species (Schaming 2016). The diversity in the Clark's nutcracker diet allows their habitat use to extend beyond exclusively whitebark pine critical habitat. Initial monitoring results suggest Clark's nutcrackers in the Blackwater area may be using a variety of habitat, including whitebark pine critical habitat located near the Mine site.

Further data analysis including a power analysis and BACI analysis will be completed in future years, as described in Section 3.9.2.4 and the WMMP Section 4.8.3.2 (ERM 2023a).

3.10 AMPHIBIANS

DS conditions addressed: 8.11, 8.12, 8.21

EAC conditions addressed: 23.c, 23.h

The amphibian monitoring program focuses on western toad, the only amphibian species of conservation concern in the RSA. Western toads are federally assessed by COSEWIC and listed on Schedule 1 of SARA (Government of Canada 2023) as a species of special concern and are provincially Blue-listed (special concern; BC CDC 2023). Western toad and other amphibian species with potential to interact with the Mine are most sensitive to disturbance at breeding sites (BC MFLNRO 2014). The western toad breeding period in the RSA occurs from April 1 to September 30, when adults, eggs, tadpoles, and/or toadlets are present at breeding sites. Western toads hibernate in terrestrial habitat for the winter, dispersing *en masse* from natal breeding areas in late summer (ECCC 2016).

The predicted residual effects of the Mine on amphibians as identified in the EIS, Vol 4, Section 5.4.7.3 are (New Gold 2015; ERM 2017):

- Habitat loss and alteration from Mine activities (not significant, negligible magnitude);
- Western toad mortalities along roads (not significant, negligible magnitude); and
- Change in amphibian distribution (not significant, negligible magnitude).

As described in Section 4.1 of the WMMP (ERM 2023a), the monitoring programs developed for western toads includes:

- Habitat Loss Monitoring (Section 2.2);
- Facility Water Structure Monitoring (Section 2.4);
- Monitoring Western Toad Mortality on Roads (Sections 3.10.2.1 and 3.10.3.1); and
- Monitoring Western Toad Breeding Ponds (Sections 3.10.2.2 and 3.10.3.2).

3.10.1 OBJECTIVES

The objectives of the follow-up monitoring programs for western toad are to:

- Evaluate western toad mortalities on roads (DS condition 8.21);
- Evaluate changes in western toad distribution in the Mine area (DS condition 8.11);
- Identify western toad breeding areas (DS condition 8.21); and
- Record western toad distribution at salvage relocation areas (DS condition 8.21).

3.10.2 METHODS

3.10.2.1 MONITORING TOAD MORTALITY ON ROADS

Western toad mortality monitoring transects were established for the first year in 2023, following the guidelines outlined in Section 4.1.3.2 of the WMMP (ERM 2023a) to evaluate if the Mine is adversely affecting the abundance of western toads due to vehicle collisions on Mine roads adjacent to breeding ponds. Surveys are scheduled to be completed two times a year; once in

May when adults move to breeding ponds and in once late summer when toadlets are dispersing from breeding ponds. Only the spring adult surveys were completed in 2023 due to the wildfire disrupting surveys in July.

Toad mortality monitoring transects will be surveyed each year the Mine is active during Construction, Operations, and Closure, with 500 m monitoring transects established where known western toad breeding sites are located within 100 m of Mine roads (ERM 2023a). In 2023, three monitoring transects were established and surveyed in May. Surveys were completed by two observers, walking in parallel to each other searching the ground for toad or toadlet presence or mortalities. Surveys were completed during the day when observers could easily identify toad mortalities.

3.10.2.2 MONITORING TOAD BREEDING PONDS

Surveys of wetlands and waterbodies within the LSA were partially completed for the second year in 2023 to assist in confirming and identifying western toad habitat and breeding sites. As a result of the July wildfire, the 2023 monitoring program was conducted at the end of September at some but not all monitoring sites. Although the sensitive amphibian breeding season is from April to September, monitoring western toad breeding sites within the LSA is typically conducted in July or August, when tadpoles are easily observed and identified (ERM 2023a). Due to the surveys being completed near the end of the breeding season and the fact that many of the survey sites had been burned in the July wildfire, survey data does not provide complete amphibian breeding data in 2023.

Monitoring was completed following RIC standards (RIC 1998d). Survey sites included the 2023 salvage and relocation sites to monitor the success of salvaged western toads as per the WMMP and federal DS condition 8.11 (ERM 2023a).

Time-constrained visual surveys were completed by two observers, with surveyors visually examining aquatic habitats for evidence of breeding (i.e., tadpoles, metamorphs, and emerging toadlets), and the adjacent terrestrial habitat for adults. Data recorded includes survey time, weather, effort, habitat characteristics, and amphibian observations (species, life stage, and estimated number). Surveys were completed at 20 sites in 2023, including the 2023 salvage and relocation sites (6 sites), and 14 sites originally surveyed in 2022.

Once additional years of data are available, a time series analysis will be completed to determine western toad presence trends, as described in Section 4.1.3.3 of the WMMP (ERM 2023a). This analysis has been delayed due to incomplete data in 2023 and in anticipation of monitoring adjustments in future due to the July wildfire.

3.10.3 RESULTS

3.10.3.1 MONITORING TOAD MORTALITY ON ROADS

Western toad mortality monitoring surveys were completed along three road transects on May 21, 2023 (Figure 3.10-1; Appendix GG). Surveys occurred during the spring egg laying period, when adult western toads move to and from breeding ponds and may be crossing roads in high number. No amphibian mortalities were recorded during the surveys completed in 2023. Surveys targeted

for toadlets during their dispersal from breeding ponds were unable to be completed due to the July wildfire. Surveys will resume in 2024 to identify potential western toad adult and toadlet mortality along Mine roads.

3.10.3.2 MONITORING TOAD BREEDING PONDS TOAD BREEDING PONDS

Surveys for western toad habitat and breeding sites were scheduled to be completed in July, but due to the July wildfire, only a subset of sites could be surveyed near the end of the amphibian sensitive breeding period. Surveys were completed from September 22 to 27, 2023 at 20 sites, with 17 within the mine site LSA, one within the transmission line LSA, and two in the RSA (Appendix HH). The 2023 program focused on sites potentially impacted by the July wildfire, as well as amphibian salvage and relocation sites (Section 2.1).

Due to survey timing, it was too late in the season to reliably detect signs of breeding (eggs, tadpoles, and metamorphs) and therefore confirm the status of all sites. One adult western toad was observed at one confirmed breeding site within the mine site LSA (Figure 3.10-2; Table 3.10-1; Appendix HH). Columbia spotted frog presence was recorded at three sites, including two adult, two juvenile and one metamorph. The two adult frogs were recorded at the same site where the adult western toad was observed. The Columbia spotted frog juveniles and metamorph were recorded at two adjacent salvage sites (Photo 3.10-2 in Section 3.10.4; Section 2.6.4). Amphibians were salvaged from these sites in June, and a fence was erected separately surrounding both sites. The fence collapsed during the July wildfire, but nearby work was completed and amphibians were able to access the area without risk of disturbance due to Construction activities.

Sites surveyed for western toad breeding potential in 2023 were added to the cumulative western toad breeding site map created in 2022 (Figure 3.10-2).

TABLE 3.10-1 AMPHIBIAN PRESENCE, 2023

Common Name	Scientific Name	Total Sites Present	Number of Individuals		
			Adult	Juvenile	Metamorph
Western Toad	<i>Anaxyrus boreas</i>	1	1	0	0
Columbia Spotted Frog	<i>Rana luteiventris</i>	3	2	2	1

3.10.3.3 INCIDENTAL OBSERVATIONS

Four individuals from two amphibian species were incidentally recorded during the 2023 WMMP wildlife compliance monitoring field season (Appendix H). Two western toads were observed in the Capoose offset area during remote camera servicing in May. Additionally, one western toad and one Columbia spotted frog were observed during the country foods program in September at unknown locations.

Two individual western toads were incidentally recorded by Blackwater on-site personnel in the Blackwater Wildlife Sighting Log (Appendix G). One adult was observed at the Fuel Station on May 25 traveling across the parking area. Additionally, 15 adults were observed on August 27 crossing the Blackwater Access Road at KM 16.

FIGURE 3.10-1 WESTERN TOAD MORTALITY TRANSECTS, 2023

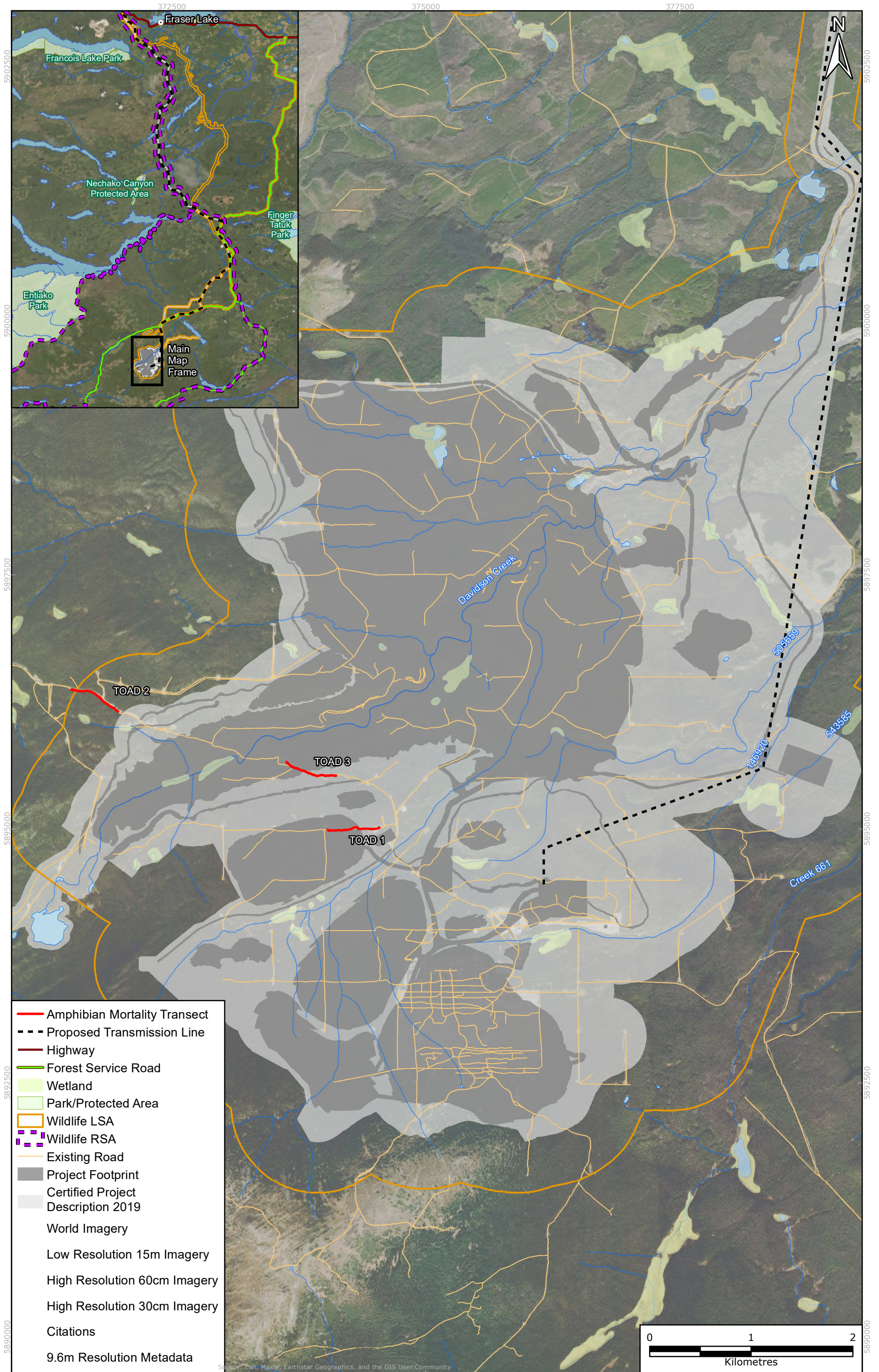
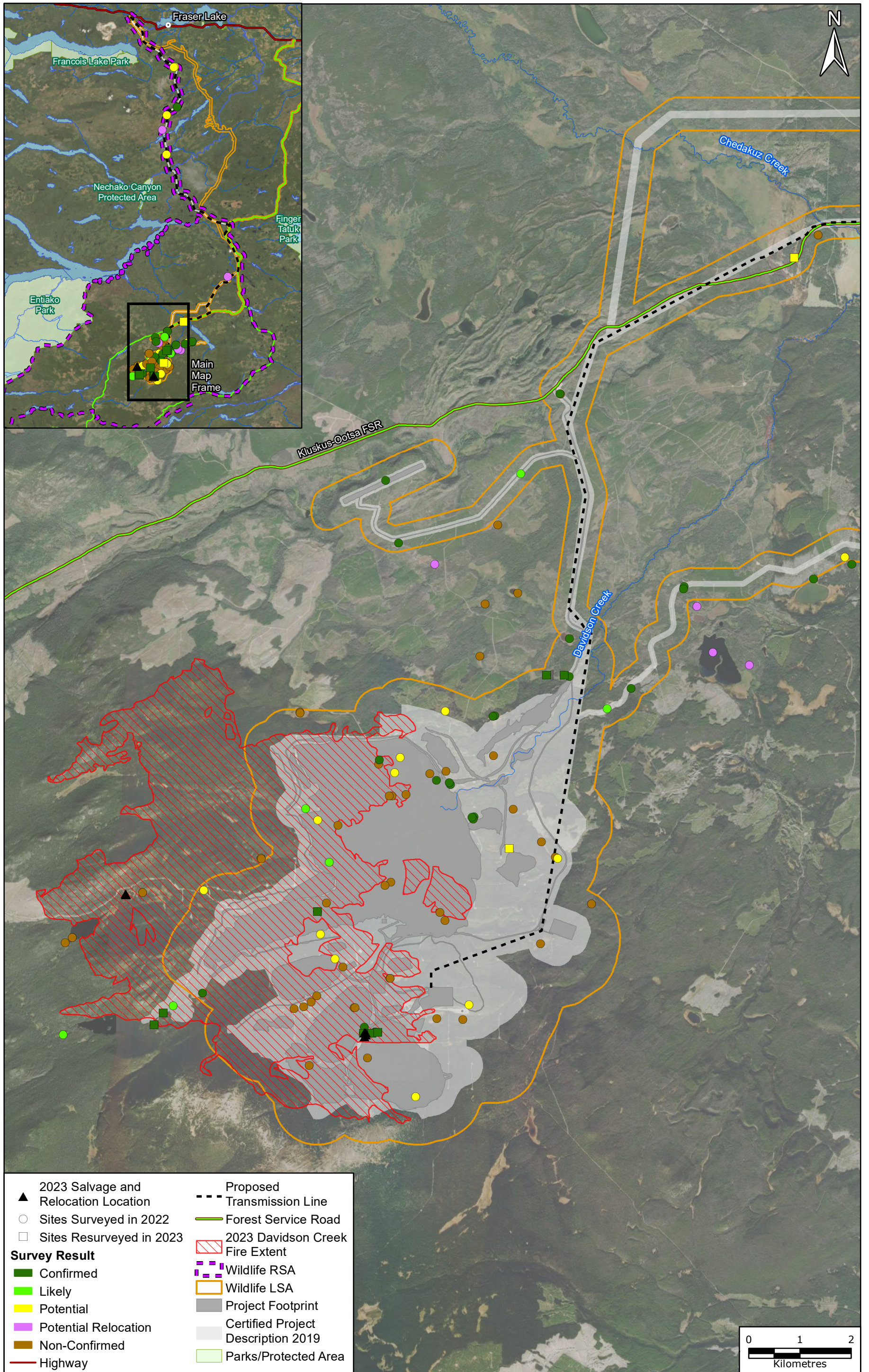


FIGURE 3.10-2 WESTERN TOAD BREEDING LOCATIONS



3.10.4 DISCUSSION

In the EIS, the Mine was predicted to have a not significant, negligible magnitude effect of habitat loss and alteration, mortality, and change in distribution for western toad (Vol 4 Section 5.4.7.3; New Gold 2015; ERM 2017). Monitoring related to these predictions, and to validate the effectiveness of mitigation measures, includes surveys for toad mortalities along active Mine roads and monitoring of western toad breeding ponds (required by DS condition 8.21). Monitoring was also conducted to confirm the success of salvaged western toad relocation sites (DS condition 8.11). Amphibian pre-clearing surveys and salvage are reported in Section 2.1. Additional monitoring for amphibians related to potential effects of facility water structures are reported in Section 2.4.

Monitoring for western toads conducted in 2023 include the first year of western toad mortality monitoring on roads and a second year of western toad breeding pond surveys. The spring western toad mortality surveys were completed in 2023 but the July surveys could not be completed due to the July wildfire. Western toad breeding pond surveys were delayed from July until September due to the July wildfire and due to time constraints were only completed for a subset of sites.

Monitoring Western Toad Mortality on Roads

Monitoring of western toad mortality on roads was conducted in May 2023 along three established road transects within 100 m of breeding ponds (Figure 3.10-1). Survey timing aligned with the adult toad migration period to breeding ponds, which occurs in the spring (COSEWIC 2012b). No amphibian mortalities were recorded during the surveys completed in 2023. The second round of surveys could not be completed due to the July wildfire. Late summer surveys are aimed at identifying toadlets as they are dispersing from breeding ponds. While western toad phenology varies geographically and each year, toadlets typically migrate *en masse* from breeding ponds to terrestrial foraging areas in July and August (COSEWIC 2012b; ECCC 2016). As field crews could not return to complete the second round of surveys until late September, these surveys could not be completed.

Western toad were incidentally recorded in the Blackwater Wildlife Sighting Log crossing the Blackwater Access Road at KM16 in late August 2023. Establishment of a transect at KM16 of the Blackwater Access Road will be completed in 2024 to capture this potential movement corridor.

Monitoring Western Toad Breeding Ponds

Western toad breeding ponds were monitored at the end of September 2023, with surveys completed at 20 waterbody and wetland sites. Sites were primarily located within the mine site LSA (85% of sites), with a limited number of sites located in the transmission line LSAs and the RSA (Figure 3.10-2). Due to the July wildfire and constraints on the ability to return to the Mine site, surveys were delayed until the end of September. The survey timing occurred later than the typical period for western toad metamorphosis and dispersal in late summer/early fall (BC CDC 2010; COSEWIC 2012b; BC MFLNRO 2016). Overnight temperatures were below freezing, and snow was accumulating on the ground over the course of the survey period. Surveys were conducted for general amphibian observation data as well as habitat information at sites which

were impacted by the July wildfire. Many of the breeding ponds were within the path of the wildfire and displayed effects from the burn (Photo 3.10-1).



Photo 3.10-1 Effects of the July wildfire on confirmed breeding site from 2022 (C13) during breeding pond surveys, September 2023.

Amphibian presence was recorded at three previously confirmed breeding sites within the LSA. Two of these sites were salvaged earlier in the season and were within the path of the burn (Photo 3.10-2). The surrounding area was severely burnt (knee-deep ash, fallen trees, and collapsed fencing which had previously separated the two sites). Despite the burned landscape, these sites had adult Columbia spotted frog, which use waterbodies year-round (BC CDC 2004). Western toad was only found at one of the 20 survey sites. It is likely that western toadlets had already dispersed to terrestrial hibernation sites.

The July wildfire affected many of the breeding pond sites which were surveyed. Fallen trees and scorched ground left multiple depressions where water accumulated (Photo 3.10-1). Site characteristics were drastically changed in some cases, with some sites being split into multiple separate waterbodies and others conjoining. Additionally, certain sites had extensive changes in water-level, such as at a relocation site that was photographed in June during amphibian salvage and again in September (Photo 3.10-3).

Completion of a time series analysis to determine trends in western toad presence will be completed in future years, as described in Section 3.10.2.2 and the WMMP Section 4.1.3.3 (ERM 2023a).



Photo 3.10-2 Connected amphibian salvage sites (BW_PO01/ BW_PO02) during breeding pond surveys, September 2023.



Photo 3.10-3 Amphibian relocation site (REL AMP01; left: June 2023 salvage activities; right: September 2023 breeding pond surveys).

4. SUMMARY AND RECOMMENDATIONS

A review of the WMMP program components and any recommendations based on monitoring and results to date is summarized in Table 4-1.

TABLE 4-1 SUMMARY OF MONITORING PROGRAMS

Program Name	Surveys Conducted	WMMP Report Section	Monitoring Completed	Program Plan		Recommendations for the 2024 Program
				Data Collection	Statistical Analysis	
Pre-Clearing Surveys and Mitigation	Pre-clearing and Follow-up Surveys	Appendix B, 2.1, 3.4.2.1, 3.5.2.1, 3.6.2.2, 3.8.2.2, 3.9.2.5	2022 & 2023	Ongoing – Annually where planned clearing overlaps species’ sensitive periods.	None.	Implement consistent methods and follow-up surveys for pre-clearing programs.
Habitat Loss Monitoring	-	2.2	2022 & 2023	Ongoing – Annually.	None.	None.
Interactions, Incidents and Mortalities	-	2.3, 3.1.3.3, 3.2.3.2, 3.3.3.1, 3.4.3.1, 3.5.3.1, 3.6.3.3, 3.7.3.1, 3.8.3.2, 3.9.3.5, 3.10.3.3	2022 & 2023	Ongoing – Annually.	None.	None.
Facility Water Structure Monitoring	-	2.4	Not initiated	Planned for 2024 – Annually for all existing and new facility water structures.	None.	Conduct assessment to identify site ponds which may require mitigation measures to limit access by wildlife.
Transmission Line Monitoring	-	2.5	2022 ¹	Planned for 2024 – Annually for the first three years of Transmission Line Operations.	None.	None.
Site Wildlife Camera Monitoring	-	2.6	2021, 2022, & 2023	Ongoing – Annually.	None.	Deploy cameras at mountain goat mineral lick and where wildlife trails may intercept Mine roads and trails.
Moose	Ungulate Pellet Count Surveys	3.1.3.1	2022 & 2023	Ongoing – Annually during Construction and the first five years of Operations. Conduct comprehensive analysis to determine continued frequency (annually or every three years).	Conduct Power analysis in 2024 and BACI once sufficient post-construction data are available.	Place physical marker at centre of each sample point.
	Snow Track Surveys	3.1.3.2	2023			Conduct aerial surveys only, discontinue ground surveys.
Caribou	Baseline Caribou Offsetting Wildlife Use Monitoring	3.2.3.1	2021, 2022, & 2023	Ongoing – Annually to collect baseline information to inform the final program.	None.	None.

Program Name	Surveys Conducted	WMMP Report Section	Monitoring Completed	Program Plan		Recommendations for the 2024 Program
				Data Collection	Statistical Analysis	
Grizzly Bear	Monitoring of Kokanee Spawning Streams	3.4.2.2	Not initiated	Planned for 2024 – Annually.	Conduct Power analysis after the first 3 years of data collection.	None.
Bats	Bat Distribution Monitoring	3.6.3.1	2022 & 2023 ²	Ongoing – Annually.	None.	None.
	Bat Roosting Structures	3.6.3.2	2022 & 2023	Ongoing - Installation and annual monitoring.	None.	None.
	NABAT Monitoring	3.6.2.4	Not initiated	Not Started – Annually for the first five years of Operations.	None.	None.
Waterbirds	Waterbird Population Monitoring	3.8.3.1	2022 & 2023 ²	Ongoing – Annually before and during Construction. Every three years during Operations and Closure.	Conduct Power analysis in 2024 and BACI once sufficient post-construction data are available.	None.
Upland Birds	Upland Bird Population Monitoring	3.9.3.1	2022 & 2023	Ongoing – Annually before and during Construction. Every three years during Operations and Closure.	Conduct Power analysis in 2024 and BACI once sufficient post-construction data are available.	None.
	Common Nighthawk Monitoring	3.9.3.2	2023			None.
	Swallow and Swift Monitoring	3.9.3.3	2022 & 2023			None.
	Clark’s Nutcracker Monitoring	3.9.3.4	2023			Establish control transects in whitebark pine habitat in high elevation areas such as Capoose.
Amphibians	Monitoring Toad Mortality on Roads	3.10.3.1	2023 ²	Ongoing – Annually.	None.	Establish a new transect at KM16.
	Monitoring Toad Breeding Ponds	3.10.3.2	2022 & 2023 ²	Ongoing – Annually.	Conduct time series analysis once sufficient post-construction data are available.	None.

¹ Year that monitoring transects were established.

² Program partially completed in 2023 due to interruptions caused by the July wildfire.

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APPENDIX A CONCORDANCE WITH CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY DECISION STATEMENT (APRIL 2018) AND ENVIRONMENTAL ASSESSMENT CERTIFICATE #M19-01 (JUNE 21, 2019)

APPENDIX A-1: CONCORDANCE WITH CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY
DECISION STATEMENT (APRIL 2018)

APPENDIX A-2: CONCORDANCE WITH ENVIRONMENTAL ASSESSMENT CERTIFICATE #M19-01
(JUNE 2019)

Appendix A-1: Concordance with Canadian Environmental Assessment Agency Decision Statement (April 2018)

Condition	Description	Location in Plan
Condition 2.1 (General Conditions)	The Proponent shall ensure that its actions in meeting the conditions set out in this Decision Statement during all phases of the Designated Mine are considered in a careful and precautionary manner, promote sustainable development, are informed by the best information and knowledge available at the time the Proponent takes action (including community and Indigenous traditional knowledge), are based on methods and models that are recognized by standard-setting bodies, are undertaken by qualified individuals, and have applied the best available economically and technically feasible technologies.	Included throughout all sections, applicable topics summarized in each Discussion section. Also see CMMP report Appendix S.
Condition 2.2 (General Conditions)	<i>The Proponent shall, when mitigation is a requirement of a condition set out in this Decision Statement, give preference to avoiding the adverse environmental effect of the Designated Mine over minimizing the adverse environmental effect of the Designated Mine. If unable to avoid the adverse environmental effect, the Proponent shall give preference to minimizing the adverse environmental effect of the Designated Mine over compensating for the adverse environmental effect of the Designated Mine. If unable to minimize the adverse environmental effect, the Proponent shall compensate for the adverse environmental effect of the Designated Mine.</i>	N/A – Addressed by the WMMP Sections 3 and 4 (ERM 2023a).
Condition 2.3 (Consultation)	<p>The Proponent shall, where consultation is a requirement of a condition set out in this Decision Statement:</p> <p>2.3.1 provide a written notice of the opportunity for the party or parties being consulted to present their views and information on the subject of the consultation;</p> <p>2.3.2 provide all information available and relevant on the scope and the subject matter of the consultation and a period of time agreed upon with the party or parties being consulted, not less than 15 days, to prepare their views and information;</p> <p>2.3.3 undertake a full and impartial consideration of all views and information presented by the party or parties being consulted on the subject matter of the consultation;</p> <p>2.3.4 strive to reach consensus with Indigenous groups; and</p> <p>2.3.5 advise the party or parties being consulted on how the views and information received have been considered by the Proponent including a rationale for why the views have, or have not, been integrated. The Proponent shall advise the party or parties in a time period that does not exceed the period of time taken in 2.3.2.</p>	Addressed in the WMMP (ERM 2023a) and CMMP (ERM 2022b). For the CMMP, see CMMP report Appendix S Section 1.3.

Condition	Description	Location in Plan
<p>Condition 2.4 (Consultation)</p>	<p><i>The Proponent shall, where consultation with Indigenous groups is a requirement of a condition set out in this Decision Statement, determine and strive to reach consensus with each Indigenous group regarding the manner by which to satisfy the consultation requirements referred to in condition 2.3, including:</i></p> <p>2.4.1 <i>the methods of notification;</i></p> <p>2.4.2 <i>the type of information and the period of time to be provided when seeking input;</i></p> <p>2.4.3 <i>the process to be used by the Proponent to undertake impartial consideration of all views and information presented on the subject of the consultation; and</i></p> <p>2.4.4 <i>the period of time and the means by which to advise Indigenous groups of how their views and information were considered by the Proponent.</i></p>	<p><i>N/A – Addressed in the WMMP (ERM 2023a) and CMMP (ERM 2022b).</i></p>
<p>Condition 2.5 (Follow-up and Adaptive Management)</p>	<p><i>The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement, have a Qualified Professional, where such a qualification exists for the subject matter of the follow-up program, determine, as part of the development of each follow-up program and in consultation with the party or parties being consulted during the development, the following information:</i></p> <p>2.5.1 <i>the follow-up activities that must be undertaken by a qualified individual;</i></p> <p>2.5.2 <i>the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program;</i></p> <p>2.5.3 <i>the scope, content, format and frequency of reporting of the results of the follow-up program;</i></p> <p>2.5.4 <i>the levels of environmental change relative to baseline conditions that would require the Proponent to implement modified or additional mitigation measure(s), including instances where the Proponent may require Designated Mine activities to be stopped; and</i></p> <p>2.5.5 <i>the technically and economically feasible mitigation measures to be implemented by the Proponent if monitoring conducted as part of the follow-up program shows that the levels of environmental change referred to in condition 2.5.4 have been reached or exceeded.</i></p>	
<p>Condition 2.6 (Follow-up and Adaptive Management)</p>	<p><i>The Proponent shall update and maintain the follow-up and adaptive management information referred to in condition 2.5 during the implementation of each follow-up program in consultation with the party or parties being consulted during the development of each follow-up program.</i></p>	<p><i>N/A – Addressed in WMMP Section 1.4 and 6 (ERM 2023a).</i></p>
<p>Condition 2.7 (Follow-up and Adaptive Management)</p>	<p><i>The Proponent shall provide a draft of the follow-up programs referred to in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22, if required, to the party or parties being consulted during the development of each follow-up program for a consultation period of up to 60 days prior to providing follow-up programs pursuant to condition 2.8.</i></p>	<p><i>N/A – Addressed in WMMP Section 4 (ERM 2023a).</i></p>

Condition	Description	Location in Plan
Condition 2.8 (Follow-up and Adaptive Management)	<i>The Proponent shall provide the follow-up programs referred to in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22, if required, to the Agency and to the party or parties being consulted during the development of each follow-up program prior to the implementation of each follow-up program. The Proponent shall also provide any update(s) made pursuant to condition 2.6 to the Agency and to the party or parties being consulted during the development of each follow-up program within 30 days of the follow-up program being updated.</i>	N/A – Addressed in WMMP Section 4 (ERM 2023a).
Condition 2.9 (Follow-up and Adaptive Management)	<p>The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement:</p> <p>2.9.1 conduct the follow-up program according to the information determined pursuant to condition 2.5;</p> <p>2.9.2 undertake monitoring and analysis to verify the accuracy of the environmental assessment as it pertains to the particular condition and/or to determine the effectiveness of any mitigation measure(s);</p> <p>2.9.3 determine whether modified or additional mitigation measures are required based on the monitoring and analysis undertaken in accordance with condition 2.9.2; and</p> <p>2.9.4 if modified or additional mitigation measures are required pursuant to condition 2.9.3, develop and implement these mitigation measures in a timely manner and monitor them in accordance with condition 2.9.2.</p>	Sections 2 and 3 WMMP Section 4 (ERM 2023a)
Condition 2.10 (Follow-up and Adaptive Management)	<i>Where consultation with Indigenous groups is a requirement of a follow-up program, the Proponent shall discuss the follow-up program with Indigenous groups and determine, in consultation with Indigenous groups, opportunities for their participation in the implementation of the follow-up program, including the analysis of the follow-up results and whether modified or additional mitigation measures are required, as set out in condition 2.9.</i>	N/A – Addressed in WMMP Section 4 (ERM 2023a).
Condition 2.11 (Annual Reporting)	<p>The Proponent shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report that sets out:</p> <p>2.11.1 the activities undertaken by the Proponent in the reporting year to comply with each of the conditions set out in this Decision Statement;</p> <p>2.11.2 how the Proponent complied with condition 2.1;</p> <p>2.11.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation, including a rationale for how the views have, or have not, been integrated;</p> <p>2.11.4 the information referred to in conditions 2.5 and 2.6 for each follow-up program;</p>	Addressed through the submission of this report. Addressed in the WMMP (ERM 2023a) and CMMP (ERM 2022b).

Condition	Description	Location in Plan
	<p>2.11.5 the results of the follow-up program requirements identified in conditions 3.14, 3.15, 3.16, 4.5, 5.5, 6.11, 6.12, 6.13, 6.14, 8.18.6, 8.20.5, 8.21, and 8.22 if required;</p> <p>2.11.4 any update made to any follow-up program in the reporting year;</p> <p>2.11.7 any modified or additional mitigation measures implemented or proposed to be implemented by the Proponent, as determined under condition 2.9 and rationale for why mitigation measures were selected pursuant to condition 2.5.4; and</p> <p>2.11.8 any change(s) to the Designated Mine in the reporting year.</p>	
Condition 2.12 (Annual Reporting)	The Proponent shall provide a draft annual report referred to in condition 2.11 to Indigenous groups, no later than June 30 following the reporting year to which the annual report applies. The Proponent shall consult Indigenous groups on the content and findings in the draft annual report.	Addressed through the submission of this report.
Condition 2.13 (Annual Reporting)	The Proponent, in consideration of any comments received from Indigenous groups pursuant to condition 2.12 shall revise and submit to the Agency and Indigenous groups a final annual report, including an executive summary in both official languages, no later than September 30 following the reporting year to which the annual report applies.	Addressed through the submission of this report.
Condition 2.14 (Information Sharing)	The Proponent shall publish on the Internet, or any medium which is publicly available, the annual reports and the executive summaries referred to in conditions 2.11 and 2.13, the offsetting plan(s) referred to in condition 3.11, the compensation plan referred to in condition 8.18 and, if required, condition 5.3, the whitebark pine management plan referred to in condition 8.20, the communication plans referred to in conditions 6.15 and 10.5, the reports related to accidents and malfunctions referred to in conditions 10.4.2 and 10.4.3, the schedules referred to in conditions 11.1 and 11.2, and any update(s) or revision(s) to the above documents, upon submission of these documents to the parties referenced in the respective conditions. The Proponent shall keep these documents publicly available for 25 years following the end of decommissioning of the Designated Mine. The Proponent shall notify the Agency and Indigenous groups of the availability of these documents within 48 hours of their publication.	Addressed through the submission of this report.
Condition 2.15 (Information Sharing)	<i>When the development of any plan is a requirement of a condition set out in this Decision Statement, the Proponent shall submit the plan to the Agency and to Indigenous groups prior to construction, unless otherwise required through the condition.</i>	N/A – Addressed through the submission of the WMMP (ERM 2023a).
Condition 4.1	The Proponent shall carry out the Designated Mine in a manner that protects migratory birds and avoids harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests or eggs. In this regard, the Proponent shall take into account Environment and Climate Change Canada’s Avoidance Guidelines and the risk of incidental take. The Proponent’s actions when carrying out the Designated Mine shall be in compliance with the <i>Migratory Birds Convention Act, 1994</i> , the <i>Migratory Birds Regulations</i> and with the <i>Species at Risk Act</i> .	Sections 2.1, 3.7, 3.8, 3.9

Condition	Description	Location in Plan
Condition 4.2	The Proponent shall deter migratory birds from using or frequenting the tailings storage facility, reclamation wetlands, pit lake and sediment control ponds until such time that water quality in these structures meets legislative requirements and water quality objectives. The Proponent shall identify the water quality objectives using an ecological risk-based approach, developed in consultation with Indigenous groups and relevant authorities.	Section 2.4. WMMP Section 3.10.3 (ERM 2023a).
Condition 4.3	<i>The Proponent shall conduct pre-construction surveys for migratory birds and their habitat in the Designated Mine area to validate the results of habitat suitability modelling for migratory birds, including migratory birds that are listed species at risk, conducted by the Proponent and presented in the Environmental Impact Statement and in the Blackwater Gold Mine – Waterbird Memo (Response to LDN/UFN #684, 693, 697, and NWFN/StFN #964). As part of the pre-construction surveys, the Proponent shall validate the applicability of fisher (Martes pennant) habitat suitability modelling to migratory birds, as identified by the Proponent in the Blackwater Gold Mine – Forest Birds (Supplemental Information in Response to 681, 683, 685, 694, 695, 703, 717, 936; and ECCC Annex 1, IR 21, 24, 25). Based on the results of the pre-construction surveys the Proponent shall, in consultation with Indigenous groups and relevant authorities, develop and implement mitigation measures for migratory bird habitat.</i>	N/A – Addressed in WMMP Section 4.8 (ERM 2023a).
Condition 4.4	<i>The Proponent shall develop, prior to construction, and in consultation with relevant authorities, mitigation measures related to sensitive periods and locations for migratory birds, including greater yellowlegs (Tringa melanoleuca). The mitigation measures shall consider critical habitat identified in applicable recovery strategies under the Species at Risk Act and suitable habitat identified by the Proponent in the environmental assessment for migratory birds, including common nighthawk (Chordeiles minor), olive-sided flycatcher (Contopus cooperi), yellow rail (Coturnicops noveboracensis), barn swallow (Hirundo rustica), bank swallow (Riparia riparia), horned grebe (Podiceps auritus). The Proponent shall implement the mitigation measures during all phases of the Designated Mine.</i>	N/A – Addressed in WMMP Sections 3.3 and 4.8 (ERM 2023a).
Condition 4.5	The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of all mitigation measures to avoid harm to migratory birds, including migratory birds that are listed species at risk, their eggs and nests. The follow-up program shall include the mitigation measures used to comply with condition 4.1 to 4.4. The Proponent shall implement the follow-up program during all phases of the Designated Mine and shall apply conditions 2.9 and 2.10 when implementing the follow-up program.	Sections 3.7, 3.8, 3.9
Condition 6.2	<i>The Proponent shall establish a speed limit of a maximum of 50 kilometres/hour on project roads and require that all persons abide by this speed limit during all phases of the Designated Mine.</i>	N/A – Addressed in WMMP Section 3.6 (ERM 2023a).

Condition	Description	Location in Plan
Condition 6.10	<i>The Proponent shall, during all phases of the Designated Mine, prohibit employees and contractors associated with the Designated Mine from fishing, hunting, trapping and gathering for any purposes not associated with the Designated Mine, within the Designated Mine area, or using the Designated Mine area to access lands outside the Designated Mine area for fishing, hunting, trapping and gathering, unless an employee or contractor is provided access by the Proponent for traditional purposes or for exercising Aboriginal rights, to the extent that such access is safe.</i>	N/A – Addressed in WMMP Section 2.1 (ERM 2023a).
Condition 6.14	The Proponent shall, prior to construction and in consultation with Indigenous groups and relevant authorities, develop a follow-up program to verify the accuracy of the environmental assessment as it pertains to adverse effects from the Designated Mine on moose (<i>Alces alces</i>) and determine the effectiveness of mitigation measures. As part of the implementation of the follow-up program, the Proponent shall conduct winter distribution and density surveys for moose (<i>Alces alces</i>) starting prior to construction and until the end of operation. The Proponent shall implement the follow-up program from construction through decommissioning and shall apply conditions 2.9 and 2.10 when implementing the follow-up program.	Section 3.1 (ERM 2023a)
Condition 8.1	<i>The Proponent shall control lighting required for all phases of the Designated Mine, including direction, timing and intensity, to avoid adverse effects on listed species at risk, while meeting health and safety requirements.</i>	N/A - Addressed in WMMP Section 3.1 (ERM 2023a).
Condition 8.2	<i>The Proponent shall, prior to construction and in consultation with Indigenous groups and relevant authorities, identify wildlife corridors that intersect project roads and shall install and maintain, during all phases of the Designated Mine, wildlife crossing signs where the wildlife corridors intersect the project roads.</i>	N/A – Addressed in WMMP Sections 3.6 and 4 (ERM 2023a).
Condition 8.3	<i>The Proponent shall not use salt for de-icing or traction control purposes on project roads during all phases of the Designated Mine unless all other methods used for de-icing or traction control purposes do not meet safety requirements.</i>	N/A – Addressed in WMMP Section 3.6 (ERM 2023a).
Condition 8.4	<i>The Proponent shall, from the start of construction to the end of decommissioning, manage carrion on project roads in consultation with relevant authorities and Indigenous groups.</i>	N/A – Addressed in WMMP Section 3.6 (ERM 2023a).
Condition 8.5	<i>The Proponent shall, during all phases of the Designated Mine, manage snow bank height along project roads and shall create and maintain escape pathways where the wildlife corridors identified pursuant to condition 8.2 intersect the project roads to allow ungulates and wolverines (<i>Gulo gulo</i>) to exit the plowed roads in winter.</i>	N/A – Addressed in WMMP Section 3.6 (ERM 2023a).
Condition 8.6	<i>The Proponent shall, prior to the start of construction, conduct mineral lick surveys within the Designated Mine area. If the results of the surveys indicate the presence of mineral licks outside the area disturbed by Designated Mine components, the Proponent shall, in consultation with Indigenous groups and relevant authorities, maintain the mineral licks in their natural state.</i>	N/A – Addressed in WMMP Section 4.4 (ERM 2023a).

Condition	Description	Location in Plan
Condition 8.7	The Proponent shall maintain vegetation under the transmission line right of way to a minimum height of 1 metre from the ground except at the location of the tower bases, guy anchor points and along the transmission line access roads, or where not feasible for safety reasons.	N/A – Addressed in WMMP Section 3.4 (ERM 2023a).
Condition 8.8	The Proponent shall deposit woody debris on the surface of upland slopes, between rocks and parallel and perpendicular to the slope when undertaking vegetation maintenance under the transmission line pursuant to condition 8.7, unless not feasible for safety reasons.	N/A – Addressed in WMMP Section 3.4 (ERM 2023a).
Condition 8.9	<p>The Proponent shall identify, prior to construction and in consultation with Indigenous groups and relevant authorities, time periods during which construction activities must be carried out to protect wildlife during sensitive life stages, including for grizzly bear (<i>Ursus arctos</i>), western toad (<i>Anaxyrus boreas</i>), wolverine (<i>Gulo gulo</i>), American marten (<i>Martes americana</i>), fisher (<i>Pekania pennanti</i>) and southern mountain caribou (<i>Rangifer tarandus caribou</i>). In doing so, the Proponent shall:</p> <p>8.9.1 apply British Columbia’s Compendium of Wildlife Guidelines for Industrial Development Mines in the North Area, British Columbia. Interim Guidance, North Area when identifying these time periods;</p> <p>8.9.2 notify, prior to construction, the Agency and Indigenous groups of these time periods and of the areas within which each of these time periods shall apply; and</p> <p>8.9.3 conduct construction activities during these time periods, unless not technically feasible.</p>	Sections 2.1, 3.2, 3.4, 3.5, 3.10
Condition 8.10	<p>If construction during the time periods referred to in condition 8.9 for grizzly bear (<i>Ursus arctos</i>), western toad (<i>Anaxyrus boreas</i>), wolverine (<i>Gulo gulo</i>), American marten (<i>Martes americana</i>) and fisher (<i>Pekania pennanti</i>) is not technically feasible, the Proponent shall conduct pre-construction surveys to identify western toad (<i>Anaxyrus boreas</i>) breeding habitat and wolverine (<i>Gulo gulo</i>), American marten (<i>Martes americana</i>), fisher (<i>Pekania pennanti</i>) and grizzly bear (<i>Ursus arctos</i>) denning habitat and develop and implement additional mitigation measures, from construction until the end of operation, in consultation with Indigenous groups and relevant authorities. In doing so, the Proponent shall:</p> <p>8.10.1 establish no work buffer zones for habitat identified during pre-construction surveys. The Proponent shall take into account British Columbia’s Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia when establishing buffer zones for western toad breeding habitat and shall take into account British Columbia’s Compendium of Wildlife Guidelines for Industrial Development Mines in the North Area, British Columbia. Interim Guidance, North Area when establishing buffer zones for wolverine (<i>Gulo gulo</i>), American marten (<i>Martes americana</i>), fisher (<i>Pekania pennanti</i>) and grizzly bear (<i>Ursus arctos</i>) denning habitat.</p>	Sections 2.1, 3.2, 3.4, 3.5, 3.10
Condition 8.11	The Proponent shall, in consultation with Environment and Climate Change Canada, have a qualified individual salvage and relocate western toad (<i>Anaxyrus boreas</i>) to suitable habitat, prior to clearing activities that cannot be scheduled outside of sensitive periods pursuant to condition 8.9.	Section 3.10

Condition	Description	Location in Plan
Condition 8.12	The Proponent shall deter western toad (<i>Anaxyrus boreas</i>) from the tailings storage facility, reclamation wetlands, pit lake, sediment control ponds, and environmental control dam until such time that water meets British Columbia's Water Quality Guidelines for the Protection of Wildlife and from project roads during construction, operation and decommissioning.	Sections 2.4 and 3.10
<i>Condition 8.13</i>	<i>The Proponent shall take into account the Western Canada White Nose Syndrome Transmission Prevention when undertaking construction activities in little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>) habitat. The Proponent shall report evidence of white nose syndrome as indicated by white muzzle or dead bats to British Columbia's Ministry of Forests, Lands, and Natural Resource Operations and Rural Development, Environment and Climate Change Canada, and Indigenous groups.</i>	<i>N/A – Addressed in WMMP Section 3.2 (ERM 2023a).</i>
Condition 8.14	The Proponent shall conduct pre-construction surveys to determine the distribution of little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>), and establish from construction until the end of operation, in consultation with Indigenous groups and relevant authorities, buffer zones around active hibernacula and active roosts. The Proponent shall take into account British Columbia's Compendium of Wildlife Guidelines for Industrial Development Mines in the North Area, British Columbia when identifying active hibernacula and active roosts and when establishing buffer zones.	Sections 2.1 and 3.6
Condition 8.15	If the pre-construction surveys referred to in condition 8.14 identify the loss of little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>) roosting habitat, the Proponent shall install, prior to construction, and maintain, during construction operation, and decommissioning, roosting structures to offset any loss of little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>) roosting habitat.	Section 3.6
<i>Condition 8.16</i>	<i>The Proponent shall, prior to construction and in consultation with Indigenous groups and relevant authorities, conduct pre-construction surveys to identify short-eared owl (<i>Asio flammeus</i>) moderate to high-value nesting and foraging habitat, and shall implement measures to mitigate the loss of short-eared owl (<i>Asio flammeus</i>) habitat caused by the Designated Mine.</i>	<i>N/A – Addressed in WMMP Section 4.8 (ERM 2023a).</i>
Condition 8.17	The Proponent shall, during all phases of the Designated Mine and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, mitigate adverse environmental effects on southern mountain caribou (<i>Rangifer tarandus caribou</i>) and its habitat, including by carrying out construction activities during time periods referred to in condition 8.9 for southern mountain caribou (<i>Rangifer tarandus caribou</i>). In doing so, the Proponent shall give preference to avoiding the destruction or alteration of habitat over minimizing the destruction or alteration of habitat, to minimizing the destruction or alteration of habitat over restoring altered or destroyed habitat on-site, and to restoring altered or destroyed habitat on-site over offsetting.	Section 2.1

Condition	Description	Location in Plan
Condition 8.18	<p><i>For any offsetting required pursuant to condition 8.17, the Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, and to the satisfaction of Environment and Climate Change Canada, a compensation plan for southern mountain caribou (<i>Rangifer tarandus caribou</i>). When developing the compensation plan, the Proponent shall take into account habitat needs for migratory birds and listed species at risk. The Proponent shall implement the compensation plan from the beginning of construction. The compensation plan shall include:</i></p> <p><i>8.18.1 mapping of critical habitat of southern mountain caribou (<i>Rangifer tarandus caribou</i>) altered or destroyed by the Designated Mine;</i></p> <p><i>8.18.2 an offsetting ratio for direct habitat loss and indirect (e.g., sensory) losses based on an assessment of options, including revegetation and road closures, which consider the types of offset, location, time lags, securement, technical and economic feasibility, and probability of success;</i></p> <p><i>8.18.3 field verified suitability mapping of areas to be prioritized for offsetting;</i></p> <p><i>8.18.4 if residual environmental effects cannot be fully offset with habitat-based measures, a description of non-habitat measures to be implemented by the Proponent and a description of how these measures will be implemented by the Proponent, including a schedule for implementation;</i></p> <p><i>8.18.5 a description of performance indicators to be used by the Proponent to evaluate the effectiveness of habitat-based and non-habitat-based compensation measures; and</i></p> <p><i>8.18.6 a description of the follow-up program the Proponent shall implement to determine the effectiveness of the mitigation measures included in the compensation plan. As part of the development of the follow-up program, the Proponent shall determine, in consultation with Indigenous groups, the methods, timing and frequency for conducting winter surveys for caribou abundance and distribution within the Designated Mine area. The Proponent shall apply conditions 2.9 and 2.10 when implementing the follow-up program.</i></p>	<p><i>N/A – CMMP Sections 2.2, 4.2, 4.3, and 4.5 (ERM 2022b)</i></p> <p><i>N/A – CMMP Section 4 (ERM 2022b)</i></p> <p><i>N/A – CMMP Section 5.7 (ERM 2022b)</i></p> <p><i>N/A – CMMP Sections 4.3 and 5.6 (ERM 2022b)</i></p> <p><i>N/A – CMMP Section 6.3 (ERM 2022b)</i></p> <p><i>N/A – CMMP Section 6 (ERM 2022b)</i></p>
Condition 8.21	<p>The Proponent shall develop, in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as it pertains to the effects of changes caused by the Designated Mine on western toad (<i>Anaxyrus boreas</i>). The Proponent shall implement the follow-up program from construction through decommissioning and shall apply conditions 2.9 and 2.10 when implementing the follow-up program. As part of the follow-up program, the Proponent shall:</p> <p>8.21.1 conduct western toad surveys annually in breeding habitat identified pursuant to condition 8.10 from the start of construction until the end of decommissioning;</p>	Section 3.10

Condition	Description	Location in Plan
	<p>8.21.2 monitor western toad (<i>Anaxyrus boreas</i>) in relocation areas for western toad (<i>Anaxyrus boreas</i>) salvage conducted pursuant to condition 8.11; and</p> <p>8.21.3 monitor western toad (<i>Anaxyrus boreas</i>) mortality on project roads from the start of construction until the end of decommissioning.</p>	
Condition 8.22	<p>The Proponent shall develop, in consultation with Indigenous groups, and implement a follow-up program to monitor little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>) usage of buffer zones established pursuant to condition 8.14 and roosting structures installed and maintained by the proponent pursuant to condition 8.15 to determine the effectiveness of the mitigation measures. The Proponent shall implement the follow-up program during construction and operation and shall apply conditions 2.9 and 2.10 when implementing the follow-up program.</p>	<p>Section 3.6. WMMP Section 4.2 (ERM 2023a).</p>

Appendix A-2: Concordance with Environmental Assessment Certificate #M19-01 (June 2019)

Condition	Description	Section in Report
<p>2 Plan Development</p>	<p>Where a condition of this Certificate requires the Holder to develop a plan, program or other document, any such plan, program or other document must, at a minimum, include the following information:</p> <ul style="list-style-type: none"> a) purpose and objectives of the plan, program or other document; b) roles and responsibilities of the Holder and Employees; c) names and, if applicable, professional certifications and professional stamps/seals, of those responsible for the preparation of the plan, program, or other document; d) schedule for implementing the plan, program or other document throughout the relevant Mine phases; e) means by which the effectiveness of the mitigation measures will be evaluated including the schedule for evaluating effectiveness; g) schedules and methods for the submission of reporting to specific agencies, Aboriginal Groups and the public and the required form and content of those reports; h) and process and timing for updating and revising the plan, program or other document, including any consultation with agencies and Aboriginal Groups that would occur in connection with such updates and revisions. 	<p>N/A – Addressed in WMMP Sections 1.1, 1.2, 3, 4, 5, 8 (ERM 2023a).</p>
<p>3 Adaptive Management</p>	<p>Where a condition of this Certificate requires the Holder to develop a plan, program or other document that includes monitoring, including monitoring of mitigation measures or monitoring to determine the effectiveness of the mitigation measures, the Holder must include adaptive management in that plan. The objective of the adaptive management is to address the circumstances that will require the Holder to implement alternate or additional mitigation measures to address effects of the Mine if the monitoring shows that those effects:</p> <ul style="list-style-type: none"> a) are not mitigated to the extent contemplated in the Application; b) are not predicted in the Application; or c) have exceeded the triggers identified in paragraph g) of this condition. <p>The adaptive management in the plan must include at least the following:</p> <ul style="list-style-type: none"> d) the monitoring program that will be used including methods, location, frequency, timing and duration of the monitoring; e) the baseline information that will be used, or collected where existing baseline information is insufficient, to support the monitoring program; 	<p>N/A – Addressed in WMMP Sections 1.4 and 4 (ERM 2023a).</p>

Condition	Description	Section in Report
	<p>f) the scope, content and frequency of reporting of the monitoring results;</p> <p>g) the identification of qualitative and quantitative triggers, which, when observed through monitoring required under paragraph d), will require the Holder to alter existing, or develop new, mitigation measures to avoid, reduce, and/or remediate effects;</p> <p>h) the methods that will be applied to detect when a numeric trigger, or type or level of change referred to in paragraph g), has occurred;</p> <p>i) a description of the process for and timing to alter existing mitigation measures or develop new mitigation measures to reduce or avoid effects;</p> <p>j) identification of the new and/or altered mitigation measures that will be applied when any of the changes identified in paragraphs a) to c) occur, or the process by which those will be established and updated over the relevant timeframe for the specific condition;</p> <p>k) the monitoring program that will be used to determine if the altered or new mitigation measures and/or remediation activities are effectively mitigating or remediating the effects and or avoiding potential effects; and</p> <p>l) the scope, content and frequency of reporting on the implementation of altered or new mitigation measures.</p> <p>If there are any requirements or mitigation measures required in the plan, program or other document for which adaptive management, or elements of adaptive management listed in paragraphs d) to l) are assessed to be not appropriate or applicable, the plan must include identification of those requirements and measures, and the rationale for that assessment.</p>	<p>N/A – Addressed in WMMP Sections 4 and 5 (ERM 2023a).</p> <p>N/A – Addressed in WMMP Sections 1.4 and 4 (ERM 2023a).</p>
4 Consultation	<p>Where a condition of this Certificate requires the Holder consult a particular party or parties regarding the content of a plan, program or other document, the Holder must, to the satisfaction of the EAO:</p> <p>a) provide written notice to each such party that:</p> <ol style="list-style-type: none"> i. includes a copy of the plan, program or other document; ii. invites the party to provide its views on the content of such plan, program or other document; and iii. indicates: i) if a timeframe for providing such views to the Holder is specified in the relevant condition of this Certificate, that the party may provide such views to the Holder within such time frame; or ii) if a timeframe for providing such views to the Holder is not specified in the relevant condition of this Certificate, specifies a reasonable period during which the party may submit such views to the Holder; 	<p>N/A – WMMP (ERM 2023a) and CMMP (ERM 2022b).</p>

Condition	Description	Section in Report
	<p>b) undertake a full and impartial consideration of any views and other information provided by a party in accordance with the timelines specified in a notice given pursuant to paragraph (a);</p> <p>c) provide a written explanation to each such party that provided comments in accordance with a notice given pursuant to paragraph (a) as to:</p> <ul style="list-style-type: none"> i. how the views and information provided by such party to the Holder have been considered and addressed in a revised version of the plan, program or other document; ii. why such views and information have not been addressed in a revised version of the plan, program or other document. <p>d) maintain a record of consultation with each such party regarding the plan, program or other document; and</p> <p>e) <i>provide a copy of such consultation record to the EAO, the relevant party, or both, promptly upon the written request of the EAO or such party. The copy of such consultation record must be provided to the EAO, relevant party, or both, no later than 15 days after the Holder receives the request for a copy of the consultation record, unless otherwise authorized by the EAO.</i></p>	<p>Addressed in the WMMP (ERM 2023a) and CMMP (ERM 2022b).</p> <p>For the CMMP, See CMMP report Appendix S Section 1.3.</p> <p><i>N/A – Noted by the WMMP (ERM 2023a) and CMMP (ERM 2022b).</i></p>
<p>5 Compliance Verification and Reporting</p>	<p>The Holder must provide to the EAO and to the Aboriginal Groups any document, data or information requested by the EAO for the purposes of compliance inspection and verification. The Holder must provide any document, data or information requested within the timeframe and in the manner specified by the EAO.</p> <p>The Holder must submit a report to the attention of the EAO and Aboriginal Groups on the status of compliance with this Certificate at the following times:</p> <ul style="list-style-type: none"> a) at least 30 days prior to the start of Construction; b) on or before March 31 in each year after the start of Construction c) at least 30 days prior to the start of Operations; d) on or before March 31 in each year after the start of Operations; e) at least 30 days prior to the start of Closure; f) on or before March 31 in each year after the start of Closure until the end of Closure; g) at least 30 days prior to the start of Post-closure; and h) on or before March 31 in each year after the start of Post-closure until the end of Post-closure. <p>The reports must be in a form satisfactory to the EAO. The EAO may adjust or extend this reporting requirement by providing written notice to the Holder.</p>	<p>Entire WMMP Report, and CMMP Report (Appendix S).</p>

Condition	Description	Section in Report
22 Caribou Mitigation and Monitoring Plan	<i>The Holder must retain a Qualified Professional to develop the Caribou Mitigation and Monitoring Plan to avoid, reduce and offset the Mine's adverse effects on caribou and its critical habitat as defined in the Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada (Environment and Climate Change Canada (ECCC) 2014, or as updated or replaced from time to time). The plan must be developed in consultation with FLNRORD, ENV, EMPR, ECCC, and Aboriginal Groups.</i>	N/A – Addressed by CMMP (ERM 2022b).
	<i>The plan must include at least the following: a) the means by which the mitigation measures identified in the Mitigation Table required under Condition 43 for the valued component Caribou will be implemented;</i>	N/A – Addressed in CMMP Section 3 (ERM 2022b).
	<i>b) a requirement that during Construction the Existing Exploration Access Road (from its origin at the Kluskus-Ootsa Forest Service road to the Mine Site) and the Mt. Davidson Exploration Road, as identified in Figure A1-1 and A-2 of Schedule A to the Certificate, be decommissioned and caribou habitat disturbed by these roads be reclaimed in a manner that supports the reestablishment of caribou habitat;</i>	N/A – Addressed in CMMP Sections 3.3.1 and 5.3 (ERM 2022b).
	<i>c) the type, timing and frequency for undertaking caribou surveys prior to commencement of Construction, as well as during Operations, and how that information will inform development and implementation of monitoring and mitigation measures during Construction and Operations;</i>	N/A – Addressed in CMMP Section 6.2.2 (ERM 2022b).
	<i>d) provision of survey results to Aboriginal Groups, FLNRORD, EMPR and ENV;</i>	Addressed by submission of this report.
	<i>e) scheduling Construction activities to take into account the caribou "least risk window" (as defined by Ungulate Winter Range Order U-7-012), including monitoring and implementation of management or mitigation measures to avoid or reduce impacts in the event caribou are observed in the area of the Mine Site;</i>	N/A – Addressed in CMMP Sections 3.1 and 3.2 (ERM 2022b).
	<i>f) the conditions under which work would be stopped if caribou are seen in the area during Construction; g) development and implementation of caribou awareness protocols for Employees;</i>	N/A – Addressed in CMMP Section 3.2 (ERM 2022b).
	<i>h) the timing and frequency, which must be at least once per year, unless otherwise authorized by the EAO, that the Holder will request to meet with FLNRORD and Aboriginal Groups to discuss opportunities for the Holder's Participation in provincial caribou regional initiatives and in initiatives related to caribou established under Section 5.2b)i.c. of the Hubulhsooninats'uhoot'alh: Foundation Framework Agreement (July 22, 2018, or as updated or replaced from time to time), between the Province and the Southern Dakeh Nation Alliance. When FLNRORD and/or Aboriginal Groups agree to meet, the Holder must organize such meeting; and</i>	N/A – Addressed in CMMP Section 5.6 (ERM 2022b).

Condition	Description	Section in Report
	<p>i) the development of a work plan for the Holder's Participation in those initiatives identified in paragraph h) when invited to do so by FLNRORD or the Ministry of Indigenous Relations and Reconciliation.</p>	N/A – Noted by the CMMP (ERM 2022b).
	<p>The plan must also include a plan to offset the loss of caribou habitat with recovery and protection of caribou habitat that will benefit the same herd of caribou that is affected by the Mine. The offsetting plan must include at a minimum:</p>	N/A – Addressed in CMMP Sections 4 and 5 (ERM 2022b).
	<p>j) Demonstration of how the plan takes into consideration the assessment and proposals contained in the Application document: New Gold's Response to the May 25, 2018 Information Request from the Canadian Environmental Assessment Agency – Updated Assessment of Impacts to Southern Mountain Caribou and Proposed Caribou Offset, submitted on August 31, 2018 (August 2018 Caribou Memo), including with respect to:</p> <ul style="list-style-type: none"> i) mapping of the caribou critical habitat altered or destroyed by the Mine; ii) identifying offset locations within the Tweedsmuir-Entiako Herd Boundary; iii) defining ecological equivalency for areas of proposed offsets compared to the areas affected by the Mine and related offset area ratios; and iv) providing a rationale for any deviation from the assessment or proposal in the August 2018 Caribou Memo, including how deviations result in the same or improved overall effectiveness in offsetting the adverse effects to caribou as compared to that included in the August 2018 Caribou Memo; 	N/A – Addressed in CMMP Sections 2 to 2.3, and 4 (ERM 2022b).
	<p>k) demonstration of how the Holder has considered and designed the offsetting plan to be consistent with or to support any provincial and/or federal plans for the recovery of the herd of caribou affected by the Mine;</p>	N/A – Addressed in CMMP Sections 2 to 3.3, 4, and 5.1 (ERM 2022b).
	<p>l) how, in identifying offset locations, the Holder sought and considered information on:</p> <ul style="list-style-type: none"> i) areas currently used by caribou; ii) Traditional Knowledge and Traditional Land Use; and iii) areas that would create contiguous blocks of protected habitat; 	N/A – Addressed in CMMP Sections 2.1 to 4.5 (ERM 2022b).
	<p>m) how the proposed offset selection takes into account the duration of effects, including the potential for the duration to change in the future, and technical and financial considerations;</p>	N/A – Addressed in CMMP Section 4.3 (ERM 2022b).
	<p>n) 1:20,000 scale topographic maps including UTM grid for areas proposed and secured for habitat-based offsetting;</p>	N/A – Addressed in CMMP Section 5.7 (ERM 2022b).
	<p>o) a description of how areas secured for habitat-based offsetting will be maintained;</p>	N/A – Addressed in CMMP Sections 4 and 5 (ERM 2022b).

Condition	Description	Section in Report
	<p>p) a monitoring program to determine the effectiveness of the offset; and</p> <p>q) <i>the specific actions required on the part of the Holder to secure the offsets, identification of the extent to which the Holder has the ability to implement the offset and identification of actions required by other parties that have been identified by the Holder for the offsets to be fully secured and implemented.</i></p>	<p>Section 3.2 and CMMP Report (Appendix S)</p> <p>N/A – Addressed in CMMP Section 4.3 (ERM 2022b).</p>
<p>23 Wildlife Mitigation and Monitoring Plan</p>	<p><i>The Holder must retain one or more Qualified Professionals to develop a Wildlife Management and Monitoring Plan. The plan must be developed in consultation with EMPR, ENV, FLNRORD, ECCC and Aboriginal Groups.</i></p> <p><i>The plan must include at least the following:</i></p> <p>a) <i>the means by which the mitigation measures identified in the Mitigations Table required under Condition 43 for the following valued components: Amphibians, Bats, Forest and Grassland Birds, Waterbirds, Furbearers, Grizzly Bear, Invertebrates, Moose, Ecosystem Composition and Plant species and Ecosystems at Risk will be implemented;</i></p> <p>b) <i>the means by which the implementation and effectiveness of mitigation measures in the plan will be monitored;</i></p> <p>c) <i>pre-construction surveys for wildlife features to be undertaken and the associated avoidance or mitigation measures to be undertaken if specified wildlife features are found in the Mine Area, as listed in Table 1, including:</i></p> <p><i>i) the method(s), timing and duration for surveys and the related rationale for that method(s), timing and duration;</i></p> <p><i>ii) the identified measures to be undertaken in light of the requirements for different wildlife features; and</i></p> <p><i>iii) the circumstances under which the required measures in the Table 1 would not be implemented, if any, including a clear rationale for those exceptions and identification of alternative measures that will be applied.</i></p>	<p>N/A – Addressed in WMMP Sections 3 and 4 (ERM 2022b).</p> <p>Section 2 and 3 WMMP Section 4 (ERM 2023a)</p> <p>N/A – Addressed in WMMP Sections 3.3 and 4 (ERM 2023a).</p>

Condition	Description	Section in Report
	<p>Table 1 Pre-construction Surveys and Associated Avoidance and Mitigation Measures:</p> <p>Mineral Licks – If pre-construction surveys identify that mineral licks are present within or near areas disturbed (sensory and physical) by Mine components, identify measures to maintain the mineral licks in their natural state as determined by a Qualified Professional. If a mineral lick is discovered during Construction or Operations that was not identified in a pre-construction survey, the Qualified Professional must identify appropriate mitigation measures to minimize impacts to the mineral lick.</p>	Section 2.1
	<p>Grizzly bear dens – If the results of the survey indicate that there are grizzly bear dens in use, establish a setback around the den(s) while it is in active use, as determined by Qualified Professional.</p>	Sections 2.1 and 3.4
	<p>Bat roosts and hibernacula features – If the results of the pre-construction surveys indicate bat roosts or hibernacula are in the Mine Area, avoid disturbance.</p> <p>If avoidance is not possible, install alternative roosts within the vicinity of the observed roost, as well as other mitigation measures as determined by a Qualified Professional. The Holder must demonstrate how the Best Management Practices Guidelines for Bats in British Columbia (ENV February 2016, or as updated or replaced from time to time) were applied.</p> <p>In addition to the pre-construction survey, the Holder must maintain an inventory of features that may function as potential roosts and hibernacula and must conduct surveys to confirm whether these features are used and by which species. If the features are being used by bats, avoid disturbance or apply appropriate mitigation measures if avoidance is not possible, as determined by a Qualified Professional.</p>	Sections 2.1 and 3.6
	<p>Furbearer dens – Should a probable active natal or maternal furbearer den be located, establish a 50-metre setback around the den during the denning period as determined by a Qualified Professional.</p> <p>Should the survey or assessment determine that there is furbearer denning habitat within the Mine Area, the plan must identify mitigation measures to be applied during the denning period, as determined by a Qualified Professional, if avoidance is not possible, and in consideration of BC Environmental Mitigation Policy, including Procedures for Mitigating Impacts on Environmental Values (BC EMP).</p>	Sections 2.1 and 3.5
	<p>Active bird nests (resident and migratory, forest, grassland and waterbirds) – If the results of the survey indicate that there are nests in use, establish a setback around the nest while it is in active use, as determined by Qualified Professional.</p> <p>The Holder must document and maintain detailed records of efforts undertaken to avoid incidental bird takes during these surveys.</p>	Sections 2.1, 3.7, 3.8, and 3.9

Condition	Description	Section in Report
	<p>d) <i>the means by which information from the habitat suitability mapping for the Mine Site will be confirmed or updated for the use of the Mine Site by grizzly bears and moose prior to Construction at the Mine Site, and in consultation with Aboriginal Groups. This must include:</i></p> <ul style="list-style-type: none"> i) <i>consideration of habitat identified through the Terrestrial Ecosystem Mapping of the Mine Site contained in the Application and identification of the habitat types requiring further assessment;</i> ii) <i>identification of methods to be used to acquire the information, including consideration of applicable Resources Information Standards Committee guidance documents and other information made available to the Holder;</i> iii) <i>the role of Aboriginal Group monitors or members of Aboriginal Groups in gathering the information;</i> iv) <i>after the information is gathered, an assessment of the adequacy of the mitigation measures proposed in the Mitigations Table required under Condition 43 in addressing the effects of the Mine, in light of the new information gathered;</i> v) <i>if the assessment indicates that additional mitigation is required, the development of new or additional mitigations in a manner consistent with the BC EMP, and documentation of how the BC EMP was applied;</i> vi) <i>how the effectiveness of the mitigation measures identified in paragraphs d)iv) and d)v) will be monitored; and</i> vii) <i>the development of a technical report and a report for a lay audience that documents the activities and outcomes required under paragraphs.</i> <p>d) i) to vi). <i>The report must be provided to Aboriginal Groups at least 60 days prior to the start of Construction at the Mine Site;</i></p>	<p>N/A – Addressed in WMMP Sections 4, 4.4, 4.7, 5 (ERM 2023a).</p>
	<p>e) <i>the means by which the Holder will confirm effects on wildlife and ecosystems in the area flooded in the Davidson Creek watershed upstream of the TSF and the mitigation measures that will be applied to address identified effects;</i></p>	<p>N/A – Addressed in WMMP Sections 3.9 and 4.4 (ERM 2023a).</p>
	<p>f) <i>the timing and frequency, which must be at least once per year, or as otherwise authorized by the EAO, that the Holder will request to meet with FLNRORD and Aboriginal Groups to discuss the Holder's Participation in provincial moose and grizzly bear regional wildlife and resource management initiatives in Wildlife Management Units 6-01 and 7-12 and initiatives related to wildlife established under sections 5.2b)i.c. and 5.2b)i.g. under the Hubulhsooninats'uhoot'ah: Foundation Framework Agreement (July 22, 2018, or as updated or replaced from time to time) between the Province and the Southern Dakelh Nation Alliance. When FLNRORD and/or Aboriginal Groups agree to meet, the Holder must organize such meeting;</i></p>	<p>N/A – Addressed in WMMP Sections 4.4 and 4.7 (ERM 2023a).</p>

Condition	Description	Section in Report
	<p><i>g) the development of a work plan for the Holder's Participation in those initiatives identified in paragraph f) when invited to do so by FLNRORD or the Ministry of Indigenous Relations and Reconciliation;</i></p>	<p><i>N/A – Ongoing as a part of the WMMP (ERM 2023a).</i></p>
	<p><i>h) the development of sub-component plans, which must include:</i></p> <ul style="list-style-type: none"> <i>i) related mitigation measures, the type, timing and frequency for undertaking wildlife surveys during Construction and Operations, and how that information will inform development and implementation of monitoring and mitigation for the following species:</i> <ul style="list-style-type: none"> <i>i. moose;</i> <i>ii. grizzly bears;</i> <i>iii. bats;</i> <i>iv. amphibians;</i> <i>v. birds (waterbirds and forest and grassland birds); and</i> <i>vi. furbearers;</i> <i>ii) identification of sensitive life stages for grizzly bears, moose, furbearers, and birds and how the Holder will avoid or mitigate impacts during these time periods taking into account at least the following:</i> <ul style="list-style-type: none"> <i>i. mitigation measures must include no-work zones, rescheduling construction activities, and applying minimum setbacks to construction activities. Where the Qualified Professional is of the view that such measures are not necessary or are impracticable, the plan must include clear justification as to under what circumstances those measures are not feasible or required and identification of alternative measures that are equally effective in mitigating effects; and</i> <i>ii. in identifying these life stages and mitigation measures, the Holder must document how it has taken into consideration the A Compendium of Wildlife Guidelines for Industrial Development Mines in the North Area, British Columbia. Interim Guidance, FLNRORD, 2014 (or as updated or replaced from time to time).</i> 	<p>Sections 2.1 and 3</p>
	<p><i>i) the means by which the Wildlife Management and Monitoring Plan will inform the Country Foods Monitoring Plan (Condition 41) and the End Land Use Plan (Condition 25);</i></p>	<p><i>N/A – Addressed in WMMP Section 2.2 (ERM 2023a).</i></p>

Condition	Description	Section in Report
	<p>j) establishment of policies that prohibit Employees, unless that activity is specifically related to employment requirements, from:</p> <ul style="list-style-type: none"> i) fishing, hunting, or trapping; ii) harassing or feeding wildlife; or iii) possessing firearms; <p>when travelling, for work-related purposes along Mine Roads, the Kluskus and Kluskus-Ootsa Forest Service Roads, and/or when at the Mine Site. The policies must identify the circumstances under which any of these activities may be allowed if they are by members of Aboriginal Groups exercising Aboriginal Interests;</p>	N/A – Addressed in WMMP Section 2.1 (ERM 2023a).
	<p>k) how the Holder will implement at least the following mitigation measures specific to the Mine Site:</p> <ul style="list-style-type: none"> i) management of lighting including direction, timing and intensity, to avoid adverse effects on wildlife, while meeting health and safety requirements; 	N/A – Addressed in WMMP Sections 3.1, 3.5, and 3.10.3 (ERM 2023a).
	<ul style="list-style-type: none"> ii) regular monitoring of wildlife use of the TSF and water quality in the TSF to determine whether the water quality in the TSF poses a health risk to wildlife; and iii) measures to exclude wildlife from the TSF during periods of health risk for wildlife that are becoming habituated to using or drinking water from the TSF; 	Section 2.4.
	<p>l) the means by which the Holder will implement at least the following mitigation measures specific to the transmission line right of way and transmission line access roads:</p> <ul style="list-style-type: none"> i) after the transmission line is constructed, allowing the vegetation within the transmission line right of way to grow in order to minimize predator sight lines by maintaining limits of approach and, after vegetation has grown to one meter in height or more, not reducing the height of the plant community to any lower than one metre from ground level, unless the area is required for tower bases, guy anchor points or along existing access roads; ii) the means by which visual barriers will be created, as directed by a Qualified Professional, to reduce sight lines for predators along the transmission line right of way; and iii) a vegetation and access management plan for the transmission line right of way that sets out the timing and means by which all newly created access roads for the construction of the transmission line will be decommissioned and revegetated after they are no longer needed for Construction, the circumstances under which access may be re-established for maintenance and/or repairs of the transmission line, and the means by which roads re-opened for maintenance or repair activity will be decommissioned and revegetated following the maintenance and/or repair activities to meet the requirements in paragraphs l) i) and ii); 	N/A – Addressed in WMMP Section 3.4 (ERM 2023a).

Condition	Description	Section in Report
	<p><i>m) how the Holder will implement at least the following mitigation measures specific to road use:</i></p> <ul style="list-style-type: none"> <i>i) establishing a 50 kilometres per hour speed limit on all Mine Roads;</i> <i>ii) identifying wildlife corridors and/or habitual crossing areas that intersect Mine Roads and install and maintain wildlife crossing signs where those wildlife corridors intersect the Mine Roads;</i> <i>iii) identifying wildlife corridors and/or habitual crossing areas that intersect the Kluskus and Kluskus-Ootsa Forest Service Roads and describe how the Holder will identify those to FLNRORD and offer to install and maintain wildlife crossing signs where those wildlife corridors intersect the Kluskus and Kluskus-Ootsa Forest Service Roads; and</i> <i>iv) the means and timing by which the Holder will notify FLRNORD of carrion resulting from impacts with Mine Vehicles on Mine Roads and the Kluskus and Kluskus-Ootsa Forest Service Roads, and when safe to do so, remove the carrion to a suitable location where the carrion can serve as a food source for wildlife, as determined by a Qualified Professional, unless FLRNORD is not able to authorize that removal and relocation;</i> 	<p><i>N/A – Addressed in WMMP Section 3.6 (ERM 2023a).</i></p>
	<p><i>n) the means by which the Holder will, throughout all phases of the Mine:</i></p> <ul style="list-style-type: none"> <i>i) record wildlife observations, wildlife mortalities observed, and significant interactions and/or conflicts between people and wildlife in the Mine Area;</i> <i>ii) tabulate and submit the information recorded in paragraph n) i) to ENV, FLNRORD and Aboriginal Groups on an annual basis; and</i> <i>iii) report on identified risks to wildlife and/or people learned from such monitoring and how such risks will be addressed; and</i> 	<p>Sections 2.3 and 3</p>
	<p><i>o) identify the project phase or phases applicable for each mitigation and/or management measure in the plan, including a rationale for why mitigation and/or management measures would not be applicable in a certain project phase or phases.</i></p>	<p><i>N/A – Addressed in WMMP Sections 3 and 4 (ERM 2023a).</i></p>
	<p><i>The Holder must provide the draft plan that was developed in consultation with EMPR, ENV, FLNRORD, ECCC, and Aboriginal Groups to EMPR, ENV, FLNRORD, ECCC, Aboriginal Groups, and the EAO for review a minimum of 60 days prior to the planned commencement of Construction or as listed in the Document Submission Plan required by Condition 10 of this Certificate.</i></p>	<p><i>N/A – Completed as a part of the WMMP (ERM 2023a).</i></p>
	<p><i>The plan, and any amendments thereto, must be implemented to the satisfaction of a Qualified Professional throughout Construction, Operations, Closure and Post-closure and to the satisfaction of the EAO.</i></p>	<p><i>N/A – Ongoing as a part of the WMMP (ERM 2023a).</i></p>

APPENDIX B 2023 PRE-CLEARING REPORTS

APPENDIX B-1: BLACKWATER BEAR, MARTEN AND BREEDING BIRD NEST SURVEYS 2023

APPENDIX B-2: BLACKWATER PROJECT, PRE-CLEARING WILDLIFE SURVEY,
ANNUAL REPORT 2023

APPENDIX B-3: 2023 PRE-CLEARING BIRD NEST SURVEY SUMMARY REPORT

APPENDIX B-4: 2023 AVIAN PRE-CLEARING SURVEY SUMMARY

APPENDIX B-5: BLACKWATER – WILDLIFE PRE-CLEARING TRIP REPORT,
NOVEMBER-DECEMBER 2023

Blackwater Bear, Marten and Breeding Bird Nest Surveys 2023

Conducted by Sean Sharpe Environmental Consulting Ltd.

Summary:

Pre-clearing surveys for furbearer dens, bear dens, bat hibernacula and breeding bird / stick nest surveys were carried out on March 8th through March 10th, 2023 by Avison Environmental and 5 subsequent surveys were conducted by Sean Sharpe Environmental Consulting crews March 13-17, March 27-31, April 10-14, April 24-28, and July 31-Aug 11, 2023. No furbearer dens, bear dens, hibernacula, stick nests, or cavity nests were detected, observed, or located during these surveys. This report includes pre-construction surveys completed by the Sean Sharpe Environmental Consulting crew and includes survey methods, results, and associated management recommendations for identified wildlife features located in the BWG construction areas.

Survey Standards and Methodologies

Scope of work:

- Review planned clearing areas, and previous surveys - Ensure the areas are within approved disturbance areas
- Complete pre-clearing surveys within areas of proposed logging for bear dens (and suitability), furbearer dens, raptor/bird nesting (stick nests and cavities) during their sensitive periods (Table 1)
- Submit daily survey locations and pertinent findings
 - Digital (.kml/.gpx) transects and observation/feature points for surveyed areas
 - Survey time, weather conditions, and other relevant information
- A weekly written memorandum including
 - Detailed activities and findings
 - Survey time, weather conditions, and other relevant information
 - Documented stripping, grubbing and stockpiling activities
 - Advice and guidance as required to BWG staff and construction subcontractors

Table 1. Sensitive Periods Applicable to the Blackwater Project Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bear Denning					15							
Furbearer Natal Denning												
Caribou												
Bat Hibernacula												
Water birds and Land birds				15				31				
Raptors-including Owls			15					15				
Clark's Nutcracker (or White-winged Crossbill and Canada Jay)			15				30					

Surveys were conducted following the Pre-Clearing Wildlife Features Survey SOP for Blackwater Gold. Survey time, weather conditions, tracks, waypoints, and observations were documented for all surveys. All sign was identified to species using available field guides and the experience of the field crew. Observations and photos of representative sign (tracks and scat) and features (cavities, nests, dens) were taken. A photo representing the habitat was taken.

Survey effort focused on areas that contain potentially suitable denning habitat for bears and furbearers, and nesting habitat for birds, such as mature coniferous and deciduous trees potentially containing cavities or snags with hollow cores. Non-forested areas (e.g., shrubby areas, previously cleared areas and open riparian areas) were not surveyed due to lack of trees that support denning sites.

Non-forested habitats that support nesting birds were surveyed after April 15 in areas where clearing activities are planned.

Bear Den Surveys

The Resources Inventory Committee's Inventory methods for bears outline survey methodology for enumeration of bears, but do not elaborate on methodology specific to detection of dens in linear features such as exploration trails or drill pads. Hodder and Ray (2005) provide information on ecotypes and general characteristics of bear den locations, but again do not elaborate on methodology specific to detection of dens. Our approach to detecting bear dens when conducting pre-clearing surveys immediately prior to clearing, is based on walking a proposed disturbance feature (i.e. exploration trail, drill pad, road allowance or, cut block), and walk a linear, or grid pattern survey and search and observe based on sight ability a 10-50 m observable area around the surveyor, watching for important den habitat features (i.e. evidence of natural or excavated ground dens, tracks, trails, scat, etc.).

Identified bear dens are monitored to determine activity. In March, activity is very difficult to determine as bears do not leave their den over the winter so there will be no sign (tracks,

disturbance). If activity is inconclusive, the site is monitored using remote cameras and a forward looking infrared camera – (FLIR) until activity is confirmed. Methods include:

- Traversing transects on snowshoes with 20 m spacing.
- Further investigation occurs when denning habitat is identified.
- A FLIR thermal imaging camera can be used to help determine activity if clearing cannot be delayed.
- Active black bear dens are provided a 100 m setback.
 - A clearly visible setback boundary consisting of yellow MFZ flagging
- Den site is not flagged to prevent additional disturbance.

Note:

Thermal cameras detect the heat lost by a subject as infrared. Since hibernating bears are expert at conserving heat using a thick layer of fat under their skin, heat levels released by bears may be minimal. Caution needs to be applied here. It is beneficial for crews to try the camera by detecting a crew member through a pile of snow and/or debris and determine best methods.

Furbearer Den Surveys

A pre-clearing survey for denning furbearers is completed when any vegetation is cleared, or construction activity is scheduled in, or adjacent to, furbearer denning habitat during the sensitive denning period (mid-March until the end of June) as outlined in the CEMP. Snow track surveys were used to complete these late winter pre-clearing surveys. Surveys followed the methods established by the Resource Inventory Committee (RIC) for ground-based survey methods for furbearers (BC MELP 1998, BC MELP 1999). Surveys were conducted prior to clearing and/or construction activities.

Furbearer denning surveys were repeated after 7 days in areas of high value habitat for the species surveyed if clearing activities had not commenced. Methods used include

- Traversing transects on snowshoes with 10-50 m spacing, depending on sightability between transects, tree density and suitable habitat (*i.e.*, large diameter dead or rotting trees with potential for cavities, and evidence of ground dens, trails, excavations, scat, etc.).
- Further investigation occurred when denning habitat or multiple track trails were identified.
- Active dens were reported daily and provided with a 30-60 m setback (species and location dependent).
 - A clearly visible setback boundary consisting of yellow MFZ flagging.
- Setbacks varied in size and shape based on:
 - disturbance activities adjacent to the den site post initial clearing (grubbing, grooming, construction etc.)
 - location within the polygon (setback island or edge).
- Den sites were not flagged to prevent predation.
- Areas with high value habitat were re-surveyed when clearing was postponed.

Furbearers occupy several den sites throughout the birthing period – known as maternal dens - and may move young from the natal den to these secondary maternal dens regularly during the kit development period.

The Resources Inventory Committee's Inventory methods for medium-sized terrestrial carnivores, and for Marten and Weasel outline survey methodology for enumeration, but do not elaborate on methodology specific to detection of dens in linear features such as exploration trails or drill pads. The BC Fisher Working Group does provide some excellent information on fisher habitat and den sites which can also be broadly applied to marten and weasel.

Hibernacula Surveys

In terms of hibernacula, once again, the Resources Inventory Committee's Inventory methods for Bats outline survey methodology for detection and enumeration of Bats, but do not elaborate on methodology specific to detection of hibernacula in linear features such as exploration trails or drill pads. However, the hibernacula section of the Wildlife Habitat Features Field Guide (Kootenay Boundary Region), does elaborate on what feature to look for, to detect hibernacula. This document was referenced for detection of hibernacula. Our approach to detecting hibernacula is based on walking a proposed disturbance feature (*i.e.* exploration trail, drill pad, road allowance or, cut block), and walk a linear or grid pattern survey and search and observe based on sight ability a 10-50 m observable area around the surveyor, searching in and around those features to locate potential hibernacula sites.

Bird Nest Surveys

There currently are no provincial or federal standards for conducting bird nest surveys. As such, it is the responsibility of the proponent of a proposed development project to produce and adhere to their own bird nest survey methodology to demonstrate due diligence in not contravening any related legislation.

Biologists followed all standards relevant to nesting surveys outlined in the Inventory Methods for Forest and Grassland Songbirds, Standards for Components for British Columbia's Biodiversity No. 15 (RIC 1999) and Inventory Methods for Raptors, Standards for Components for British Columbia's Biodiversity No. 11 (RIC 2001), as well as recommendations outlined by the Canadian Wildlife Service (CWS). Where deemed appropriate, survey methods are modified to account for local and/or site-specific conditions.

Pre-clearing bird nest surveys are completed prior to vegetation clearing during sensitive breeding periods for bird species occurring in the project area (Table 1). Sensitive breeding periods are designated for water birds and land birds, raptors, and Clark's nutcracker. Detection cues for breeding behaviour include carrying food or nesting material, nests observed, distraction displays, copulation and alarm calling. Surveys are completed by crews knowledgeable in bird identification and behaviour following the methods listed:

- Traversing transects on snowshoes with 20 m spacing.
- Searching trees in the area for signs of wildlife/owls, including pellets and cavities.
- Knocking on larger diameter trees or snags which may serve as roosts.
- Utilizing playback for the detected species to elicit a reaction from owls in the area.
- Addition methods may be employed in specific areas.
 - Areas of high owl nesting habitat
 - ARU(s) deployed to determine owl presence
- A second visit the following day may be used to confirm nesting as required.
- Stand watch may be utilized to confirm nesting when bird behaviour suggests active nesting and a nest is not located.
- Active nest sites are provided with a setback ranging from 30 m to 1 km, depending on species and nest location (setback island or edge).
 - A clearly visible setback boundary consisting of yellow MFZ flagging
- The nest site is not flagged to avoid further disturbance

The previous Migratory Birds Regulations protected the nests of all migratory birds, at all times, for as long as they existed, which meant that many nests were protected when they no longer benefited migratory birds. The new Migratory Birds Regulations, 2022, provide protection to migratory bird nests when they are considered to have a high conservation value for migratory birds.

The nests of most migratory bird species may be destroyed, damaged, disturbed or removed when they do not contain a migratory bird or viable egg.

For most migratory bird species, removing the nest when it does not contain a migratory bird or viable egg (generally after the breeding season) will have no effect on the ability of those birds to nest again. The great majority build or occupy new nests each year. However, some species may reuse the same nest structure year after year, and the loss of these nests could have a negative effect on future nesting success. The nests of the 18 species, listed in Schedule 1 of the MBR 2022, are protected year-round and cannot be damaged, destroyed, removed or disturbed, even when they are unoccupied, unless the conditions of the regulations have been met. One of the most noteworthy changes to the amended Regulations of the Migratory Birds Convention Act is the inclusion of the Pileated Woodpecker on the list of species for which nesting sites are protected after active nesting.

Environment and Climate Change Canada (ECCC) encourages practices that will ensure the long-term conservation of migratory bird populations locally, including the retention of sufficient high-quality habitat. For cavity nesting species, this may mean the retention of dying and dead standing trees in forest stands, whether or not they contain the nesting cavity of the Pileated Woodpecker.

Results and Observations:

March 8-10, 2023

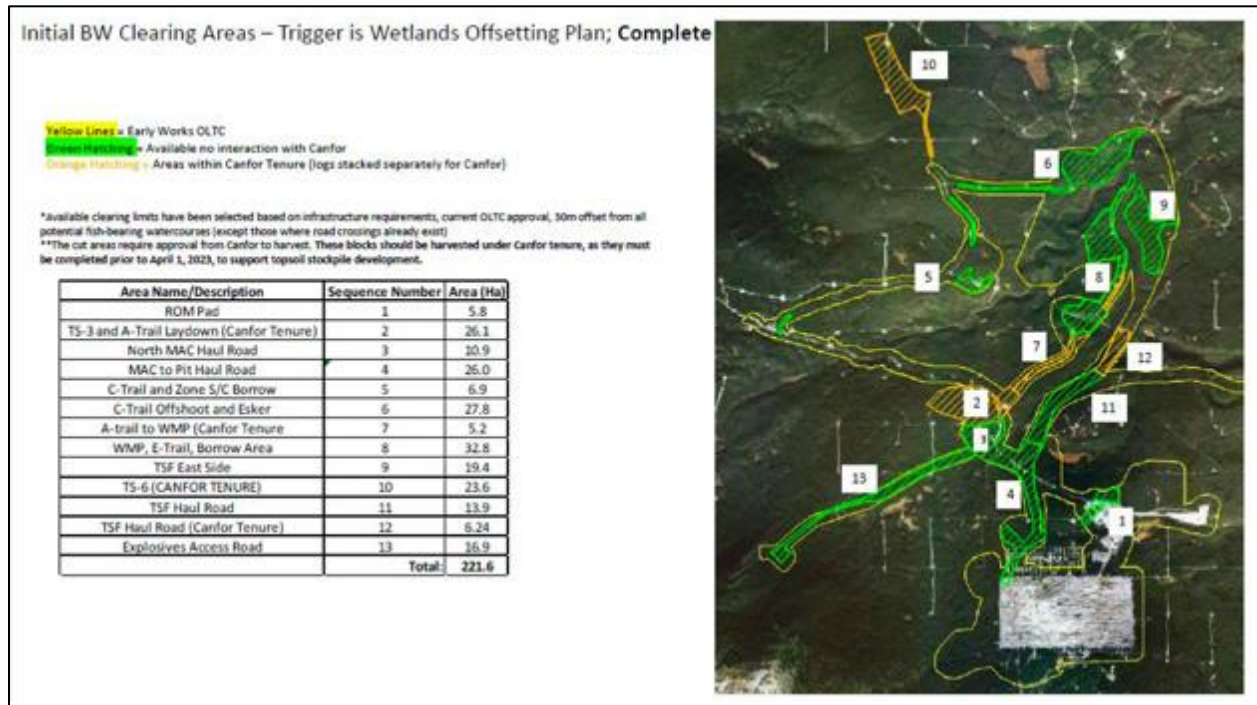


Figure 1. Map of Prioritized Clearing Plan March 8-10.

No furbearer dens, bear dens, hibernacula, stick nests, or cavity nests were detected, observed, or located during these surveys.

March 13-17, 2023

March 13 – Sequence 2

An active fur bearer den was identified in Sequence 2 and a 60 m buffer was applied - 2 strands of flagging tape at each mark - 1 blue and 1 green. GPS coordinates of the den site was recorded and submitted. The area surveyed is shown in Figure 1; the den site is shown in Photos 1 and 2.

Due to the location of the den and overlapping critical infrastructure, and to balance the wildlife and construction needs the buffer was adjusted. Both the den buffer and the laydown area were reduced along the overlapping area (Photo 3). The den setback was reduced to 25 m on the construction side and a tree fence will be constructed along this edge. The remaining setback remains connected to undisturbed forest.

No nesting behaviour or active nests was identified for Canada jay, white-winged crossbill, owls were found.



Photo 1. Active den site.



Photo 2. Active den site.

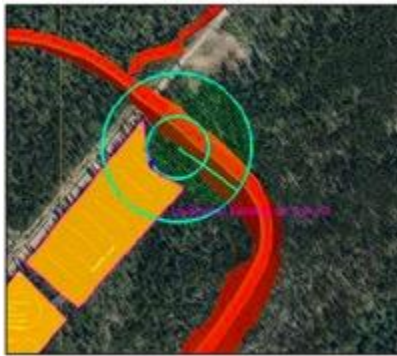


Photo 3. The den is located in the centre of the green circles. The outer green circle represents the 60 m setback required by the CEMP. The adjusted setback is represented by green hatching, based on professional judgement after the site visit. The green hatching connects the 25 m offset (inner circle) to the west and south.

The Atco trailers on the north side of the road near 0km are current being used by bushy-tailed wood rat and marten tracks were noted around the trailer parameters. There are open windows providing access. A one-way exit is an effective way to allow the animals to leave and block re-entry.

- Close all openings prior to installation.
- Check to ensure there are no nestlings prior to enclosure is required.

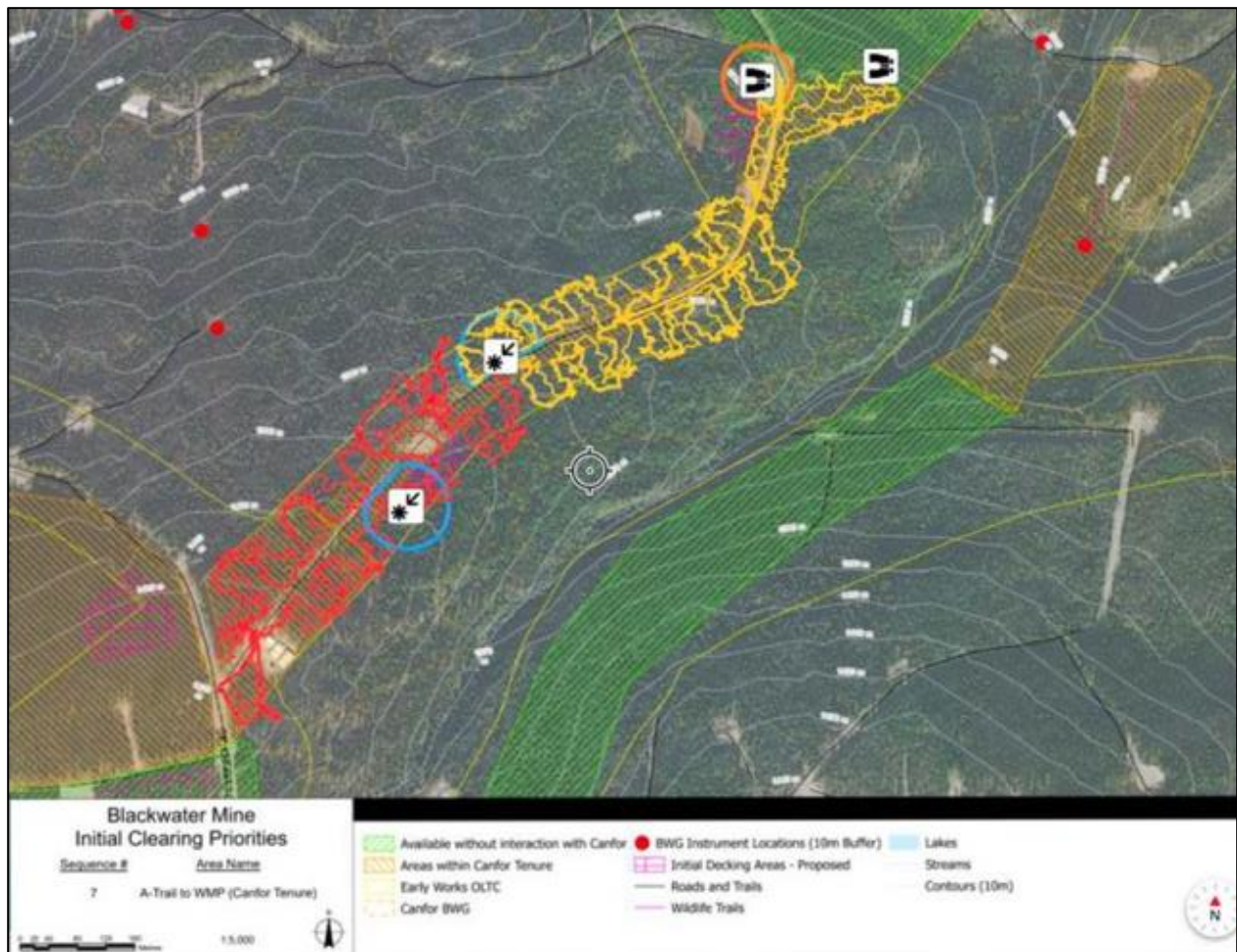


Figure 2. Sequence 2 and 7 surveys. Blue line is the den setback applied at the time of the survey; the red circle shows the potential black bear den site.

March 14 – Sequence 7

One active fur bearer den was identified in Sequence 7 and a 60 m buffer was applied - 2 strands of flagging tape at each mark. 1 blue and 1 green. GPS coordinates of the den site was recorded and submitted. The den site is shown in Photos 4 and 5.

The den is likely an alternate site for the den identified in Sequence 2. Due to the location of the den and overlapping critical infrastructure (haul road), this site will be monitored to provide additional information of activity. If the site is determined to be a natal den site it will be provided with a setback; if it is determined to be a resting site, it will not.

The den site was revisited on March 16. No new tracks were detected close to the den site; if no new tracks are identified on the next check, the den can be determined as non-natal.

A debris pile was identified as a potential black bear den site in Sequence 7 (Figure 1, red circle). The snow-covered pile is composed of CWD with spaces that may be attractive to a bear for overwintering. The site was reported and will be investigated further with a FLIR. Clearing has been held to 100 m of the site until activity can be confirmed.

No nesting behaviour or active nests were identified for Canada jay, white-winged crossbill, or owls.



Photo 4. Furbearer den site – entrance at stump Photo 5. Den site – alternate entrance at base



Photo 6. Den site.

Photo 7. Potential black bear den site.

March 15 – Sequence 8 and 12

Sequence 8 and the north portion of 12 was accessed from E-Trail.

Sequence 8:

This is a young pine stand with low wildlife habitat value. Wildlife sign identified during this survey includes tracks from lynx, fox, grouse and red squirrel. All sign was identified as travelling animals. No active dens or nests for Canada jay, white-winged crossbill, and owls were found.

Sequence 12:

No active dens for primary furbearers was identified in this old (age class 7/8) mixed forest with high CWD and downed trees. The snow was deep with no upper crusts in this high use old forest. Wildlife sign identified include tracks from lynx, and marten. Wildlife observations included red squirrel, spruce grouse, black-backed woodpecker, white-winged crossbill, and boreal chickadee. No nesting behaviour or active nests were identified for Canada jay, white-winged crossbill, owls were found.

A very high use was observed for marten, lynx and red squirrel. A “special habitat” area was identified. This area showed a very high use by multiple species and contains numerous middens and other feeding areas, and small mammal denning.

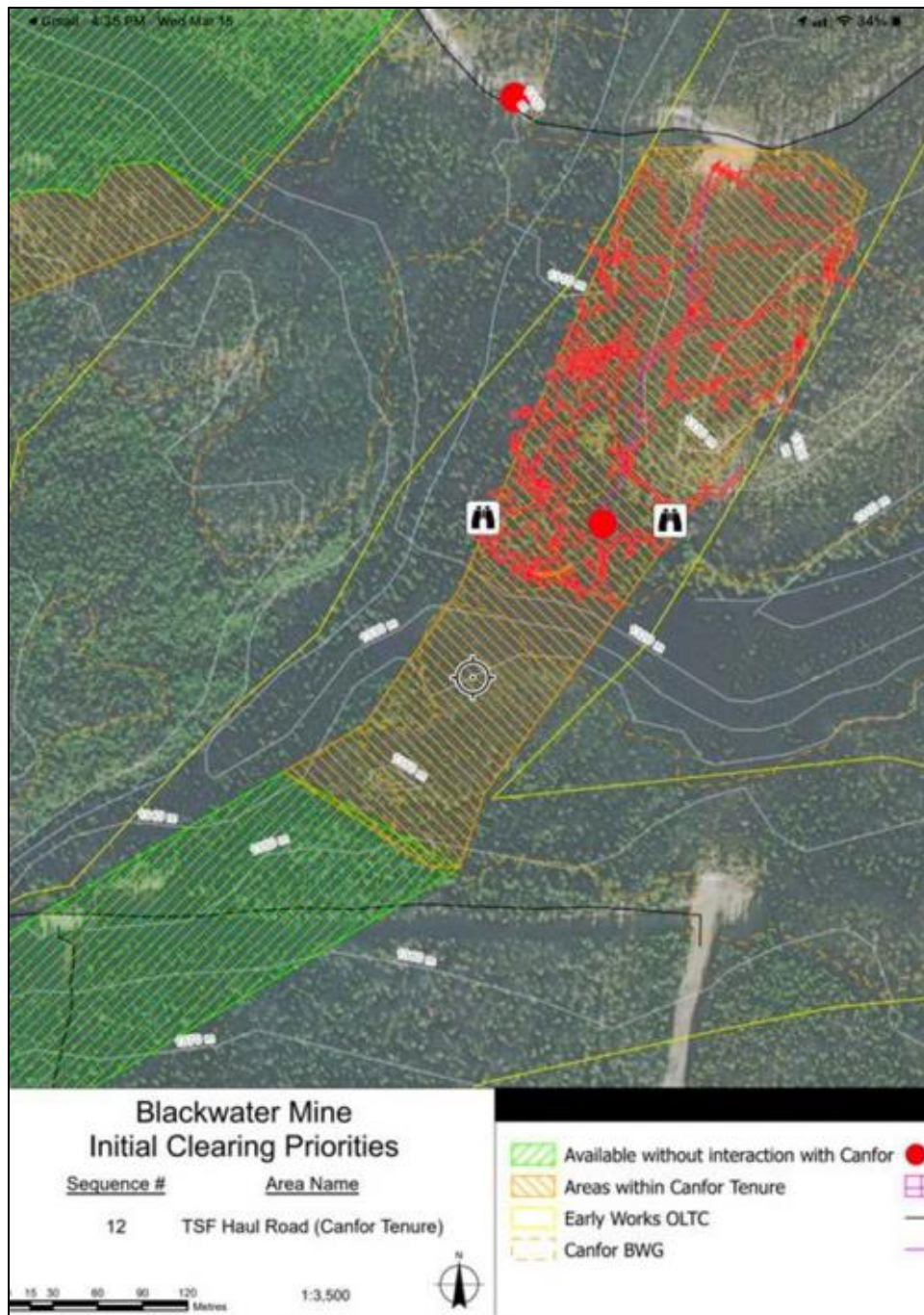


Figure 3. Sequence 12 North area.

March 16 – Sequence 12

The survey for the southern portion of Sequence 12 was completed the following day and accessed from the southern access road. Surveys were completed with assistance from Sam Lynch (BWG Environment). The area surveyed ended at the top of the steep slope that occurs in the middle section of this block and is delineated with standard block boundary flagging. A higher density of trees occurs in the south section with a higher wildlife use (Photo 8).

A den for a primary furbearer was identified, although it is not known if the site is a natal or resting den. Marten track trails were observed leading into areas under the snow in CWD piles (Photo 9). The area surrounding the den is high use for marten, lynx, hare and squirrel.

A potential bear den was identified in their high value area. The potential den is northeast facing with good snow cover over a large fallen tree and an entrance under the tree (Photos 10 and 11). The area north of the potential bear den has a steep drop about 25 m past the den. Both den sites were not flagged at the time of the survey. A 100 m setback buffer for the bear will encompass the majority of the southern section of the block. The marten and potential black bear den setbacks overlap and extend the potential setback area (Figure 4). No nesting behaviour or active nests were identified for Canada jay, white-winged crossbill, owls were found.



Photo 8. Sequence 12 South Habitat .



Photo 9. Marten Den site.



Photo 10. Potential Black Bear Den.



Photo 11. Potential Black Bear Den.

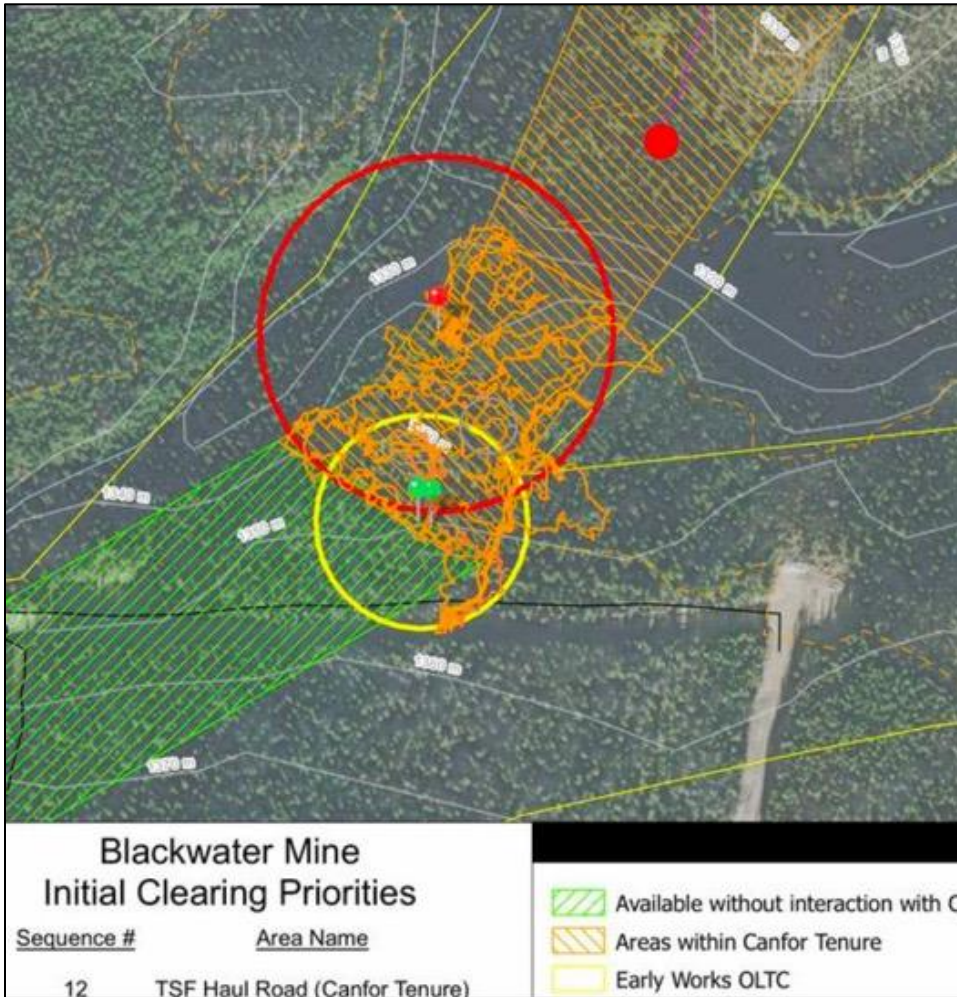


Figure 4. Sequence 12 south survey area. Potential bear den location is identified with the red pin and furbearer den with the green pin. Potential setbacks are red and green (respectively).

March 17 – Sequence 12 and 10

Sequence 12:

After discussion with Jack Love, Environmental Manager BWG, the identified “special habitat” was flagged with MFZ flagging tape. The setback (Figure 5) was strategically placed to allow for beneficial preservation of the area as well as to allow for harvesting desired trees.

Representative habitat is shown below (Photos 12-15).

Sequence 10:

Access is from C-Trail around 12 km. This moderately aged spruce forest is not high value wildlife habitat for bears or primary furbearers. The understory is somewhat simple and does not support prey for primary furbearers. No active dens were found for primary furbearers. Fresh tracks from marten, lynx, snowshoe hare and red squirrel were identified throughout the surveyed portion; however, use was moderately low. A white-winged crossbill was seen carrying nest materials.

This Sequence was incomplete – the surveyed area is shown in Figure 6.



Photo 12. Sequence 10 habitat.



Photo 13. Sequence 10 habitat.



Photo 14. Sequence 10 habitat.



Photo 15. Sequence 10 habitat.



Figure 5. Sequence 12 habitat set back.



Figure 6. Sequence 10 survey areas.

Follow-up

- Sequence 2: Monitor den site with strategically placed remote cameras to determine effectiveness of the adjusted setback buffer methods.
- Sequence 7: Monitor site to determine type of marten den with remote cameras. Apply set back to natal den. The den site was revisited on March 16 with no new tracks detected. If no new tracks are identified on a secondary check, the den can be determined as non-natal.
- Sequence 7: Monitor potential bear den site to determine activity with a FLIR. Apply set back to active den.
- Sequence 12 south: Monitor site to determine type of marten den with remote cameras. Apply set back to natal den.

- Sequence 12 south: Monitor potential bear den site to determine activity with a FLIR. Apply set back to active den.
- Sequence 10 survey is incomplete.

Notes:

Nesting behaviour was observed for Canada jay and white-winged crossbill. This is expected as they are known to begin nesting in late winter at these elevations (Ehrlich et al 1988, Sibley and Audobon field guides).

Wildlife Observations

A fox was seen on the Sequence 12 north access road (Photo 20). He was not shy and came right to the truck. A wildlife sighting card was submitted. Numerous birds were identified, including a male white-winged crossbill that was collecting nesting material. Mammals observed include fresh grey wolf tracks (Table 1).

Table 1. Wild Observation Summary

13-Mar-23	14-Mar-23	15-Mar-23	16-Mar-23	17-Mar-23
Pine Grosbeak	Common Raven	Canada Jay	Canada Jay	Boreal Chickadee
White-winged crossbill	Canada Jay	Boreal Chickadee	Boreal Chickadee	American Three-toed Woodpecker - Males drumming in the surveyed area and outside the block.
Common Raven	White-winged crossbill - A male and female were together gathering grit from area with exposed dirt.	White-winged crossbill	White-winged crossbill	White-winged crossbill Male with nesting material in the surveyed area of the block, and birds calling and singing.
Boreal Chickadee	Boreal Chickadee	Pine Grosbeak	Pine Grosbeak	Red-breasted Nuthatch
Red-breasted Nuthatch		Black-backed Woodpecker	American Three-toed Woodpecker	Red Fox
		Spruce Grouse	Red-breasted Nuthatch	
Canada Jay		Grey Wolf (tracks)	Pine Siskin	
13-Mar-23	14-Mar-23	15-Mar-23	16-Mar-23	17-Mar-23
American Marten (tracks)	American Marten (tracks)	American Marten (tracks)	American Marten (tracks)	American Marten (tracks)
Canada Lynx (tracks)	Canada Lynx (tracks)	Canada Lynx (tracks)	Canada Lynx (tracks)	Canada Lynx (tracks)
Snowshoe Hare (tracks)	Snowshoe Hare (tracks)	Snowshoe Hare (tracks)	Snowshoe Hare (tracks)	Snowshoe Hare (tracks)

Weather Summary

The weather was mostly calm with no new snow during the week (Table 2).

Table 2. Weather Summary March 13 to 17.

Date	Temperature	Cloud Cover	Wind	Snow	Comments
13-Mar-23	-6 deg C	Overcast until noon then sun and cloud	Beaufort 4 to 5	light snow pellet shower at 15:00	
14-Mar-23	-7 deg C	Overcast until 9:00 then sun and cloud	Beaufort 4 to 5	N/A	Snow pellets from March 13 present in wildlife tracks
15-Mar-23	-8 deg C	High cloud until 10:00 then sun and cloud	Beaufort 4 to 5	N/A	
16-Mar-23	-6 deg C	Sun	Beaufort 1 to 2	N/A	
17-Mar-23	-7 deg C	Sun	Beaufort 1	N/A	

March 27-31, 2023

Surveys were conducted by qualified professionals knowledgeable and experienced in identification of birds, important wildlife features and habitat in the project area.

Sequence 5:

- Sequence 5 wildlife pre-clearing survey complete.
- 1 wildlife setback established and marked with MFZ flagging tape.

This is an age class 4 and 5 Pl (Sx) stand with a Sx/Bl understory and dead pine. Wildlife sign identified during this survey includes tracks from snowshoe hare, red squirrel and grouse. High use and animals were seen in an area in the southern portion. This area is bounded by clear-cuts. No active nests (Canada jay, white-winged crossbill, owls) were found in this area. An existing MFZ for an instrument location was extended 15 m to include a natal den for red squirrel in this area (Figure 1).



Figure 1. Sequence 5 Wildlife pre-clearing survey results.

Sequence 5 North:

- Sequence 5-North wildlife pre-clearing survey complete.
- 1 wildlife setback on boundary edge – Sequence boundary trees marked with MFZ flagging tape.

This dense, age class 4 Sx (Pl) forest has a productive understory. Wildlife sign identified include tracks from snowshoe hare and red squirrel. No active nests (Canada jay, white-winged crossbill, owls) were found in this area.

An area north end was identified as a natal den for red squirrel. The area is located on the border and includes trees marked as the cutting boundary. MFZ flagging tape was added to 4 boundary marked trees to ensure these are not cut (Figure 2).

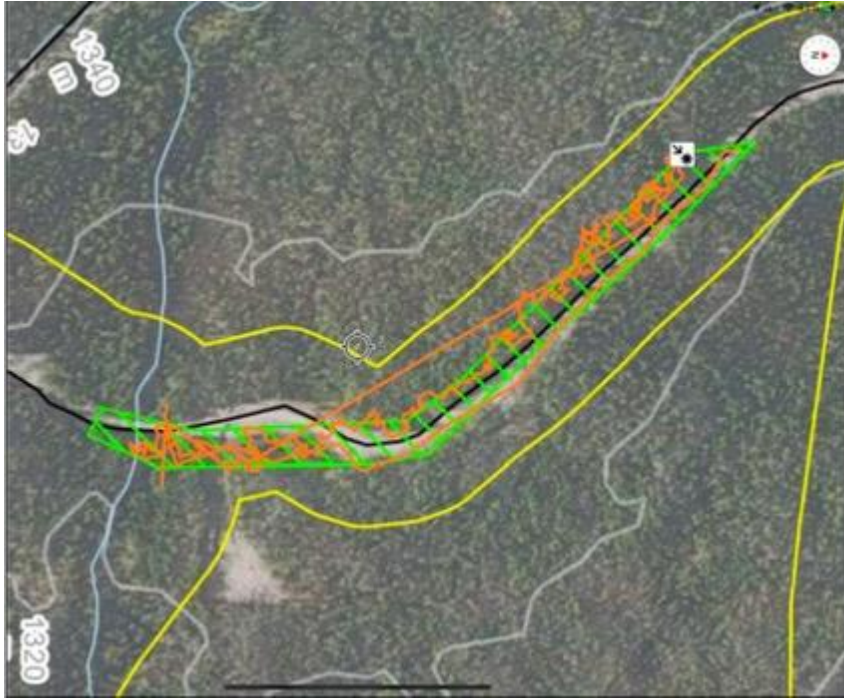


Figure 2. Sequence 5 North Wildlife Pre-clearing Survey Results.

Sequence 10 Additional Decking Area:

- Sequence 10 wildlife pre-clearing survey complete.
- No wildlife setbacks established.

This is an age class 5 Pl/Bl forest with a Sx/Bl understory with little habitat value. Very little wildlife use was identified in this area. Tracks were identified for wolf and grouse. The area surveyed is shown in Figure 3.

Seq 10 Logging and Clearing



Figure 3. Sequence 10 Wildlife Pre-clearing Survey Results

Sequence 8 - North of Buttonhook Road (including corridor between N and S lobes):

- *Sequence 8 wildlife pre-clearing survey complete.*
- *1 wildlife setback (established and marked with MFZ flagging tape by BWG).*

The area surveyed is a mixed age forest on a sloping landscape. This age class 5/6 pine leading with spruce forest has an understory of spruce and fir with low habitat value. Wildlife sign identified during this survey includes travel tracks from snowshoe hare, red squirrel and American marten. No active nests (Canada jay, white-winged crossbill, owls) were found in this area.

A large area was identified as very high use by red squirrel. This area was the highest use observed over the pre-clearing surveys to date. The location was provided to BWG with a recommended setback that includes a corridor to the edge to prevent and island feature setback. Area surveyed and setback location is shown in Figure 4.

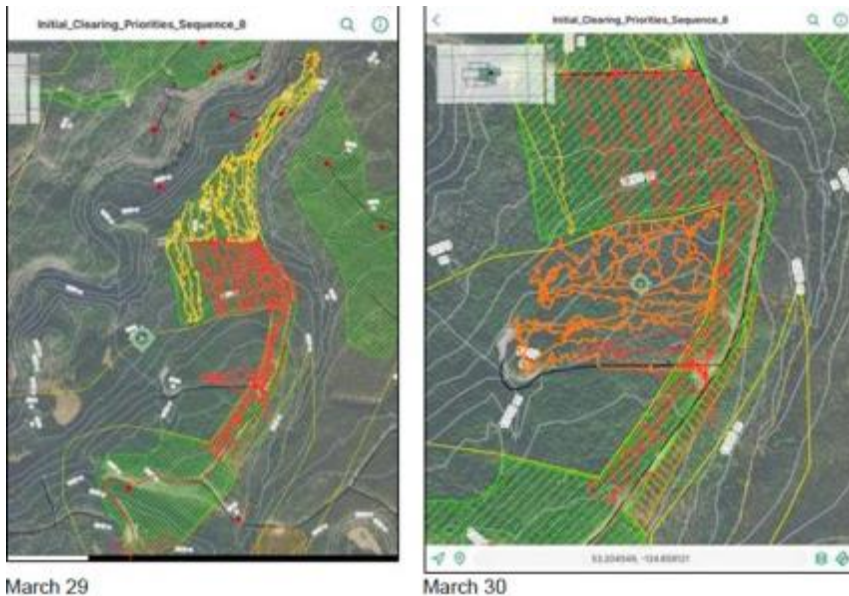


Figure 4. Sequence 8 Wildlife Pre-clearing Survey Results

Sequence 3

- *Sequence 3 wildlife pre-clearing survey complete.*
- *2 wildlife setbacks established and marked with MFZ flagging tape.*
- *Re-survey April 7 if not cleared of vegetation.*

This is a productive age class 6 Sx/Pl forest. The conifer trees have an abundant cone crop, attracting an abundance of white-winged crossbills and squirrels. Very high use by snowshoe hare was also noted. Travel tracks were identified for American marten and wolf.

This site was surveyed for wildlife on March 30 and 31. On March 30, two white-winged crossbill fledglings were identified with a female and a pair was observed in a tree and thought to be on a nest. The pair flew off due to our presence and returned shortly after.

On March 31, the site was revisited to confirm activity. A male was observed alarm calling in the same location as on March 30. Activity was detected, again in the same location. With the behaviour shown by the male in the same location over 2 consecutive days, and the visuals of birds observed in the same tree, it has been determined to be an active nest.

A setback buffer of 50m was established and flagged with MFZ flagging tape. The maximum time the birds will need to finish their nesting is 5 weeks. Disturbance within the setback should be limited to essential pass through on foot only.

A setback buffer was provided for a natal den (snowshoe hare). This is located on the western boundary of Sequence 3 and is marked with yellow MFZ flagging tape. Survey area and setbacks are shown in Figure 5.



Figure 5. Sequence 3 Wildlife Pre-clearing Survey Results

Follow-up

- Follow up on Sequence survey completion and results reporting. Clearing of an area prior to wildlife pre-clearing surveys has highlighted the need to track pre-clearing survey results in a real-time table that is updated daily. This will provide information including:
 - Areas (Sequences) surveyed for wildlife (pre-clear surveys) and completion date
 - Active setbacks and dates of estimated release/actual release
 - Re-survey date if not cleared by (for birds and high value furbearer denning habitats)
- Monitor active dens and nests in setbacks to determine current activity
 - Sites are monitored from a distance to prevent disturbance
 - Stand watches are used for nest monitoring
 - Snow tracking and/or cameras (remote and FLIR) are used for den monitoring

Follow-up from March 13-17 Surveys

- Sequence 2: Monitor den site with strategically placed remote cameras to determine effectiveness of the adjusted setback buffer methods.
- Sequence 7: Monitor site to determine type of marten den with remote cameras. Apply set back to natal den. The den site was revisited on March 16 with no new tracks detected. If no new tracks are identified on a secondary check, the den can be determined as non-natal.
- Sequence 7: Monitor potential bear den site to determine activity with a FLIR. Apply setback to active den.
- Sequence 12 south: Monitor site to determine type of marten den with remote cameras. Apply set back to natal den.
- Sequence 12 south: Monitor potential bear den site to determine activity with a FLIR. Apply set back to active den.
- Sequence 10 survey is incomplete.

Sequence 2 and 7

The active fur bearer den was provided with an adjusted setback on March 13. The site was revisited on March 27 and no new tracks were identified. A remote camera was set up to monitor the site. The site was revisited after 4 days to check for activity (camera detections and new tracks). No use was identified and the site was released.

The potential den site located in Sequence 7, 200 m from the Sequence 2 site, was also determined to be inactive and released.

The potential bear den in Sequence 7 was revisited on March 31 and determined to be inactive and released.

The Atco trailers on the north side of the road near A-Trail 0 km remain open to wildlife. If the trailers will be moved, a one-way exit is an effective way to allow the animals to leave and block re-entry prior to removal.

- Close all openings prior to installation
- Check to ensure there are no nestlings within the trailers prior to enclosure installation
- Check under the trailers for nestlings prior to moving them

Sequence 12 South

A den for a primary furbearer and a potential bear den were identified on March 16 in the southern portion of Sequence 12. Both den sites were reported with options for setbacks and monitoring. A setback was employed for the potential bear den (by BWG).

Sequence 10

The area was cleared after March 17.

Notes:

Nesting was observed for white-winged crossbill. This is expected as they are known to begin nesting in late winter at these elevations when cone crops are especially productive (Ehrlich et al 1988, Sibley and Audobon field guides). It is expected that there will be a high number of nesting birds in the areas containing productive spruce cone crops.

Bears are expected to emerge anytime so care and awareness of the dangers associated with bear encounters is highlighted.

Western toad is also expected to emerge from hibernation in the coming weeks and migrate to breeding areas. This species is known to use many forms of open water for breeding and egg laying including ditches, depressions and holes created during construction.

Breeding in construction areas can be prevented by limiting breeding features within these areas. Exclusion fencing is an effective management strategy to keep toads away and minimize the need for salvage and relocation.

Wildlife Observations

Numerous birds were identified, including white-winged crossbill fledglings and nesting adults. Sign observations include tracks from lynx, wolf, marten, black bear, hare, fox, squirrel, and river otter. Only red squirrel was seen (Table 1).

Table 1. Wildlife Observation Summary

March 27	March 28	March 29	March 30	March 31
Dark-eyed Junco	Dark-eyed Junco	Dark-eyed Junco	Dark-eyed Junco	Dark-eyed Junco
Common Raven	Common Raven	Common Raven	Boreal Chickadee	Canada Jay
Red-breasted Nuthatch	Red-breasted Nuthatch	Red-breasted Nuthatch	Red-breasted Nuthatch	White-winged Crossbill (WWCB). Male displaying territorial behaviour (alarm calling) in same location in Sequence 3 where two birds exited
American Three-toed Woodpecker (ATTW)	ATTW	ATTW Male drumming and feeding in sequence 8	ATTW drumming outside of survey area	
Canada Jay	Canada Jay	Canada Jay	Canada Jay	

March 27	March 28	March 29	March 30	March 31
White-winged Crossbill	White-winged Crossbill	White-winged Crossbill	Sequence 3 Female WWCB feeding with 2 juvenile birds. Two areas with suspect active WWCB nests	spruce tree. Additional WWCB flyovers
Unspecified grouse tracks. Suspect Spruce Grouse	Unspecified grouse tracks. Suspect Spruce Grouse	Unspecified grouse tracks. Suspect Spruce Grouse	Unspecified grouse tracks. Suspect Spruce Grouse	Unspecified grouse tracks. Suspect Spruce Grouse
Pine Grosbeak	Black Bear (trk)	Red Fox (trks)	Pine Grosbeak	Red Fox (trks)
Grey Wolf (trks)	Canada Lynx (trks)	Grey Wolf (trks)	American Marten (trks)	Grey Wolf (trks)
American Marten (trks)	American Marten (trks)	American Marten (trks)	Red Squirrel	American Marten (trks)
Snowshoe Hare (trks)	Snowshoe Hare (trks)	Snowshoe Hare (trks)		Snowshoe Hare (trks)
Red Squirrel	River Otter (trks)	Red Squirrel	Snowshoe Hare (trks)	Red Squirrel
	Red Squirrel			

Weather Summary

The weather was mostly calm and sunny. About 5 cm of snow fell on March 24th and several centimeters fell overnight Thursday March 30/31 (Table 2).

Table 2. Weather Summary March 27 to 31, 2023

Date	Temp (0C)	Cloud Cover	Wind	Snow
March 27	-11 to -3	Low cloud until 10 am then full sun	Beaufort 2 in the afternoon	Snow on March 25. Soft layer of snow still present.
March 28	-11 to -3	Clear and sunny	Beaufort 2 in the afternoon	North aspect has soft snow. 4 days since last snowfall.
March 29	-7 to +1	Clear and sunny	Beaufort 2 in the afternoon	North aspect has soft snow. 5 days since last snowfall
March 30	-7 to +1	Clear and sunny	Beaufort 2 to 3 in the afternoon	North aspect has soft snow. 6 days since last snowfall
March 31	-2	Cloudy	N/A	2 cm of fresh snow overnight and snowing until 10 am.

April 10-14, 2023

Surveys were conducted by qualified professionals knowledgeable and experienced in identification of birds, important wildlife features and habitat in the project area. The snow has transformed into soft, deep, corn snow. Older wildlife tracks were difficult to detect during the surveys, but any new sign was evident with deep track imprints.

7-day window

Date of Survey Completed	Date For Re-survey
April 24, 2023	May 2, 2023
April 25, 2023	May 3, 2023
April 26, 2023	May 4, 2023
April 27, 2023	May 5, 2023
April 28, 2023	May 6, 2023

BP4 and Diversion

- BP4 and Diversion wildlife pre-clearing surveys are complete.
- Re-survey the areas after May 2 and 3 if trees are not removed by then.
- Survey the logged area north of the road next to PB4 for ground nesting birds prior to logging of PB4.

BP4 was surveyed over two days (April 24 - yellow tracks) (April 25 - orange tracks) as shown in Figure 2.

The stand is an age class 4 lodgepole pine leading stand. There were some Sx and Bl present but in low numbers, and there was an understory of all three species. There are numerous dead Pl (standing and windthrown) due to mountain pine beetle. The north-east area of the polygon is steep and the blowdown is exposed due to melted snow. The area along Davidson creek is very steep with exposed blowdown on the east aspect. There is an area of age class 5/6 Sx and Bl trees along Davidson creek and in the green hatched area surveyed (orange track).

Overall, the polygon is low value for wildlife, and tracks detected over the two days included marten, snowshoe hare, red squirrel and one pile of moose droppings. Several grouse resting areas were found, and two male spruce grouse were flushed during the surveys.

Dark-eyed Juncos were heard counter-singing in the stand. The area north of the road has been logged and the trees have been moved to a laydown. The ground at this location is snow free, with some logging debris

still present. This is a preferred habitat for this species and a bird survey should be performed in areas within 30 m of BP4 to determine if any active nests are present.

Diversion area is located along A trail (surveyed April 25 - tracks in orange), and is also shown in Figure 1. The majority of the laydown area (red area on map) has already been logged this past winter. The area surveyed is a Pl leading age class 4/5 stand. The polygon is a mixture of widely spaced Pl with dead standing and windthrown Pl. There are areas of Sx and Bl with a good understory of these species. Wildlife tracks/sign include spruce grouse, red squirrel, snowshoe hare. Remains of a killed CAJA were seen. This was likely killed by a raptor and plucked at the scene. Overall, the stand has a low wildlife rating. Re-survey after May 1 and 2 if trees are not removed before then.



Figure 2. BP4 and Diversion

3B – WMP East Logging and Clearing Map

- WMP East logging and clearing area wildlife pre-clearing surveys are completed.
- Re-survey after May 2-5 if trees are not removed by then.
- Contact Randy Moody (Whitebark pine specialist) to determine the management plan for the juvenile Whitebark pines located in the northern section of the orange hatched area.
- Remove only the trees within the Canfor orange ribboned area (minus the Whitebark pine trees) on the upper bench to avoid tree removals in the 30 m riparian zone.

The green hatched polygon was surveyed on April 25 (orange tracks) as shown in Figure 3. Approximately two-thirds of the polygon has been previously logged at an undetermined date. The treed area was a Pl leading age class 4/5 stand. The area has a low wildlife value and no wildlife sign was detected during the survey. The red delineated lay down area is located in the previously logged area with minimal standing trees. Both areas are cleared for tree removal but the treed area will require a re-survey after May 2 if trees are not removed by then.

EW Sequence 8 (areas for mulching)

This area is within the grey boundary on the map and it was surveyed April 25 (orange tracks) and April 26 (red tracks) as shown in Figure 3. The laydown area in red, adjacent to the E Trail was previously logged this winter. No ground nesting birds were detected in the debris left on the ground.

The remaining treed areas left standing north of the A trail (orange track lines) and south of the A road (red track lines) are age class 4 Lodgepole pine. The areas have a low wildlife value, and only a few spruce grouse resting areas were detected during the surveys. There is also a small island of trees in the northern section (red tracks) of the grey area. No wildlife sign was detected in this area.

The orange hatched area south of A trail was surveyed on April 26 (red tracks) as shown in Figure 3.

The area is a productive Age class 6/7 Pl/Sx/Bl stand with a good understory Sx and Bl. There is a steep slope midway in the polygon that transitions to an upper bench of a more open Pl stand. Overall the polygon is rated high value for wildlife. The flatter area also borders the creek that also has good wildlife habitat. Wildlife signs during the survey included red squirrel and spruce grouse.

The blue hatched area was surveyed April 26 (red track lines) as shown in Figure 3. It is an age class 3 high density Pl stand with low wildlife value, and SPGR was the only wildlife sign present. Areas surveyed April 25 and 26 will require a re-survey after May 2 or 3 if trees are not removed by then. The orange area north of the A trail was surveyed April 27 (white tracks). The area is primarily a dead lodgepole pine stand with dead standing and windthrown Pl trees. The majority of the understory trees are juvenile lodgepole trees. The wildlife value for this area is low.

A clump of six juvenile Whitebark pine trees (Listed Endangered Federally, and blue listed Provincially) were located in the polygon (caution icon on map) as shown in Figure 3 and 4. These trees have germinated from a seed cache left by a Clark's Nutcracker and are healthy with no white pine blister rust evident on them. The trees have a 7 m MFZ buffer (red circle on map) as shown in Figure 2. The Whitebark pine specialist will be contacted by BWG to determine the management plan for these trees.

The block boundary adjacent to the creek is a steep slope and there was productive age class 6/7 Sx and Bl trees. The block boundary (blue paint and orange flagging) is approximately 12 meters (red pin on map in Figure 3) from the flowing edge of the creek. Moving the boundary to the upper bench is recommended to comply with the 30 m buffer for the riparian zone.

Note: There is another marked block boundary (orange Canfor flagging) on the upper bench of the area surveyed. Using this boundary would be the best option for this area. The area will require a re-survey after May 4 if the trees are not removed by then.

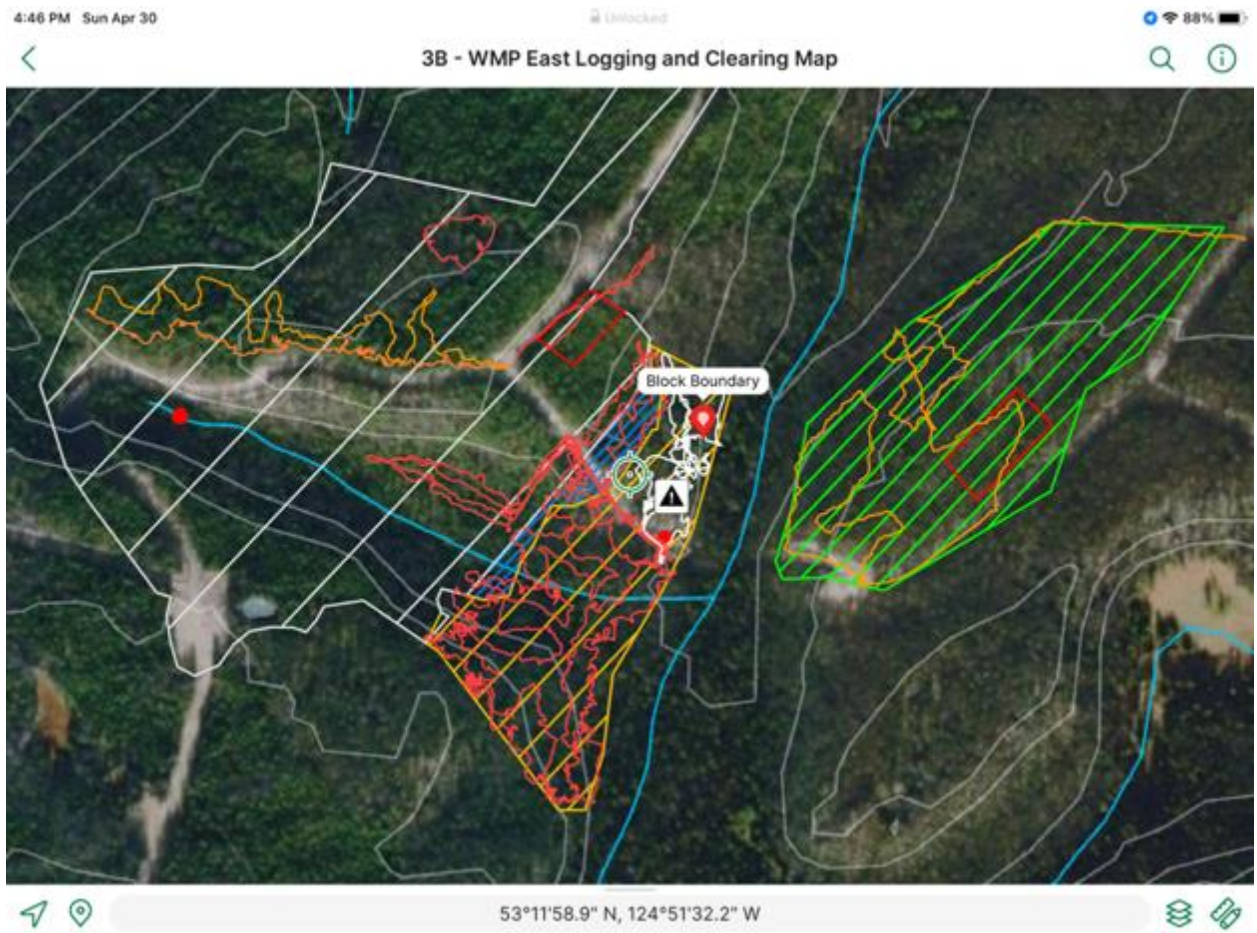


Figure 3. 3B – WMP East Logging and clearing map.



Figure 4. Whitebark pine trees.

1M TS-4B Mulching

- 1M TS-4B Mulching area wildlife pre-clearing surveys are completed.
- The previously logged area (minus two small sections of islands of mature trees) do not require a wildlife pre-clearing survey.
- Re-survey after May 2-5 if trees are not removed by then.
- Wetland areas will require MFZ delineation, flagging and an amphibian survey when the area is snow-free.
- A squirrel midden on the eastern polygon border has a 10 m MFZ buffer.

The areas bordering the road were surveyed on April 26, 2023 (orange tracks) as shown in Figure 5. The majority of the area is an age class 4/5 lodgepole pine leading stand. The wildlife value is low and only spruce grouse sign was detected. The green hatched boundary was not flagged but the blue hatched area had been flagged. A re-survey is required after May 3 if trees are not removed by then.

The 27 ha area includes a large previously logged area. Only two small islands of mature trees required a survey in this area (April 27, white tracks) as shown in Figure 5. Both islands of trees are low value for wildlife and no wildlife sign was detected. The remaining logged area has minimal trees present.

The large treed area in the upper half of the polygon was surveyed on April 27 (white tracks) as shown in Figure 5. The northern half of the polygon (bordered by the road) is an age class 3-5 lodgepole pine stand. The wildlife value for this area is low. Squirrel and SPGR tracks/sign were present in this area. The lower half of the polygon and the trees along the polygon border were a mixture of Pl/Sx/Bl with a good understory of all three species. The wildlife value for this area is moderate, with fox, red squirrel and SPGR sign. An extensive red squirrel midden (Figure 6) along the southern border received a 10 meter MFZ buffer. Other wildlife sign include moose tracks and an overnight moose bedding area along the road that runs north-south in the polygon.

In the south-western corner of the polygon there is a wetland and a swampy area with black spruce. The area is delineated by an orange polygon and a caution icon over the wetland on Figure 5. This area will require MFZ delineation, flagging and an amphibian survey when it is snow free. Warmer temperatures that started during the survey period significantly increased bird activity.

Dark-eyed Juncos were active in the southern boundary of the polygon where the edges are snow free. A pair of Spruce grouse were flushed but no nesting location was detected in the area. A re-survey is required after May 4 if trees are not removed by then.

Note: The lines in white and orange were the only areas with completed surveys for this polygon. A survey crew laying out the block boundary started work **after** the pre-clearing wildlife surveys took place. If any areas outside of the blue polygon are included in the block boundary, these will have to be surveyed at a later date.



Figure 5. TS-4B Mulching Area



Figure 6. Squirrel Midden

1A TS2 and Access Road

- 1A TS2 Access Road wildlife pre-clearing surveys are completed.
- A Red-breasted Nuthatch excavation hole will require a stand watch before the tree removals to determine if the nest is active.
- Re-survey after May 5 if trees are not removed by then.
- The spruce bog in the buffer along the road will require MFZ delineation, flagging and an amphibian survey in the open water when the entire bog area is snow free.
- Creek MFZ boundary needs to be determined and flagged on the southern side of the creek crossing.
- The area surveyed was surveyed on April 28 (white tracks) as shown in Figure 6. The majority of the area is a productive age class 7/8 spruce and balsam stand. There are many dead standing decayed trees that are good wildlife trees, especially for cavity nesting birds. The wildlife value of this area is high. The wildlife tracks/sign in the area include Spruce grouse, snowshoe hare, marten and red squirrel.

A Red-breasted Nuthatch was detected excavating a hole in a tree by the road edge (red icon) as shown in Figure 6. The dead balsam tree (~25 cm dbh) is flagged with blue and green flagging. It is a nest of interest, and a stand watch is recommended prior to tree removals to determine if the nest is active.

Dark-eyed Juncos were singing and setting up territory close to the boundary with logged Sequence 4. This area was almost snow free and logging debris is present. A bird survey is required prior to debris removal/grubbing to determine that no ground nesting birds have active nests in debris on site.

Note: There were some water courses identified in the larger area surveyed (red icons) as shown in Figure 6. These areas are still snow covered, but running water was heard. It is recommended to re-survey when snow free to determine the location of these water courses and if they require MFZ buffering.

The two creeks with bridges on the M road required 30 m MFZ buffering (orange lines) as shown in Figure 7. The MFZ buffers on the north sides of both creeks were completed. For the most eastern creek, the south east buffer has not been flagged. The location of the creek was undetermined and the creek may be present inside the large polygon and is indicated by the Caution Icon in Figure 6. This area will require further surveying to determine the creek location and MFZ flagging.

Regarding the western creek, the south west buffer was not completed. Running water areas were found in the buffer area (Red icons in Figure 6) and further investigation is required to determine the accurate location of the creek. The road edge could be used as the MFZ buffer, and this will require flagging.

There is a spruce bog with an area that is snow free with standing water (Red icon in Figure 6). No amphibians were detected in the open water but the entire area was not visible due to the snow. This area will require MFZ delineation, flagging and an amphibian survey when the area is snow free.

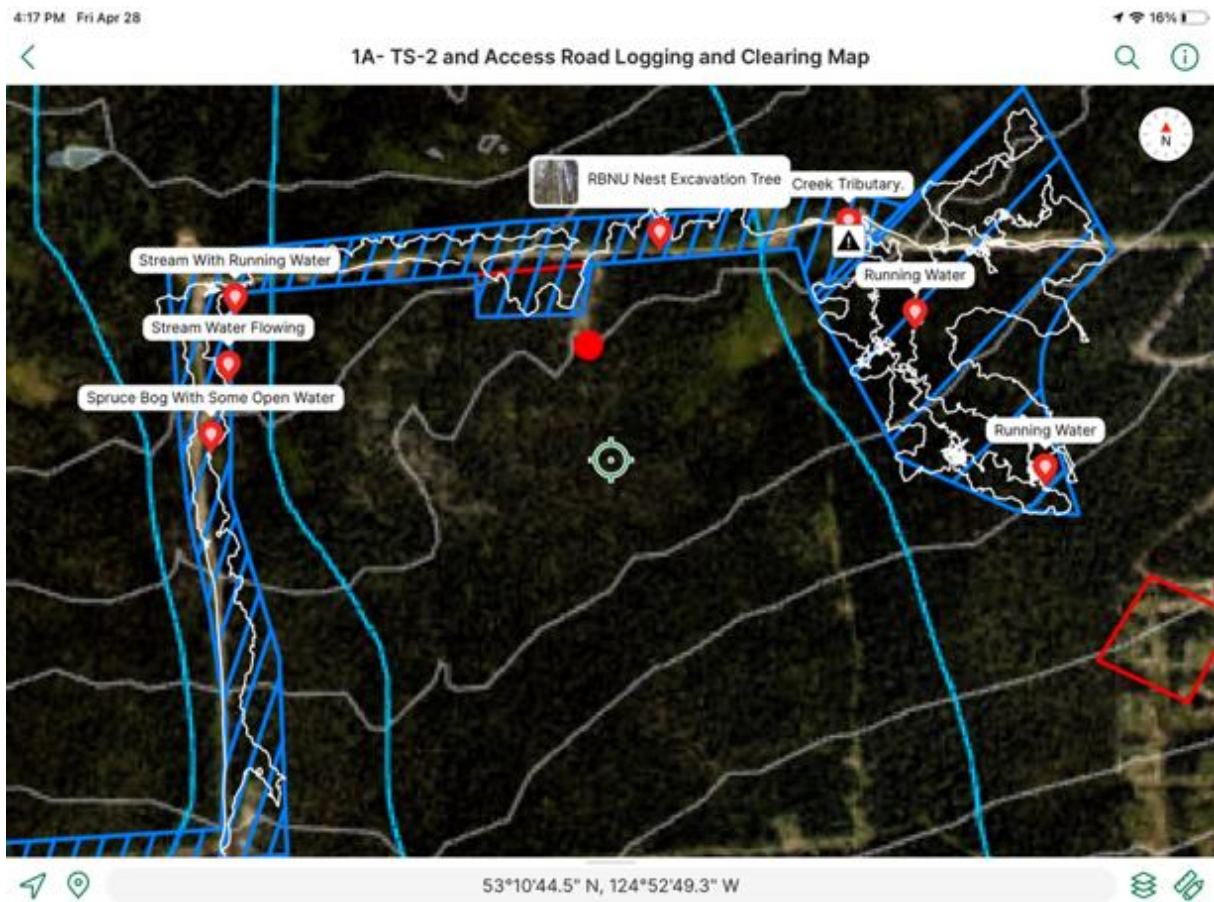


Figure 6. 1A-TS-2 and Access Road logging and clearing map



Figure 7. RMZ buffers for 1A-TS-2 and Access Road Map.

Follow-up from April 10-14 Surveys

- An extensive Excel spreadsheet has been generated by BWG for tracking of pre-clearing survey results and associated timelines.
- Sequence 4 logging has been completed and debris is on the ground. Prior to any clean-up/grubbing, a bird survey is required to identify any active ground nests in the logging debris.
- Clearing has begun in Sequence 9 and 11.
- Sequence 10 is complete.

Notes:

April 15 is the start date for the migratory bird nesting window (April 15 to August 15), and pre-cleared areas will require a re-survey if the area is not actioned within 7 days. As nesting becomes more pronounced during the breeding season, the 7-day window will be reduced to 5 days.

Bears are expected to emerge anytime, so care and awareness of the dangers associated with bear encounters is highlighted. Western toad is also expected to emerge from hibernation in the coming weeks and migrate to breeding areas. This species is known to use many forms of open water for breeding and egg laying including ditches, depressions and holes created during construction. Breeding in construction areas can be prevented by limiting breeding features within these areas. Exclusion fencing is an effective management strategy to keep toads away and minimise the need for salvage and relocation.

Determining any wildlife corridors on the maps is recommended. For the early works (Sequence 1-13), any of the creeks present in or near these logged areas have a buffer. Overall, there is a good understory and overstory of conifers in these buffers, and they have a high wildlife value. Determining and incorporating wildlife corridors into the upcoming major works (and if they can they be connected to any existing creek buffers) would be beneficial to all wildlife.

April 24-28, 2023

Surveys were conducted by qualified professionals knowledgeable and experienced in identification of birds, important wildlife features and habitat in the project area.

The snow has transformed into soft, deep, corn snow. Older wildlife tracks were difficult to detect during the surveys, but any new sign was evident with deep track imprints.

7-day window

Date of Survey Completed	Date For Re-survey
April 24, 2023	May 2, 2023
April 25, 2023	May 3, 2023
April 26, 2023	May 4, 2023
April 27, 2023	May 5, 2023
April 28, 2023	May 6, 2023

BP4 and Diversion

- BP4 and Diversion wildlife pre-clearing surveys are complete.
- Re-survey the areas after May 2 and 3 if trees are not removed by then.
- Survey the logged area north of the road next to PB4 for ground nesting birds prior to logging of PB4.

BP4 was surveyed over two days (April 24 - yellow tracks) (April 25 - orange tracks) as shown in Figure 1.

The stand is an age class 4 lodgepole pine leading stand. There were some Sx and Bl present but in low numbers, and there was an understory of all three species.

There are numerous dead Pl (standing and windthrown) due to mountain pine beetle. The north-east area of the polygon is steep and the blowdown is exposed due to melted snow. The area along Davidson creek is very steep with exposed blowdown on the east aspect. There is an area of age class 5/6 Sx and Bl trees along Davidson creek and in the green hatched area surveyed (orange track).

Overall, the polygon is low value for wildlife, and tracks detected over the two days included marten, snowshoe hare, red squirrel and one pile of moose droppings. Several grouse resting areas were found, and two male spruce grouse were flushed during the surveys.

Dark-eyed Juncos were heard counter-singing in the stand. The area north of the road has been logged and the trees have been moved to a laydown. The ground at this location is snow free, with some logging debris still present. This is a preferred habitat for this species and a bird survey should be performed in areas within 30 m of BP4 to determine if any active nests are present.

Diversion area is located along A trail (surveyed April 25 - tracks in orange), and is also shown in Figure 1. The majority of the laydown area (red area on map) has already been logged this past winter. The area surveyed is a Pl leading age class 4/5 stand. The polygon is a mixture of widely spaced Pl with dead standing and windthrown Pl. There are areas of Sx and Bl with a good understory of these species. Wildlife tracks/sign include spruce grouse, red squirrel, snowshoe hare. Remains of a killed CAJA were seen. This was likely killed by a raptor and plucked at the scene. Overall, the stand has a low wildlife rating. Re-survey after May 1 and 2 if trees are not removed before then.



Figure 1. BP4 and Diversion

3B – WMP East Logging and Clearing Map

- WMP East logging and clearing area wildlife pre-clearing surveys are completed.
- Re-survey after May 2-5 if trees are not removed by then.
- Contact Randy Moody (Whitebark pine specialist) to determine the management plan for the juvenile Whitebark pines located in the northern section of the orange hatched area.
- Remove only the trees within the Canfor orange ribboned area (minus the Whitebark pine trees) on the upper bench to avoid tree removals in the 30 m riparian zone.

The green hatched polygon was surveyed on April 25 (orange tracks) as shown in Figure 2.

Approximately two-thirds of the polygon has been previously logged at an undetermined date. The treed area was a Pl leading age class 4/5 stand. The area has a low wildlife value and no wildlife sign was detected during the survey. The red delineated lay down area is located in the previously logged area with minimal standing trees. Both areas are cleared for tree removals but the treed area will require a re-survey after May 2 if trees are not removed by then.

EW Sequence 8 (areas for mulching)

This area is within the grey boundary on the map and it was surveyed April 25 (orange tracks) and April 26 (red tracks) as shown in Figure 2. The laydown area in red, adjacent to the E Trail was previously logged this winter. No ground nesting birds were detected in the debris left on the ground.

The remaining treed areas left standing north of the A trail (orange track lines) and south of the A road (red track lines) are age class 4 Lodgepole pine. The areas have a low wildlife value, and only a few spruce grouse resting areas were detected during the surveys. There is also a small island of trees in the northern section (red tracks) of the grey area. No wildlife sign was detected in this area.

The orange hatched area south of A trail was surveyed on April 26 (red tracks) as shown in Figure 2.

The area is a productive Age class 6/7 Pl/Sx/Bl stand with a good understory Sx and Bl. There is a steep slope midway in the polygon that transitions to an upper bench of a more open Pl stand. The polygon is rated high value for wildlife. The flatter area also borders the creek that also has good wildlife habitat. Wildlife signs during the survey included red squirrel and spruce grouse.

The blue hatched area was surveyed April 26 (red track lines) as shown in Figure 2. It is an age class 3 high density Pl stand with low wildlife value, and SPGR was the only wildlife sign present.

Areas surveyed April 25 and 26 will required a re-survey after May 2 or 3 if trees are not removed by then.

The orange area north of the A trail was surveyed April 27 (white tracks). The area is primarily a dead lodgepole pine stand with dead standing and windthrown Pl trees. The majority of the understory trees are juvenile lodgepole trees. The wildlife value for this area is low.

A clump of six juvenile Whitebark pine trees (Listed Endangered Federally, and blue listed Provincially) were located in the polygon (caution icon on map) as shown in Figure 2 and 3. These trees have germinated from a seed cache left by a Clark's Nutcracker and are healthy with no white pine blister rust evident on them. The trees have a 7 m MFZ buffer (red circle on map) as shown in Figure 2. The Whitebark pine specialist will be contacted by BWG to determine the management plan for these trees.

The block boundary adjacent to the creek is a steep slope and there was productive age class 6/7 Sx and Bl trees. The block boundary (blue paint and orange flagging) is approximately 12 meters (red pin on map in

Figure 2) from the flowing edge of the creek. Moving the boundary to the upper bench is recommended to comply with the 30 m buffer for the riparian zone.

Note: There is another marked block boundary (orange Canfor flagging) on the upper bench of the area surveyed. Using this boundary would be the best option for this area. The area will require a re-survey after May 4 if the trees are not removed by then.

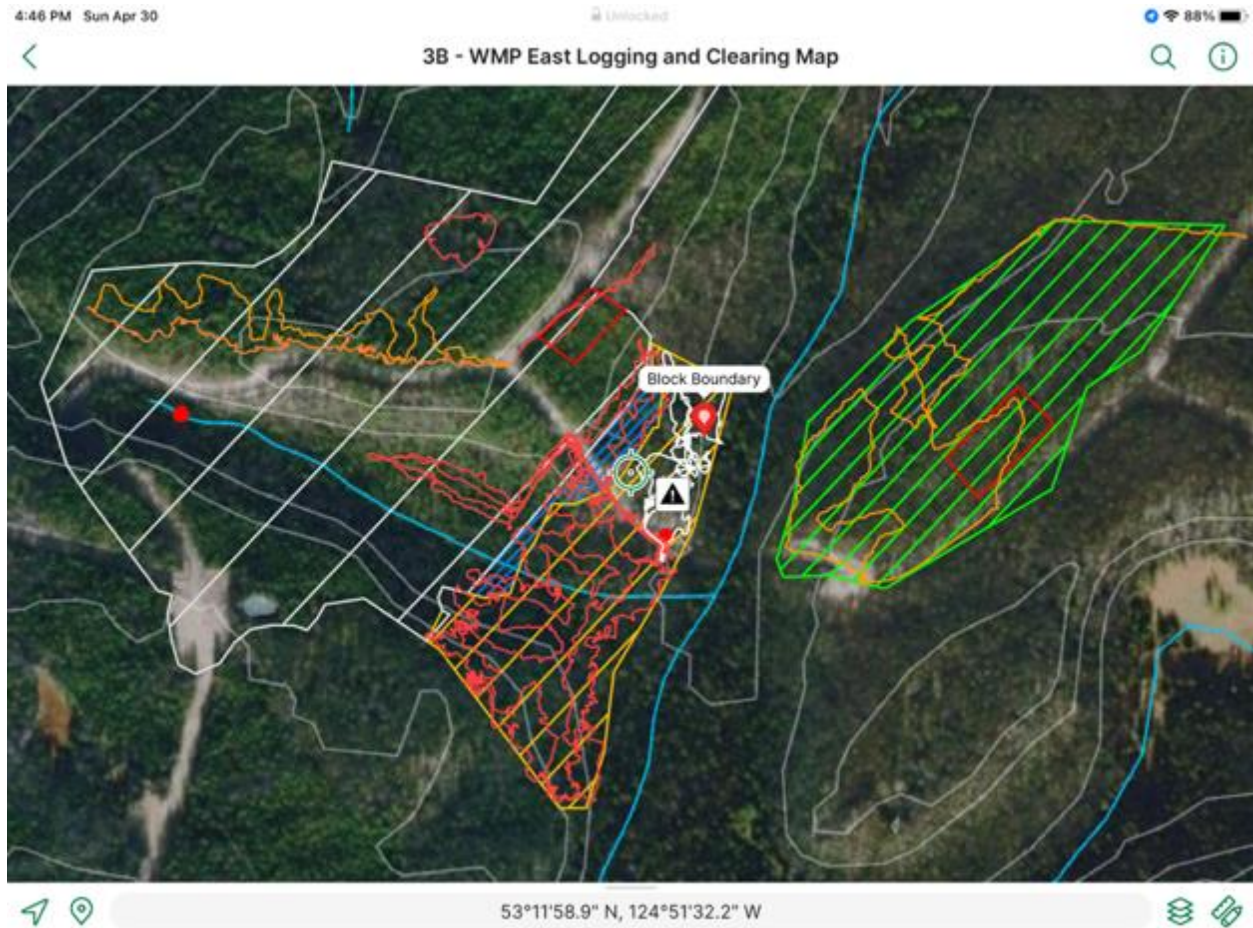


Figure 2. 3B – WMP East Logging and clearing map.

1M TS-4B Mulching

- 1M TS-4B Mulching area wildlife pre-clearing surveys are completed.
- The previously logged area (minus two small sections of islands of mature trees) do not require a wildlife pre-clearing survey.
- Re-survey after May 2-5 if trees are not removed by then.
- Wetland areas will require MFZ delineation, flagging and an amphibian survey when the area is snow-free.
- A squirrel midden on the eastern polygon border has a 10 m MFZ buffer.

The areas bordering the road were surveyed on April 26, 2023 (orange tracks) as shown in Figure 4. The majority of the area is an age class 4/5 lodgepole pine leading stand. The wildlife value is low and only spruce

grouse sign was detected. The green hatched boundary was not flagged but the blue hatched area had been flagged. A re-survey is required after May 3 if trees are not removed by then.

The 27 ha area includes a large previously logged area. Only two small islands of mature trees required a survey in this area (April 27, white tracks) as shown in Figure 4. Both islands of trees are low value for wildlife and no wildlife sign was detected. The remaining logged area has minimal trees present.

The large, treed area in the upper half of the polygon was surveyed on April 27 (white tracks) as shown in Figure 4. The northern half of the polygon (bordered by the road) is an age class 3-5 lodgepole pine stand. The wildlife value for this area is low. Squirrel and SPGR tracks/sign were present in this area. The lower half of the polygon and the trees along the polygon border were a mixture of PI/Sx/Bl with a good understory of all three species. The wildlife value for this area is moderate, with fox, red squirrel and SPGR sign. An extensive red squirrel midden (Figure 5) along the southern border received a 10 meter MFZ buffer. Other wildlife sign include moose tracks and an overnight moose bedding area along the road that runs north-south in the polygon.

In the south-western corner of the polygon there is a wetland and a swampy area with black spruce. The area is delineated by an orange polygon and a caution icon over the wetland on Figure 4. This area will require MFZ delineation, flagging and an amphibian survey when it is snow free. Warmer temperatures that started during the survey period significantly increased bird activity.

Dark-eyed Juncos were active in the southern boundary of the polygon where the edges are snow free. A pair of Spruce grouse were flushed but no nesting location was detected in the area. A re-survey is required after May 4 if trees are not removed by then.

Note:

The lines in white and orange were the only areas with completed surveys for this polygon. A survey crew laying out the block boundary started work **after** the pre-clearing wildlife surveys took place. If any areas outside of the blue polygon are included in the block boundary, these will have to be surveyed at a later date.

1M - TS-4B Mulching Map



Figure 4. TS-4B Mulching Area



Figure 5. Squirrel Midden

1A TS2 and Access Road

- 1A TS2 Access Road wildlife pre-clearing surveys are completed.
- A Red-breasted Nuthatch excavation hole will require a stand watch before the tree removals to determine if the nest is active.
- Re-survey after May 5 if trees are not removed by then.
- The spruce bog in the buffer along the road will require MFZ delineation, flagging and an amphibian survey in the open water when the entire bog area is snow free.
- Creek MFZ boundary needs to be determined and flagged on the southern side of the creek crossing.

The area surveyed was surveyed on April 28 (white tracks) as shown in Figure 6. The majority of the area is a productive age class 7/8 spruce and balsam stand. There are many dead standing decayed trees that are good wildlife trees, especially for cavity nesting birds. The wildlife value of this area is high. The wildlife tracks/sign in the area include Spruce grouse, snowshoe hare, marten and red squirrel.

A Red-breasted Nuthatch was detected excavating a hole in a tree by the road edge (red icon) as shown in Figure 6. The dead balsam tree (~25 cm dbh) is flagged with blue and green flagging. It is a nest of interest, and a stand watch is recommended prior to tree removals to determine if the nest is active.

Dark-eyed Juncos were singing and setting up territory close to the boundary with logged Sequence 4. This area was almost snow free and logging debris is present. A bird survey is required prior to debris removal/grubbing to determine that no ground nesting birds have active nests in debris on site.

Note: There were some water courses identified in the larger area surveyed (red icons) as shown in Figure 6. These areas are still snow covered, but running water was heard. It is recommended to re-survey when snow free to determine the location of these water courses and if they require MFZ buffering.

The two creeks with bridges on the M road required 30 m MFZ buffering (orange lines) as shown in Figure 7. The MFZ buffers on the north sides of both creeks were completed. For the most eastern creek, the south east buffer has not been flagged. The location of the creek was undetermined and the creek may be present inside the large polygon and is indicated by the Caution Icon in Figure 6. This area will require further surveying to determine the creek location and MFZ flagging.

Regarding the western creek, the south west buffer was not completed. Running water areas were found in the buffer area (Red icons in Figure 6) and further investigation is required to determine the accurate location of the creek. The road edge could be used as the MFZ buffer, and this will require flagging.

There is a spruce bog with an area that is snow free with standing water (Red icon in Figure 6). No amphibians were detected in the open water but the entire area was not visible due to the snow. This area will require MFZ delineation, flagging and an amphibian survey when the area is snow free.

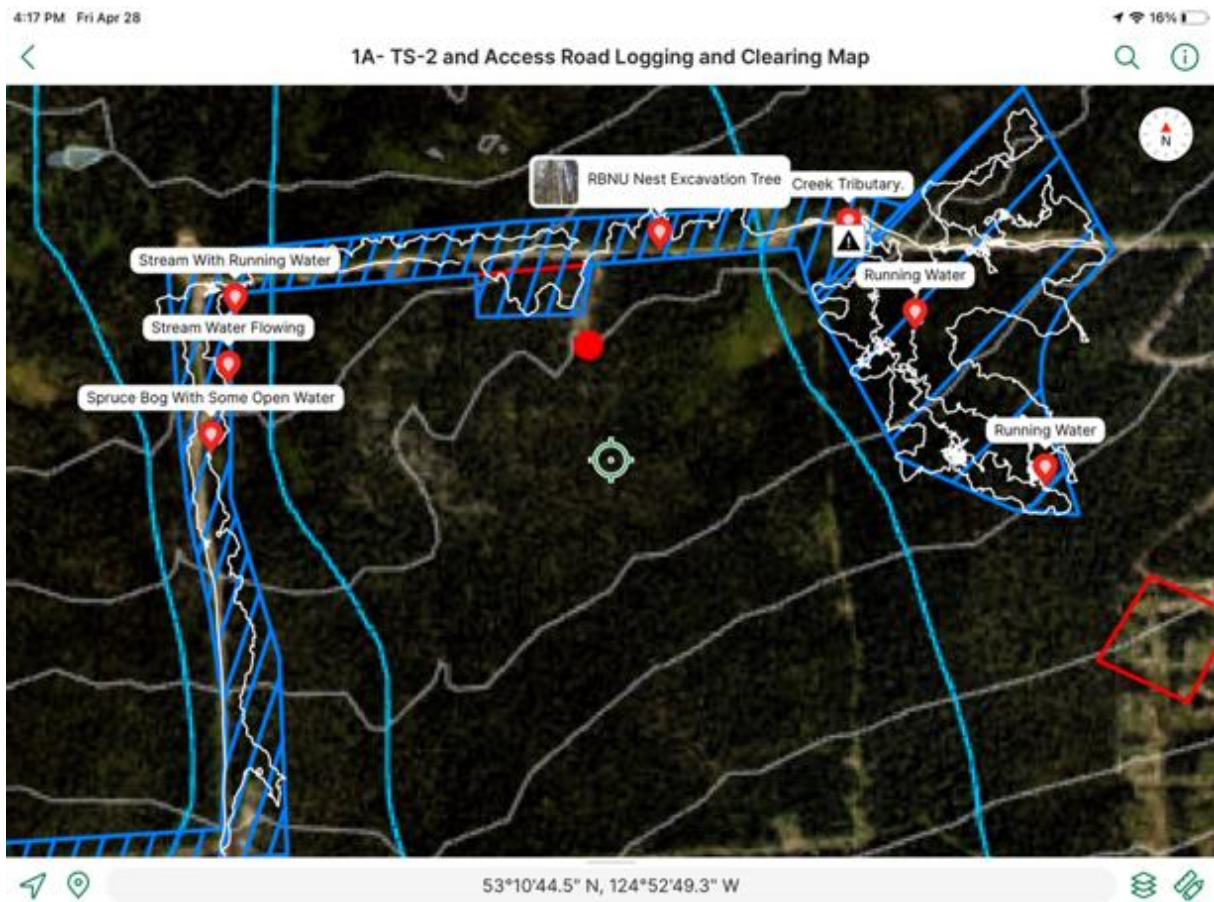


Figure 6. 1A-TS-2 and Access Road Logging and Clearing Map



Figure 7. RMZ buffers for 1A-TS-2 and Access Road Map

Follow-up from April 10-14 Surveys

- An extensive Excel spreadsheet has been generated by BWG for tracking of pre-clearing survey results and associated timelines.
- Sequence 4 logging has been completed and debris is on the ground. Prior to any clean-up/grubbing, a bird survey is required to identify any active ground nests in the logging debris.
- Clearing has begun in Sequence 9 and 11.
- Sequence 10 is complete.

Notes:

April 15 is the start date for the migratory bird nesting window (April 15 to August 15), and pre-cleared areas will require a re-survey if the area is not actioned within 7 days. As nesting becomes more pronounced during the breeding season, the 7-day window will be reduced to 5 days.

Bears are expected to emerge anytime, so care and awareness of the dangers associated with bear encounters is highlighted.

Western toad is also expected to emerge from hibernation in the coming weeks and migrate to breeding areas. This species is known to use many forms of open water for breeding and egg laying including ditches, depressions and holes created during construction. Breeding in construction areas can be prevented by limiting breeding features within these areas. Exclusion fencing is an effective management strategy to keep toads away and minimise the need for salvage and relocation.

Determining any wildlife corridors on the maps is recommended. For the early works (Sequence 1-13), any of the creeks present in or near these logged areas have a buffer. Overall, there is a good understory and overstory of conifers in these buffers, and they have a high wildlife value. Determining and incorporating wildlife corridors into the upcoming major works (and if they can they be connected to any existing creek buffers) would be beneficial to all wildlife.

Wildlife Observations

Numerous birds were identified, including White-winged Crossbills and Clark’s Nutcracker. Sign observations include tracks from marten, hare, fox, squirrel and moose. (Table 1).

Table 1. Wildlife Observation summary

April 24	April 25	April 26	April 27	April 28
DEJU	VATH	DEJU	DEJU	DEJU
AMRO	CAJA	AMRO	AMRO	WWCR
CAJA	DEJU males counter singing	RBNU	CAJA	BOCH
WWCR	ATTW drumming and flyover	WWCR	BOCH	RBNU
SPGR visual 2 males and many resting spots/tracks	WWCR	BOCH	SPGR visual pair, tracks and resting spots	AMRO
CORA	PISI	CAJA	PIGR	VATH

April 24	April 25	April 26	April 27	April 28
Moose (old excrement)	SPGR visual female (tracks/beds)	SPGR (tracks and resting spots)	RBNU	CAJA
	Red Squirrel (tracks)	ATTW drumming	PISI	ATTW
	Snowshoe Hare (tracks)	GCKI	WWCR	GCKI
	American Marten (tracks)	8 SNGO landed at camp in the snow near D dorm	Red Squirrel (tracks) and large midden	SPGR (tracks/resting spots)
		Red Squirrel (tracks)	Snowshoe Hare (tracks)	NOFL
			Moose (tracks and bedding site)	COHA
			Red Fox (excrement)	Clark's Nutcracker
				American Marten (tracks)
				Red Squirrel (tracks)
				Snowshoe Hare (tracks)

Weather Summary

Temperatures climbed steady throughout the week (Table 2) and the snow conditions became more saturated and softer over the week. Very strong winds on April 26th lead to debris on top of the snow and more blowdown.

Table 2. Weather Summary April 24 to 28, 2023

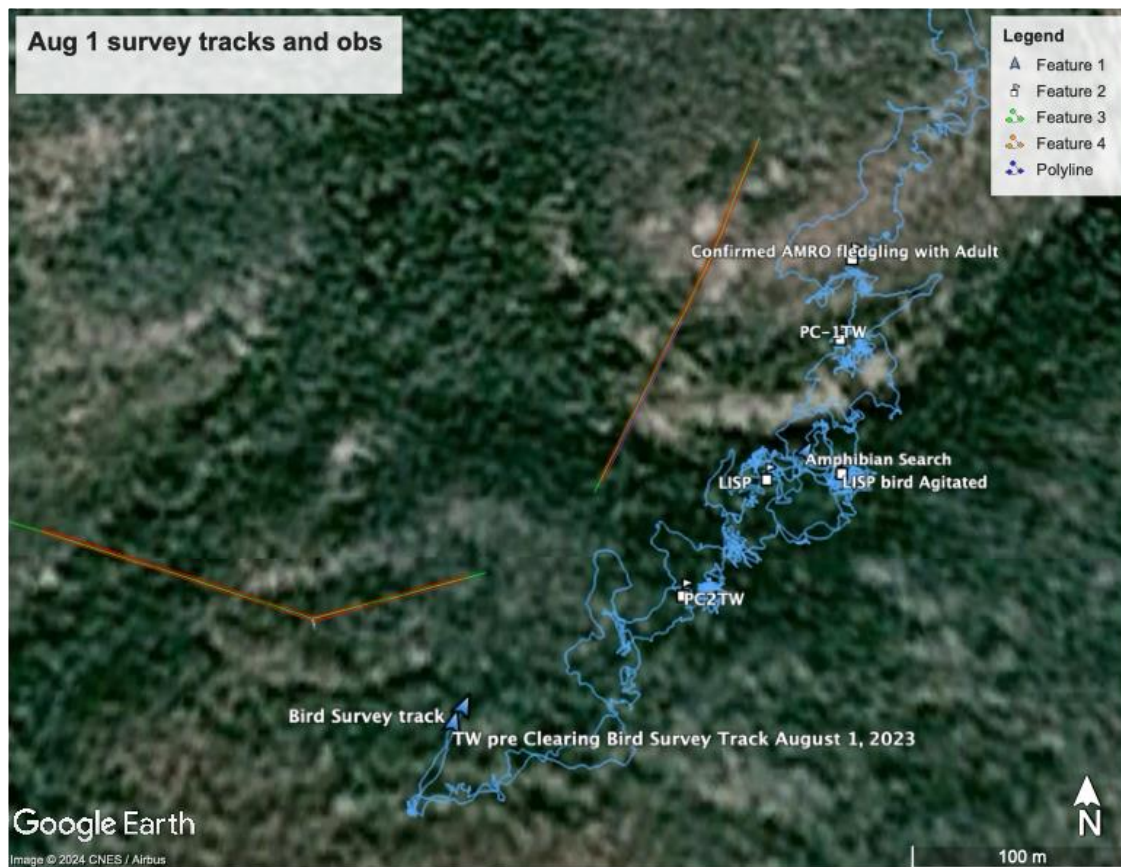
Date	Temp (°C)	Cloud Cover	Wind	Snow
April 24	-1 to +4	Clear until 10:30 am then cloudy with sunny periods.	Beaufort 2/3	1-2 cm of snow overnight at camp. Transformed saturated soft corn snow.
April 25	-1 to +2	Cloudy in the am then sunny.	Beaufort 2-3 in the am, 1 in pm.	1 day since snow fall. Crust hard until 10:30, then soft. Saturated and soft corn snow.
April 26	+2 to +5	Overcast and light rain until 8:30 then sunny.	Beaufort 6/7 after 10:30 am	No snow for the last 2 days. Transformed saturated soft corn snow.
April 27	+1 to +13	Variable sun and cloud	Beaufort 1-2	No snow for the last 3 days. Transformed saturated soft corn snow with debris layer on top.
April 28	+3 to +15	Clear and sunny	Calm	No snow for the last 4 days. Transformed saturated corn snow with debris layer on top.

July 31-Aug 11, 2023

July 31-Aug 1

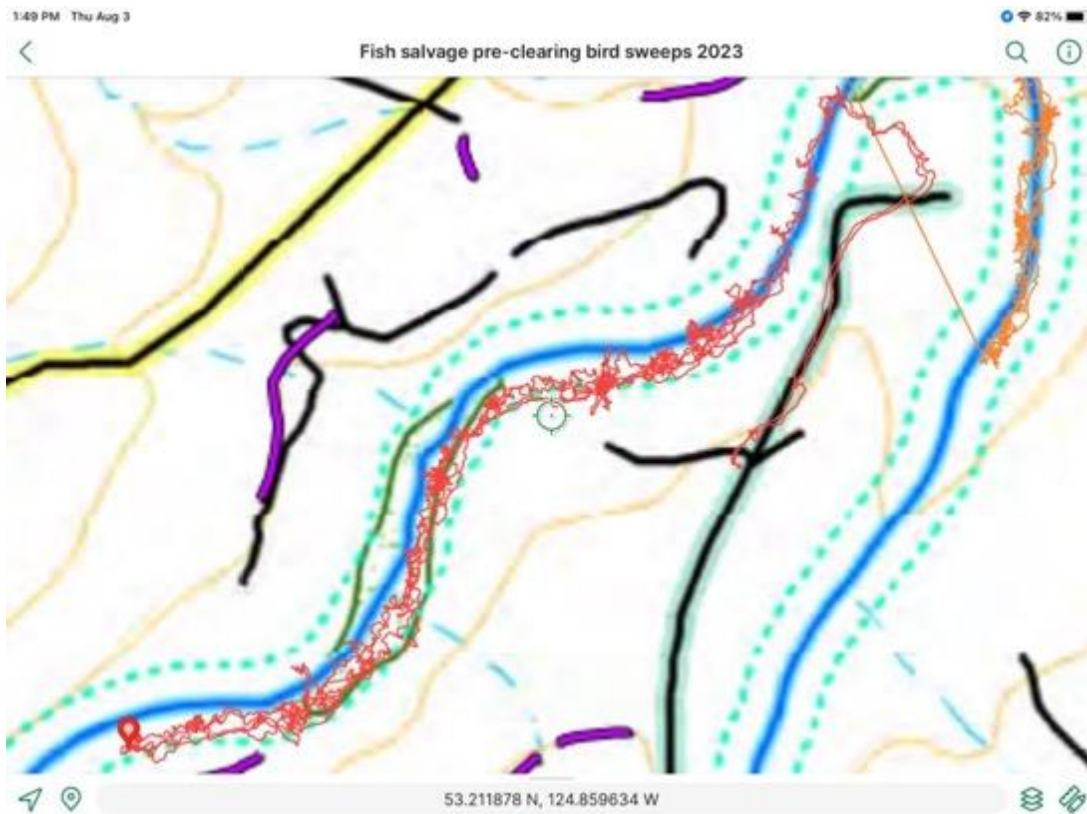
Pre-clearing bird and amphibian surveys were conducted for the WMP East area. The weather was clear and 7 deg at the start of the surveys. It was confirmed the DEJU nest previously detected on June 28 was no longer active. One potential Lincoln's sparrow (LISP) was identified in the wetland area. A second pass will be performed Aug 1 to determine confirmation. DEJU and AMRO with juveniles were detected during the bird surveys. The birds identified for the day included: DEJU, AMRO, CAJA, RECR, RBNU, NOFL, ATTW, TOSO, YRWA, PISI, LISP, GCKI, CLNU and RUHU.

The wetland was surveyed for any presence of amphibians. A two-person crew spent 1 hour surveying the area (2 person hours) and no amphibians were detected. The sump area on the A Trail at approximately 1 km was assessed for amphibians and none detected.



Aug 2-3

Pre-clearing bird surveys for the fish salvage work on Davidson creek. Point data was collected by Jason from Triton. No active nests were detected.



August 5

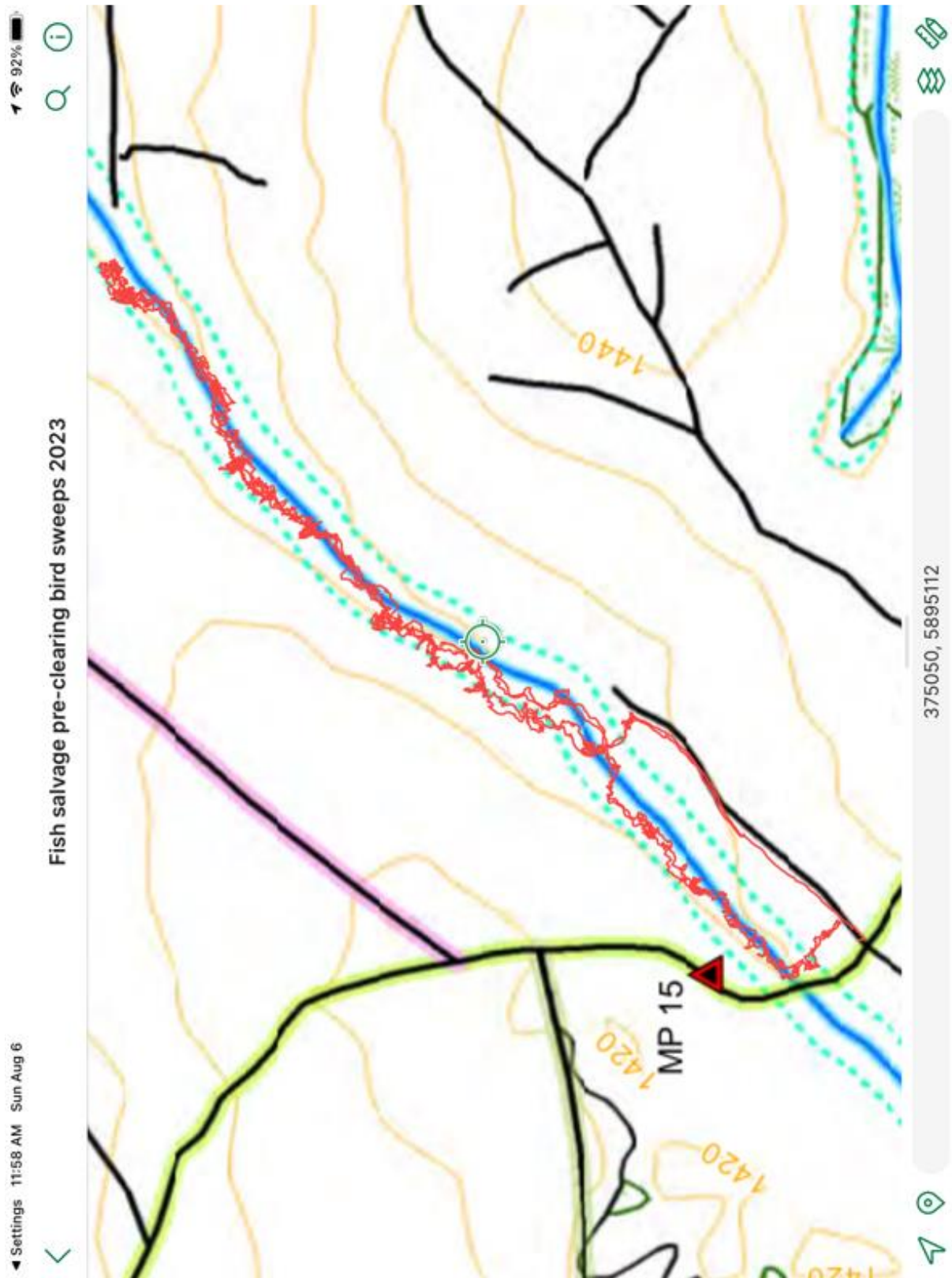
The team assessed the Mountain Bluebird nesting location in one of the holes on the front section of the flatbed deck. The flat bed has been parked in the mobile maintenance area of the mine site. The bird was detected carrying food into the nest area on July 9. A picture via a cell phone was taken today of the inside of the hole. The nest is not occupied at this time. It would be difficult to determine if the nesting birds were successful based on the nest. One Mountain Bluebird was identified in the mobile maintenance area.



Mountain Bluebird nest

August 6

The team joined the Triton bird crew to perform pre-clearing bird surveys. Track files have been sent to Robert St Jean of Whisky Jack Consulting. The Triton crew collected the point count data. No active nests were detected.



Aug 6 bird surveys

August 7

Theresa and Ken White surveyed the area on the East WMP where a Pacific Wren was previously sighted and may have been nesting in the area. No nesting bird was detected during the survey.



Aug 7 surveys including potential wren nest area

Limitations

The assessment(s) of the project site(s) described in this report have been made using acceptable minimal standards for detecting Bear and Furbearer Dens, and Hibernacula. Additionally, the assessment(s) described in this report have been made using acceptable standards for an Active Bird Nest Survey Program (ABNSP) and inactive nests outside the breeding window for use in pre-clearing surveys. These surveys are designed to help meet requirements for due diligence on behalf of the client(s) to achieve compliance with Federal and Provincial legislation pertaining to migratory birds and species at risk. Legislation includes the Federal Migratory Bird Convention Act [1994 c.22] and Migratory Birds Regulations [C.R.C., c. 1035], Species at Risk Act [2002, c.29] and British Columbia Wildlife Act [RSBC 1996 c.4SS]. The ABNSP follows standards relevant to nesting surveys outlined in the Inventory Methods of Forest and Grassland Songbirds, Standards for Components of British Columbia's Biodiversity No. 15 (RIC 1999) and Inventory Methods for Raptors, Standards for Components of British Columbia's Biodiversity No. 11 (RIC 2001). The program also follows recommendations outlined by the Canadian Wildlife Service (CWS). Where appropriate, survey methods deemed may be modified to account for local and/or site-specific conditions.

Notwithstanding the recommendations and conclusions made in this correspondence, it must be acknowledged that bear dens, furbearer dens, hibernacula, and stick and cavity nests can sometimes be difficult to locate despite following established protocols and making best possible survey efforts. While all reasonable efforts have been made to ensure the surveys were completed to the best possible standards, no guarantees are offered, or implied. It is both professionally and practically impossible to predict with absolute certainty that all bear dens, hibernacula, stick and cavity nests have been accounted for. In accordance with standard protocols, the assessment presented in this correspondence is valid for two weeks after the last survey date. If no work is initiated by the client(s) within these two weeks, a new survey is required. Approval and implementation of any recommendations made within this correspondence is the responsibility of the client, and in no way implies any inspection or supervisory role on the part of Avison Management Services Ltd. In the event that inspection or supervision of all or part of the implementation plan is requested, the request shall be in writing and the details agreed to in writing by both parties. Sketches, diagrams and photographs contained in this report, being intended as visual aids, should not be construed as engineering reports or legal surveys.

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Blackwater Project

Pre-Clearing Wildlife Survey

Annual Report

2023

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1. Summary

Pre-clearing, furbearer den, bear den, hibernacula and nest surveys were carried out from March 8th through May 25th, 2023 on an on-call basis, typically cross shifting with Sean Sharpe Environmental Consulting personnel. Numerous wildlife pre-clearing surveys were conducted between March and May of 2023. No Bear dens, Furbearer dens, or bat hibernacula were found during these surveys. During early surveys in March and April, no active bird nests were located, however, as the nesting window timeframe continued into May, nesting activity intensified, and pre-clearing and/or construction activities were temporarily halted and buffers placed around nesting areas in specific locations where nests were either located, or suspected. Details regarding these activities can be found in Section 5.3.

2. Introduction

The Blackwater Gold project is on the northern flanks of Mt. Davidson in the Nechako Plateau approximately 160 kilometres southwest of the city of Prince George and 110 km southwest of the town of Vanderhoof, in central British Columbia. In 2023 the mine officially entered the construction phase of the project commencing with clearing of roads and construction areas of the mine.

Avison Management Services (AMS) Ltd. was retained to conduct furbearer den, bear den, hibernacula, and nest surveys to determine presence of denning furbearers and bears, potential bat hibernacula, and stick or cavity nests, prior to clearing and building road access and decking areas from March through May of 2023.

Each year an annual report is to be submitted outlining pre-clearing activities that were conducted as part of the WMMP, DS conditions 4.1, 8.9, 8.10 and 8.14, and EAC condition 23. This report has been prepared as part of that requirement.

3. Location

3.1 Location References

The map in Appendix 1. includes a list of prioritized sequencing of clearing at the Blackwater Project. Pre-clearing wildlife surveys will document surveys completed for these prioritized areas.

4. Survey Standards and Methodology

4.1 Bear Den Surveys

The Resources Inventory Committee's Inventory methods for Bears outline survey methodology for enumeration of bears, but do not elaborate on methodology specific to detection of dens in linear features such as exploration trails or drill pads. Hodder and Ray (2005) provide information on ecotypes and general characteristics of bear den locations, but again do not elaborate on methodology specific to detection of dens. At a minimum, we implement SOP(s) and recommendations set out in the Wildlife Mitigation and Monitoring Plan (WMMP 2022). Our field approach to detecting bear dens when conducting pre-clearing surveys immediately prior to clearing, is based on walking a proposed disturbance feature

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(i.e. exploration trail, drill pad, road allowance or, cut block), and walk a linear, or grid pattern survey and search and observe based on sight ability a 10-50 m observable area around the surveyor, watching for important den habitat features (i.e. evidence of natural or excavated ground dens, tracks, trails, scat, etc.). For areas that a surveyor suspects may be a denning site, but no tracks, evidence of digging, etc. are observable, a Forward Looking Infrared (FLIR) camera is utilized to determine if a hibernating bear is utilizing the denning location.

The following is a list of Bear species whose distribution overlap and have been observed in the Blackwater Mine area. The dens of these species were searched for during surveys.

Table 1. List of potential Bear species whose distribution over-lap the Blackwater project. (E-Fauna BC, 2022).

Common Name	Scientific Name
American Black Bear	<i>Ursus americanus</i>
Grizzly Bear	<i>Ursus arctos horribilis</i>

4.2 Furbearer Den Surveys

The Resources Inventory Committee's Inventory methods for medium-sized terrestrial carnivores, and for Marten and Weasel outline survey methodology for enumeration, but do not elaborate on methodology specific to detection of dens in linear features such as exploration trails or drill pads. The BC Fisher Working Group does provide some excellent information on fisher habitat and den sites which can also be broadly applied to marten and weasel. At a minimum, we implement SOP(s) and recommendations set out in the Wildlife Mitigation and Monitoring Plan (WMMP 2022). Our approach to detecting furbearer dens is based on walking a proposed disturbance feature (i.e. exploration trail, drill pad, road allowance or, cut block), and walk a linear or grid pattern survey and search and observe based on sight ability of a 10-50 m observable area around the surveyor, watching for tracks (i.e. good snow, conditions), important den habitat features (i.e. large diameter dead or rotting trees with potential for cavities, and evidence of ground dens, trails, excavations, scat, etc.).

The following is a list of Furbearer species whose distribution overlap and/or have been observed in the Blackwater Mine area. The dens of these species were searched for during surveys.

Table 2. List of potential Furbearer species whose distribution over-lap the Blackwater project. (E-Fauna BC, 2022).

Common Name	Scientific Name
American (Pine) Marten	<i>Martes americana</i>
Ermine (Short-tailed weasel)	<i>Mustela erminea</i>
American Mink	<i>Neovison vison</i>
Fisher	<i>Pekania pennanti</i>
Least Weasel	<i>Mustela nivalis</i>
North American River Otter	<i>Lontra canadensis</i>
Wolverine	<i>Gulo gulo</i>

4.3 Hibernacula Surveys

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The Resources Inventory Committee's inventory methods for Bats outlines survey methodology for detection and enumeration of Bats, but does not elaborate on methodology specific to detection of hibernacula in linear features such as exploration trails or drill pads. However, the hibernacula section of the Wildlife Habitat Features Field Guide (Kootenay Boundary Region), does elaborate on what feature to look for, to detect hibernacula. This document was referenced for detection of hibernacula. Our approach to detecting hibernacula is based on walking a proposed disturbance feature (i.e. exploration trail, drill pad, road allowance or, cut block), and walk a linear or grid pattern survey and search and observe based on sight ability a 10-50 m observable area around the surveyor, searching in and around those features to locate potential hibernacula sites.

The following is a list of Bat species that could potentially be present in the Blackwater Mine area.

Table 3. List of potential Bat species whose distribution over-lap the Blackwater project. (E-Fauna BC, 2022).

Common Name	Scientific Name
Big Brown Bat	<i>Eptesicus fuscus</i>
California Bat	<i>Myotis californicus</i>
Keen Bat	<i>Myotis keenii</i>
Hairy Winged Bat	<i>Myotis volans</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Little Brown Bat	<i>Myotis lucifugus</i>
Long-Eared Bat	<i>Myotis evotis</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Yuma Bat	<i>Myotis yumanensis</i>

4.4 Nest Surveys

There currently are no provincial or federal standards for conducting bird nest surveys. As such, it is the responsibility of the proponent of a proposed development project to produce and adhere to their own bird nest survey methodology to demonstrate due diligence in not contravening any related legislation. At a minimum, we implement SOP(s) and recommendations set out in the Wildlife Mitigation and Monitoring Plan (WMMP 2022).

Avison Management Services Ltd., biologists attempt to follow all standards relevant to nesting surveys outlined in the Inventory Methods for Forest and Grassland Songbirds, Standards for Components for British Columbia's Biodiversity No. 15 (RIC 1999) and Inventory Methods for Raptors, Standards for Components for British Columbia's Biodiversity No. 11 (RIC 2001), as well as recommendations outlined by the Canadian Wildlife Service (CWS). Where deemed appropriate, survey methods are modified to account for local and/or site-specific conditions.

The previous Migratory Birds Regulations protected the nests of all migratory birds, at all times, for as long as they existed, which meant that many nests were protected when they no longer benefited migratory

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birds. The new Migratory Birds Regulations, 2022, provide protection to migratory bird nests when they are considered to have a high conservation value for migratory birds. The nests of most migratory bird species may be destroyed, damaged, disturbed or removed when they do not contain a migratory bird or viable egg.

For most migratory bird species, removing the nest when it does not contain a migratory bird or viable egg (generally after the breeding season) will have no effect on the ability of those birds to nest again. The great majority build or occupy new nests each year. However, some species may reuse the same nest structure year after year, and the loss of these nests could have a negative effect on future nesting success. The nests of the 18 species, listed in Schedule 1 of the MBR 2022, are protected year-round and cannot be damaged, destroyed, removed or disturbed, even when they are unoccupied, unless the conditions of the regulations have been met. One of the most noteworthy changes to the amended Regulations of the Migratory Birds Convention Act is the inclusion of the Pileated Woodpecker on the list of species for which nesting sites are protected after active nesting.

Environment and Climate Change Canada (ECCC) encourages practices that will ensure the long-term conservation of migratory bird populations locally, including the retention of sufficient high-quality habitat. For cavity nesting species, this may mean the retention of dying and dead standing trees in forest stands, whether or not they contain the nesting cavity of the Pileated Woodpecker.

Avison Management Services Ltd., biologists attempt to follow all standards relevant to surveys provided by the Federal and Provincial governments and other reliable sources. Where deemed appropriate, survey methods are modified to account for local and/or site-specific conditions.

This assessment also included searching the Provincial BC Red List and BC Blue List, SARA, and the federally designated COSEWIC Endangered, COSEWIC Threatened, COSEWIC Special Concern lists. The following species of birds or breeding birds listed as species at risk in the Caribou Regional District of British Columbia were found in this search (see below). None of the nests of the species below were located during this assessment, nor were cavity nests of the Pileated Woodpecker found in this pre-clearing survey.

The following is a list of Avian species whose distribution overlap and/or have been observed in the Blackwater Mine area. The nest of these species is searched for during surveys, and any observations are documented.

Table 4. Avian species designated at risk that have been identified as utilizing or residing in the Caribou Regional District.

English Name	Scientific Name	BC List	Global	COSEWIC	SARA
American Avocet	<i>Recurvirostra americana</i>	Blue	G5 (2016)		
American Bittern	<i>Botaurus lentiginosus</i>	Blue	G5 (2016)		
American Golden-Plover	<i>Pluvialis dominica</i>	Blue	G5 (2016)		
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Red	G4 (2016)	NAR	
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	Blue	G4 (2016)	SC	1-SC (2006)
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	Blue	G4 (2016)	SC	1-SC (2011)

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Barn Owl	<i>Tyto alba</i>	Blue	G5 (2016)	T	1-T (2018)
Barn Swallow	<i>Hirundo rustica</i>	Yellow	G5 (2016)	SC	1-T (2017)
Bay-breasted Warbler	<i>Setophaga castanea</i>	Red	G5 (2016)		
Black Scoter	<i>Melanitta americana</i>	Blue	G5 (2016)		
Black Swift	<i>Cypseloides niger</i>	Blue	G4 (2016)	E	1-E (2019)
Black-crowned Night-heron	<i>Nycticorax</i>	Red	G5 (2016)		
Black-throated Green Warbler	<i>Setophaga virens</i>	Blue	G5 (2016)		
Bobolink	<i>Dolichonyx oryzivorus</i>	Red	G5 (2016)	SC	1-T (2017)
Brant	<i>Branta bernicla</i>	Blue	G5 (2016)		
Brewer's Sparrow, breweri subspecies	<i>Spizella breweri</i>	Blue	G5T5 (2016)		
Burrowing Owl	<i>Athene cunicularia</i>	Red	G4 (2016)	E	1-E (2003)
California Gull	<i>Larus californicus</i>	Red	G5 (2016)		
Canada Goose, occidentalis subspecies	<i>Branta canadensis occidentalis</i>	Red	G5T3 (2016)		
Canyon Wren	<i>Catherpes mexicanus</i>	Blue	G5 (2016)	NAR	
Cape May Warbler	<i>Setophaga tigrina</i>	Blue	G5 (2016)		
Caspian Tern	<i>Hydroprogne caspia</i>	Blue	G5 (2016)	NAR	
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	Red	G4 (2016)	SC	1-SC (2019)
Clark's Grebe	<i>Aechmophorus clarkii</i>	Red	G5 (2022)		
Common Murre	<i>Uria aalge</i>	Red	G5 (2016)		
Common Nighthawk	<i>Chordeiles minor</i>	Blue	G5 (2016)	SC	1-T (2010)
Double-crested Cormorant	<i>Nannopterum auritum</i>	Blue	G5 (2016)	NAR	
Eared Grebe	<i>Podiceps nigricollis</i>	Blue	G5 (2016)		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Yellow	G5 (2016)	SC	1-SC (2019)
Ferruginous Hawk	<i>Buteo regalis</i>	Unknown	G4 (2016)	T	1-T (2010)
Flammulated Owl	<i>Psilosops flammeolus</i>	Blue	G4 (2016)	SC	1-SC (2003)
Forster's Tern	<i>Sterna forsteri</i>	Red	G5 (2016)	DD	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Red	G5 (2016)		
Gray Flycatcher	<i>Empidonax wrightii</i>	Blue	G5 (2016)	NAR	
Great Blue Heron, fannini subspecies	<i>Ardea herodias fannini</i>	Blue	G5T4 (2016)	SC	1-SC (2010)

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Great Blue Heron, herodias subspecies	<i>Ardea herodias</i>	Blue	G5T5 (2016)		
Green Heron	<i>Butorides virescens</i>	Blue	G5 (2016)		
Gyr Falcon	<i>Falco rusticolus</i>	Blue	G5 (2016)	NAR	
Horned Lark, merrilli subspecies	<i>Eremophila alpestris merrilli</i>	Red	G5T4 (2016)		
Horned Lark, strigata subspecies	<i>Eremophila alpestris strigata</i>	Red	G5T2 (2016)	E	1-E (2005)
Horned Puffin	<i>Fratercula corniculata</i>	Red	G5 (2016)		
Hudsonian Godwit	<i>Limosa haemastica</i>	Red	G4 (2016)	T	
Lark Sparrow	<i>Chondestes grammacus</i>	Blue	G5 (2016)		
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Blue	G4 (2016)	T	1-T (2012)
Long-billed Curlew	<i>Numenius americanus</i>	Yellow	G5 (2016)	SC	1-SC (2005)
Long-tailed Duck	<i>Clangula hyemalis</i>	Blue	G5 (2016)		
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Blue	G3 (2016)	T	1-T (2003)
Northern Fulmar	<i>Fulmarus glacialis</i>	Red	G5 (2016)		
Northern Goshawk, atricapillus subspecies	<i>Accipiter gentilis atricapillus</i>	Blue	G5T5 (2016)	NAR	
Northern Goshawk, laingi subspecies	<i>Accipiter gentilis laingi</i>	Red	G5T2 (2016)	T	1-T (2003)
Northern Pygmy-owl, swarthi subspecies	<i>Glaucidium gnoma swarthi</i>	Blue	G4G5T3T4 Q (2019)		
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Yellow	G4 (2016)	SC	1-T (2010)
Peregrine Falcon	<i>Falco peregrinus</i>	No Status	G4 (2016)	SC	1-SC
Peregrine Falcon, anatum subspecies	<i>Falco peregrinus anatum</i>	Red	G4T4 (2016)	NAR	1-SC (2012)
Peregrine Falcon, pealei subspecies	<i>Falco peregrinus pealei</i>	Blue	G4T3 (2016)	SC	1-SC (2003)
Pine Grosbeak, carlottae subspecies	<i>Pinicola enucleator carlottae</i>	Blue	G5T3 (2016)		
Prairie Falcon	<i>Falco mexicanus</i>	Red	G5 (2016)	NAR	
Purple Martin	<i>Progne subis</i>	Blue	G5 (2016)		
Red Knot	<i>Calidris canutus</i>	Blue	G4 (2016)	T	1-T (2010)
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Blue	G4G5 (2016)	SC	1-SC (2019)
Rough-legged Hawk	<i>Buteo lagopus</i>	Blue	G5 (2016)	NAR	
Rusty Blackbird	<i>Euphagus carolinus</i>	Blue	G4 (2016)	SC	1-SC (2009)

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Sage Thrasher	<i>Oreoscoptes montanus</i>	Red	G4 (2016)	E	1-E (2003)
Sharp-tailed Grouse, columbianus subspecies	<i>Tympanuchus phasianellus columbianus</i>	Blue	G5T3 (2022)		
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Blue	G5 (2016)		
Short-eared Owl	<i>Asio flammeus</i>	Blue	G5 (2016)	T	1-SC (2012)
Smith's Longspur	<i>Calcarius pictus</i>	Blue	G4G5 (2016)		
Spotted Owl	<i>Strix occidentalis</i>	Red	G3G4 (2016)	E	1-E (2003)
Surf Scoter	<i>Melanitta perspicillata</i>	Blue	G5 (2016)		
Swainson's Hawk	<i>Buteo swainsoni</i>	Red	G5 (2016)		
Thick-billed Murre	<i>Uria lomvia</i>	Red	G5 (2016)		
Tufted Puffin	<i>Fratercula cirrhata</i>	Blue	G5 (2016)		
Tundra Swan	<i>Cygnus columbianus</i>	Blue	G5 (2016)		
Upland Sandpiper	<i>Bartramia longicauda</i>	Red	G5 (2016)		
Wandering Tattler	<i>Tringa incana</i>	Blue	G4G5 (2016)		
Western Grebe	<i>Aechmophorus occidentalis</i>	Red	G5 (2016)	SC	1-SC (2017)
Western Screech-Owl	<i>Megascops kennicottii</i>	No Status	G4G5 (2016)	T	1-T
Western Screech-Owl, kennicottii subspecies	<i>Megascops kennicottii</i>	Blue	G4G5T4 (2016)	T	1-T (2005)
Western Screech-Owl, macfarlanei subspecies	<i>Megascops kennicottii macfarlanei</i>	Blue	G4G5T4 (2016)	T	1-T (2005)
White-headed Woodpecker	<i>Dryobates albolarvatus</i>	Red	G4 (2016)	E	1-E (2003)
White-tailed Ptarmigan, saxatilis subspecies	<i>Lagopus leucura saxatilis</i>	Blue	G5T3T4 (2021)		
White-throated Swift	<i>Aeronautes saxatalis</i>	Blue	G5 (2016)		
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Blue	G5 (2016)	E	1-E (2006)
Winter Wren	<i>Troglodytes hiemalis</i>	Blue	G5 (2016)		

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Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Red	G5 (2016)		
Yellow-breasted Chat	<i>Icteria virens</i>	Red	G5 (2016)	E	1-E (2003)
American Avocet	<i>Recurvirostra americana</i>	Blue	G5 (2016)		
American Bittern	<i>Botaurus lentiginosus</i>	Blue	G5 (2016)		
American Golden-Plover	<i>Pluvialis dominica</i>	Blue	G5 (2016)		
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Red	G4 (2016)	NAR	
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	Blue	G4 (2016)	SC	1-SC (2006)
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	Blue	G4 (2016)	SC	1-SC (2011)
Barn Owl	<i>Tyto alba</i>	Blue	G5 (2016)	T	1-T (2018)
Barn Swallow	<i>Hirundo rustica</i>	Yellow	G5 (2016)	SC	1-T (2017)
Bay-breasted Warbler	<i>Setophaga castanea</i>	Red	G5 (2016)		
Black Scoter	<i>Melanitta americana</i>	Blue	G5 (2016)		
Black Swift	<i>Cypseloides niger</i>	Blue	G4 (2016)	E	1-E (2019)
Black-crowned Night-heron	<i>Nycticorax</i>	Red	G5 (2016)		
Black-throated Green Warbler	<i>Setophaga virens</i>	Blue	G5 (2016)		
Bobolink	<i>Dolichonyx oryzivorus</i>	Red	G5 (2016)	SC	1-T (2017)
Brant	<i>Branta bernicla</i>	Blue	G5 (2016)		
Brewer's Sparrow, breweri subspecies	<i>Spizella breweri</i>	Blue	G5T5 (2016)		
Burrowing Owl	<i>Athene cunicularia</i>	Red	G4 (2016)	E	1-E (2003)
California Gull	<i>Larus californicus</i>	Red	G5 (2016)		
Canada Goose, occidentalis subspecies	<i>Branta canadensis occidentalis</i>	Red	G5T3 (2016)		
Canyon Wren	<i>Catherpes mexicanus</i>	Blue	G5 (2016)	NAR	
Cape May Warbler	<i>Setophaga tigrina</i>	Blue	G5 (2016)		
Caspian Tern	<i>Hydroprogne caspia</i>	Blue	G5 (2016)	NAR	
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	Red	G4 (2016)	SC	1-SC (2019)
Clark's Grebe	<i>Aechmophorus clarkii</i>	Red	G5 (2022)		
Common Murre	<i>Uria aalge</i>	Red	G5 (2016)		
Common Nighthawk	<i>Chordeiles minor</i>	Blue	G5 (2016)	SC	1-T (2010)
Double-crested Cormorant	<i>Nannopterum auritum</i>	Blue	G5 (2016)	NAR	

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Eared Grebe	<i>Podiceps nigricollis</i>	Blue	G5 (2016)		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Yellow	G5 (2016)	SC	1-SC (2019)
Ferruginous Hawk	<i>Buteo regalis</i>	Unknown	G4 (2016)	T	1-T (2010)
Flammulated Owl	<i>Psilosops flammeolus</i>	Blue	G4 (2016)	SC	1-SC (2003)
Forster's Tern	<i>Sterna forsteri</i>	Red	G5 (2016)	DD	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Red	G5 (2016)		
Gray Flycatcher	<i>Empidonax wrightii</i>	Blue	G5 (2016)	NAR	
Great Blue Heron, fannini subspecies	<i>Ardea herodias fannini</i>	Blue	G5T4 (2016)	SC	1-SC (2010)
Great Blue Heron, herodias subspecies	<i>Ardea herodias</i>	Blue	G5T5 (2016)		
Green Heron	<i>Butorides virescens</i>	Blue	G5 (2016)		
Gyr Falcon	<i>Falco rusticolus</i>	Blue	G5 (2016)	NAR	
Horned Lark, merrilli subspecies	<i>Eremophila alpestris merrilli</i>	Red	G5T4 (2016)		
Horned Lark, strigata subspecies	<i>Eremophila alpestris strigata</i>	Red	G5T2 (2016)	E	1-E (2005)
Horned Puffin	<i>Fratercula corniculata</i>	Red	G5 (2016)		
Hudsonian Godwit	<i>Limosa haemastica</i>	Red	G4 (2016)	T	
Lark Sparrow	<i>Chondestes grammacus</i>	Blue	G5 (2016)		
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Blue	G4 (2016)	T	1-T (2012)
Long-billed Curlew	<i>Numenius americanus</i>	Yellow	G5 (2016)	SC	1-SC (2005)
Long-tailed Duck	<i>Clangula hyemalis</i>	Blue	G5 (2016)		
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Blue	G3 (2016)	T	1-T (2003)
Northern Fulmar	<i>Fulmarus glacialis</i>	Red	G5 (2016)		
Northern Goshawk, atricapillus subspecies	<i>Accipiter gentilis atricapillus</i>	Blue	G5T5 (2016)	NAR	
Northern Goshawk, laingi subspecies	<i>Accipiter gentilis laingi</i>	Red	G5T2 (2016)	T	1-T (2003)
Northern Pygmy-owl, swarhi subspecies	<i>Glaucidium gnoma swarhi</i>	Blue	G4G5T3T4 Q (2019)		
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Yellow	G4 (2016)	SC	1-T (2010)
Peregrine Falcon	<i>Falco peregrinus</i>	No Status	G4 (2016)	SC	1-SC
Peregrine Falcon, anatum subspecies	<i>Falco peregrinus anatum</i>	Red	G4T4 (2016)	NAR	1-SC (2012)

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Peregrine Falcon, pealei subspecies	<i>Falco peregrinus pealei</i>	Blue	G4T3 (2016)	SC	1-SC (2003)
Pine Grosbeak, carlottae subspecies	<i>Pinicola enucleator carlottae</i>	Blue	G5T3 (2016)		
Prairie Falcon	<i>Falco mexicanus</i>	Red	G5 (2016)	NAR	
Purple Martin	<i>Progne subis</i>	Blue	G5 (2016)		
Red Knot	<i>Calidris canutus</i>	Blue	G4 (2016)	T	1-T (2010)
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Blue	G4G5 (2016)	SC	1-SC (2019)
Rough-legged Hawk	<i>Buteo lagopus</i>	Blue	G5 (2016)	NAR	
Rusty Blackbird	<i>Euphagus carolinus</i>	Blue	G4 (2016)	SC	1-SC (2009)
Sage Thrasher	<i>Oreoscoptes montanus</i>	Red	G4 (2016)	E	1-E (2003)
Sharp-tailed Grouse, columbianus subspecies	<i>Tympanuchus phasianellus columbianus</i>	Blue	G5T3 (2022)		
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Blue	G5 (2016)		
Short-eared Owl	<i>Asio flammeus</i>	Blue	G5 (2016)	T	1-SC (2012)
Smith's Longspur	<i>Calcarius pictus</i>	Blue	G4G5 (2016)		
Spotted Owl	<i>Strix occidentalis</i>	Red	G3G4 (2016)	E	1-E (2003)
Surf Scoter	<i>Melanitta perspicillata</i>	Blue	G5 (2016)		
Swainson's Hawk	<i>Buteo swainsoni</i>	Red	G5 (2016)		
Thick-billed Murre	<i>Uria lomvia</i>	Red	G5 (2016)		
Tufted Puffin	<i>Fratercula cirrhata</i>	Blue	G5 (2016)		
Tundra Swan	<i>Cygnus columbianus</i>	Blue	G5 (2016)		
Upland Sandpiper	<i>Bartramia longicauda</i>	Red	G5 (2016)		
Wandering Tattler	<i>Tringa incana</i>	Blue	G4G5 (2016)		
Western Grebe	<i>Aechmophorus occidentalis</i>	Red	G5 (2016)	SC	1-SC (2017)
Western Screech-Owl	<i>Megascops kennicottii</i>	No Status	G4G5 (2016)	T	1-T
Western Screech-Owl, kennicottii subspecies	<i>Megascops kennicottii</i>	Blue	G4G5T4 (2016)	T	1-T (2005)

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Western Screech-Owl, <i>macfarlanei</i> subspecies	<i>Megascops kennicottii macfarlanei</i>	Blue	G4G5T4 (2016)	T	1-T (2005)
White-headed Woodpecker	<i>Dryobates albolarvatus</i>	Red	G4 (2016)	E	1-E (2003)
White-tailed Ptarmigan, <i>saxatilis</i> subspecies	<i>Lagopus leucura saxatilis</i>	Blue	G5T3T4 (2021)		
White-throated Swift	<i>Aeronautes saxatalis</i>	Blue	G5 (2016)		
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Blue	G5 (2016)	E	1-E (2006)
Winter Wren	<i>Troglodytes hiemalis</i>	Blue	G5 (2016)		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Red	G5 (2016)		
Yellow-breasted Chat	<i>Icteria virens</i>	Red	G5 (2016)	E	1-E (2003)

5. Wildlife Survey Results

Sections 5.1, 5.2, 5.3, highlight the overall results of den, nest, and hibernacula surveys. Section 5.3 also highlights specific survey details where additional actions were implemented after a nest was located, or nests were suspected in a given area during surveys.

For specific survey details by date, please refer to Appendix 2, which provides detailed survey information including:

- the dates and surveys completed,
- with spatial areas covered (points and/or tracks, depending on the survey)
- observations, weather, site notes, etc.
- All mitigations applied (i.e., buffers implemented, what size, any activity allowances, any cameras or other monitoring implemented)
- Dates of follow up monitoring
- Details of any changes to mitigations and notes/reason
- Outcomes of mitigations – when buffers were removed and why

5.1 Bear and Furbearer Den Survey Results

No active furbearer or bear dens were observed or identified during these surveys.

5.2 Hibernacula Survey Results

No active hibernacula were observed or identified during these surveys.

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5.3 Nest Survey Result

In March and April, no active nests or cavities nests were identified during the surveys, however, as the nesting window moved into full swing, more nesting behavior was observed, and machine free zones or buffers were established to protect nesting Birds. The following paragraphs highlight the cases where this occurred and details the actions taken.

On April 4th, 2023, in area Sequence 3 (Appendix 2 - Table 19). This area had been previously flagged by another survey crew as potentially containing a white-winged crossbill nest. Avison's Wildlife Crew was asked by Artemis to conduct an intensive search of the area. This search did not yield the location or identification of any active or inactive nests; however, surveyors did observe and note several white-winged crossbill's in the area. Although the crew could not locate a nest, the crew could not say with 100% certainty that there was not a nest and referred the information to the Artemis environmental department. Following deliberation on the matter, Artemis directed the Avison wildlife crew to remove the ribbon around the machine free zone.

On May 15, 2023 in area 2M – BP1 (Seq 8) and 3B – WMP was surveyed (Appendix 2 - Table 27). No nests were visually located, however, based on defensive behavior and vocalizations it is presumed that there are nests of an American Robin, a Boreal Chickadee, and a spruce grouse In the Northeast tip of the 2M – BP1 (Seq 8) Mulching area map. This area was ribboned out to avoid any clearing inside the ribboned area during the remaining nesting window.

On May 23, 2023, a construction crew discovered a bird nest in a previously cleared area while undertaking stripping activities in one of our work sites at (Location: 53.18984° N, 124.86289° W, Area: Andrew's Hill (Old MSA Pad)). The nest was confirmed to be that on an American Robin (*Turdus migratorius*) and had two Robin eggs in the nest. A 100m work and machine free buffer was placed around the nest. The nest was then monitored by Biologists and/or technicians from a safe distance using binoculars to determine if the nest was being actively used. On June 12, 2023, after 20 days with no further observations of a nesting pair or any American Robin nesting or displaying nesting behavior on or near the nest, and with temperatures on many nights well below and with snow events, it was determined by Avison's Biologist Olin Albertson RPBio, that the eggs were likely no longer viable, and that the nest had been abandoned. As a result, the environmental team at BW allowed the buffer to be removed and construction activities resumed.

Previously, the Migratory Birds Regulations (MBR) provided year-round protection for nests from being disturbed, destroyed or taken, anywhere in Canada where they were found, for as long the nest existed, for all 395 migratory bird species that are included in the Migratory Birds Convention Act. The Migratory Birds Regulations, 2022 (MBR 2022) change protection from all nests of migratory birds always being protected to most nests being protected only when they contain a live bird or viable egg. This supports conservation benefits, as the nests of most migratory birds only have conservation value when they are active (contain a bird or viable egg), and also provides flexibility and predictability for stakeholders to manage their compliance requirements as they undertake activities on the landscape that may affect migratory bird nests." (<https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/fact-sheet-nest-protection-under-mbr-2022.html>)

6. Conclusions

No Bear dens, Furbearer dens, or bat hibernacula were found during these surveys. In March and April, with the exception of White-Winged Crossbills, little nesting activity is observed at this elevation. During early surveys in March and April, no active bird nests were located, however, as the nesting window time frame continued into May, breeding behavior and nesting activity intensified, and pre-clearing and/or construction activities were temporarily halted and buffers placed around nesting areas in specific locations where nest we either located, or suspected. As a result of intensified breeding behavior and nesting activity in May, the pre-clearing work window timeframes also decreased to five days following a survey. The decrease in a valid work window timeframe requires intensive work planning from construction managers to minimize having to survey the same location multiple times when a work window expires.

7. Limitations

The assessment(s) of the project site(s) described in this report have been made using acceptable minimal standards for detecting Bear and Furbearer Dens, and Hibernacula. Additionally, the assessment(s) described in this report have been made using acceptable standards for an Active Bird Nest Survey Program (ABNSP) and inactive nests outside the breeding window for use in pre-clearing surveys. These surveys are designed to help meet requirements for due diligence on behalf of the client(s) to achieve compliance with Federal and Provincial legislation pertaining to migratory birds and species at risk. Legislation includes the Federal Migratory Bird Convention Act [1994 c.22] and Migratory Birds Regulations [C.R.C., c. 1035], Species at Risk Act [2002, c.29] and British Columbia Wildlife Act [RSBC 1996 c.4SS]. The ABNSP follows standards relevant to nesting surveys outlined in the Inventory Methods of Forest and Grassland Songbirds, Standards for Components of British Columbia's Biodiversity No. 15 (RIC 1999) and Inventory Methods for Raptors, Standards for Components of British Columbia's Biodiversity No. 11 (RIC 2001). The program also follows recommendations outlined by the Canadian Wildlife Service (CWS). Where appropriate, survey methods deemed may be modified to account for local and/or site-specific conditions.

Notwithstanding the recommendations and conclusions made in this correspondence, it must be acknowledged that bear dens, furbearer dens, hibernacula, stick nest, cavity nests, and other bird nests, can sometimes be difficult to locate despite following established protocols and making best possible survey efforts. While all reasonable efforts have been made to ensure the surveys were completed to the best possible standards, no guarantees are offered, or implied. It is both professionally and practically impossible to predict with absolute certainty that all bear dens, hibernacula, and nests have been accounted for. In accordance with standard protocols, the assessment presented in this correspondence, work windows following surveys are valid for a specified period of time after the last survey date. As the Avian nesting window intensifies, survey validity windows become shorter. Work windows following surveys typically range from two weeks to a couple of days, and are specified by the supervising survey wildlife biologist. If no work is initiated by the client(s) within specified time frames, a new survey is required. Approval and implementation of any recommendations made within this correspondence is the responsibility of the client, and in no way implies any inspection or supervisory role on the part of Avison Management Services Ltd. In the event that inspection or supervision of all or part of the implementation plan is requested, the request shall be in writing and the details agreed to in writing by both parties. Sketches, diagrams and photographs contained in this report, being intended as visual aids, should not be construed as engineering reports or legal surveys.

8. References

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9. Appendices

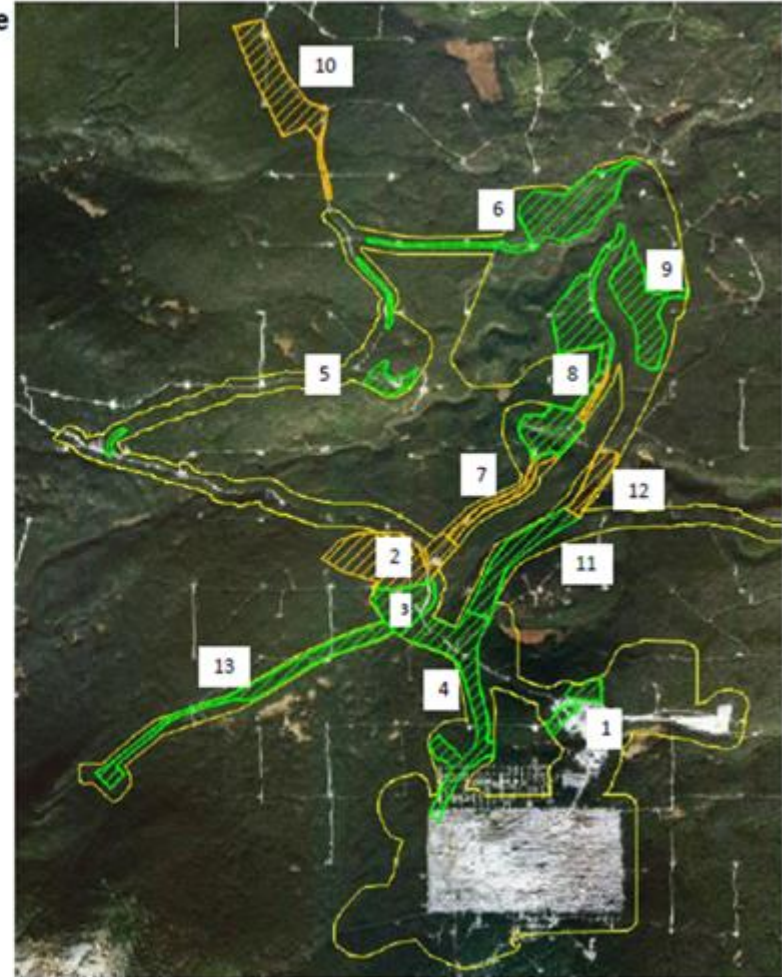
9.1 Appendix 1. Map of Prioritized Clearing Plan as of March 7, 2023.

Initial BW Clearing Areas – Trigger is Wetlands Offsetting Plan; Complete

- Yellow Lines** = Early Works OLTC
- Green Hatching** = Available no interaction with Canfor
- Orange Hatching** = Areas within Canfor Tenure (logs stacked separately for Canfor)

*Available clearing limits have been selected based on infrastructure requirements, current OLTC approval, 30m offset from all potential fish-bearing watercourses (except those where road crossings already exist)
 **The cut areas require approval from Canfor to harvest. These blocks should be harvested under Canfor tenure, as they must be completed prior to April 1, 2023, to support topsoil stockpile development.



Area Name/Description	Sequence Number	Area (Ha)
ROM Pad	1	5.8
TS-3 and A-Trail Laydown (Canfor Tenure)	2	26.1
North MAC Haul Road	3	10.9
MAC to Pit Haul Road	4	26.0
C-Trail and Zone S/C Borrow	5	6.9
C-Trail Offshoot and Esker	6	27.8
A-trail to WMP (Canfor Tenure)	7	5.2
WMP, E-Trail, Borrow Area	8	32.8
TSF East Side	9	19.4
TS-6 (CANFOR TENURE)	10	23.6
TSF Haul Road	11	13.9
TSF Haul Road (Canfor Tenure)	12	6.24
Explosives Access Road	13	16.9
Total:		221.6



9.2 Appendix 2. Summary of Results for Wildlife Pre-clearing Surveys.



9.2.1 Week of March 8th-10th, 2023

Table 5. Rom Pad Decking Area - Pre-clearing Wildlife Survey, March 8th, 2023.

Name	Area
<i>ROM Pad</i>	<i>Approx. 3 ha</i>
Survey Date	Survey Start and End Time
<i>March 8th, 2023</i>	<i>11:00 am - 12:45 pm</i>
Weather	Conditions
<i>Clear and -4 degrees Celsius</i>	<i>1.5 m of Snow</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<i>Tracks of Snowshoe hare, Red squirrel, Red fox, Pine Marten, Spruce Grouse, and Short-tailed weasel were observed,</i>	<i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.</i>



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Table 6. MAC to Pit Haul Road Decking Area 2 - Pre-clearing Wildlife Survey, March 9th, 2023.

Name	Area
MAC to Pit Haul Road Decking Area 2	Approx. 5.1 ha
Survey Date	Survey Start and End Time
March 9 th , 2023	8:30 am - 11:00 pm
Weather	Conditions
Clear and -8 degrees Celsius	1.5 m of Snow
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Snowshoe hare, Red squirrel, Red fox, Pine Marten, Spruce Grouse, and Short-tailed weasel were observed, A Gray jay was observed, a Raven was heard vocalizing, and an unknown species of woodpecker species was heard drumming on a distant tree.	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.



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Table 7. MAC to Pit Haul Road Decking Area 1 - Pre-clearing Wildlife Survey, March 9th, 2023.

Name	Area
MAC to Pit Haul Road Decking Area 1	Approx. 2.41 ha
Survey Date	Survey Start and End Time
March 9 th , 2023	1:30 pm – 15:30 pm
Weather	Conditions
Clear and -4 degrees Celsius	1.5 m of Snow
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Lynx, Snowshoe hare, Red squirrel, Red fox, Pine Marten, Spruce Grouse, and Short-tailed weasel were observed.	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.


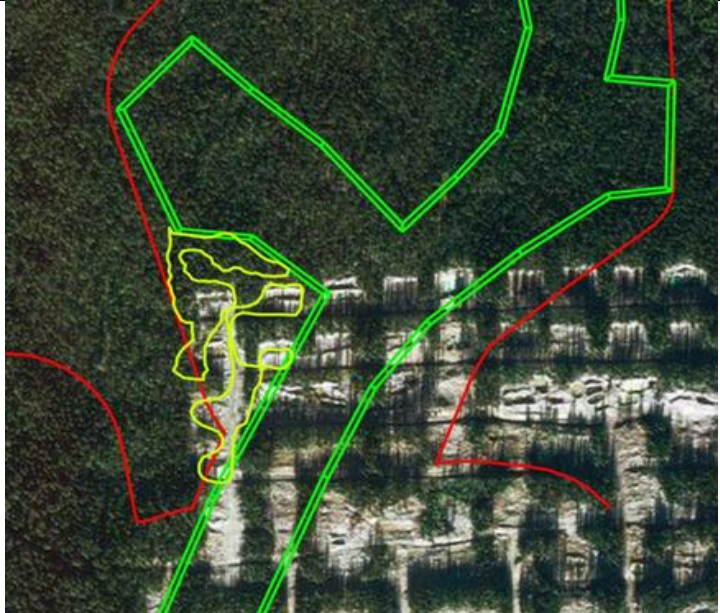
2023 Annual Pre-clearing Wildlife Survey Report

Table 8. MAC to Pit Haul Road Proposed Decking Area - Pre-clearing Wildlife Survey, March 10th, 2023.

Name	Area
MAC to Pit Haul Road – Proposed Decking Area	Approx. 3.8 ha
Survey Date	Survey Start and End Time
March 10 th , 2023	7:45 am – 9:30 am
Weather	Conditions
Overcast and -4 degrees Celsius	1.5 m of Snow
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Lynx, Snowshoe hare, Red squirrel, Pine Marten, Spruce Grouse, and Short-tailed weasel were observed.	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.

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Table 9. MAC to Pit Haul Road Decking Area #3 - Pre-clearing Wildlife Survey, March 10th, 2023.

Name	Area
MAC to Pit Haul Road Decking Area #3	Approx. 1.36 ha
Survey Date	Survey Start and End Time
March 10 th , 2023	11:00 am – 12:45 pm
Weather	Conditions
Clear and -4 degrees Celsius	1.5 m of Snow
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Lynx, Snowshoe hare, Red squirrel, Pine Marten, Willow Ptarmigan, and Short-tailed weasel were observed. Two Canada Jays were also observed.	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.

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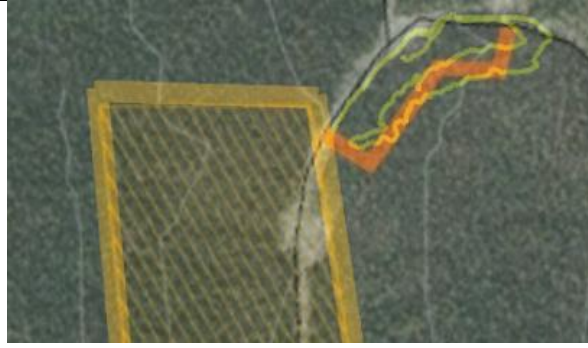
9.1.2 Week of March 20th-24th, 2023

Table 10. Sequence 10 - Pre-clearing Wildlife Survey, March 20th – March 21st, 2023.

Name	Area
Sequence 10	Approx. 23.6 ha
Survey Date	Survey Start and End Time
March 20 th – 21 st , 2023	12:00 - 16:30 pm; 8:00 – 16:00 PDT
Weather	Conditions
Clear and -1° C	Snow covered
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Snowshoe hare, Red squirrel, Red fox, Pine Marten, Spruce Grouse, and were observed. Nuthatch and Raven was visually identified. Boreal Chickadee, White-Winged Crossbill and Dark-Eyed Junco identified by call	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed. The upper portion was completed prior to Avison returning to site March 20 th .



2023 Annual Pre-clearing Wildlife Survey Report

Table 11. Sequence 10 Proposed Decking Area - Pre-clearing Wildlife Survey, March 22nd, 2023.

Name	Area
Sequence 10 Proposed Decking Area Directly North East	Approx. 1 ha
Survey Date	Survey Start and End Time
March 22 nd , 2023	8:00 am - 10:00 pm
Weather	Conditions
Clear and -2°C	Snow Covered
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
Tracks of Snowshoe hare, Red squirrel were observed. a Raven was seen in the area and herd vocalizing. An American Three Toed woodpecker species visually identified and photographed.	Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.



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Table 12. Sequence 10 Proposed Decking Area - Pre-clearing Wildlife Survey, March 22nd, 2023.

Name	Area
<i>Sequence 10 Proposed Decking Area Directly East</i>	<i>Approx. 1 ha</i>
Survey Date	Survey Start and End Time
<i>March 22nd, 2023</i>	<i>11:15 – 12:15 PDT</i>
Weather	Conditions
<i>Clear and 0°C</i>	<i>Snow Covered</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<i>Tracks of Spruce Grouse and Snowshoe Hare were observed in the area. Dark-Eye Junco and White-Winged Crossbill were identified by their call.</i>	<i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.</i>


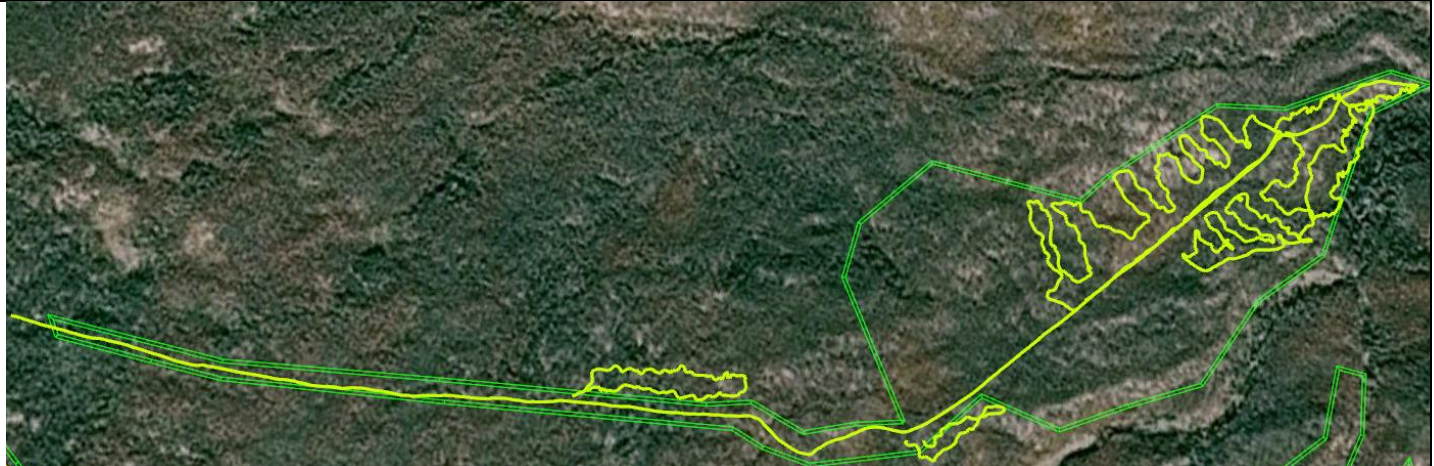
2023 Annual Pre-clearing Wildlife Survey Report

Table 13. Sequence 10 extension - Pre-clearing Wildlife Survey, March 10th, 2023.

Name	Area
<i>Sequence 10 - extension</i>	<i>Approx. 7 ha</i>
Survey Date	Survey Start and End Time
<i>March 23rd, 2023</i>	<i>7:45 – 10:30</i>
Weather	Conditions
<i>Overcast and 0 degrees Celsius</i>	<i>Snow cover, crusted</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<i>Tracks of coyote, Snowshoe hare, Red Squirrel, and Spruce Grouse were observed. American Robin identified by call.</i>	<i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.</i>

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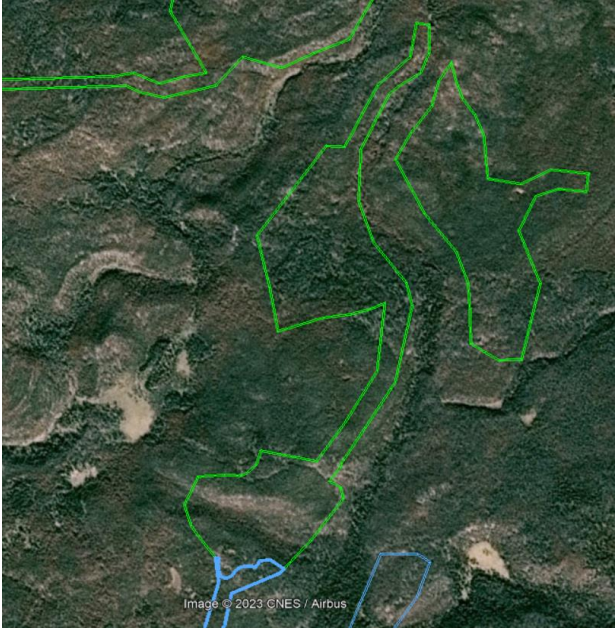
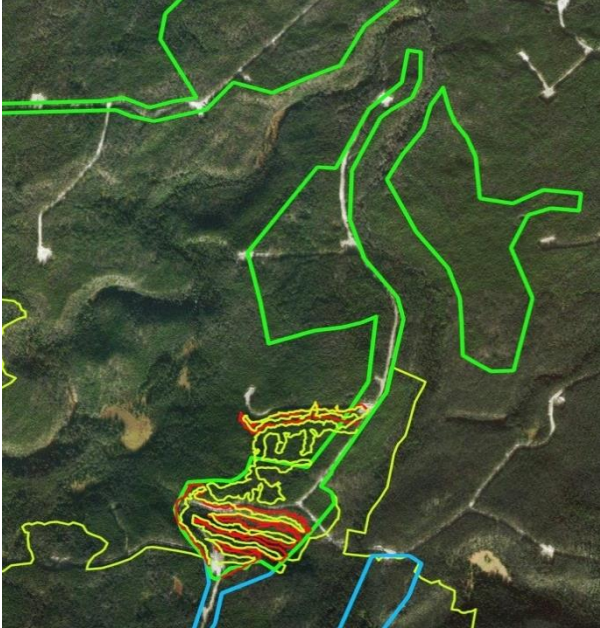
Table 14. Sequence 6 and additional Decking Areas - Pre-clearing Wildlife Survey, March 21st – 24th, 2023.

Name	Area
<i>Sequence 6 and additional decking areas</i>	<i>Approx. 12 ha</i>
Survey Date	Survey Start and End Time
<i>March 22nd, 23rd, 24th, 2023</i>	<i>10:00 – 12:30; 12:00 – 15:00; 8:00 – 11:30</i>
Weather	Conditions
<i>Clear to Overcast. -4°C to +3°C</i>	<i>Snow covered, crusted</i>
Proposed Clearing Area Map	
	
Survey Track	
	
Observed Wildlife	Comments
<i>Tracks of Snowshoe hare, Red squirrel and Spruce Grouse were observed.</i>	<i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed. Two addition decking areas were surveyed on request of the client</i>

2023 Annual Pre-clearing Wildlife Survey Report

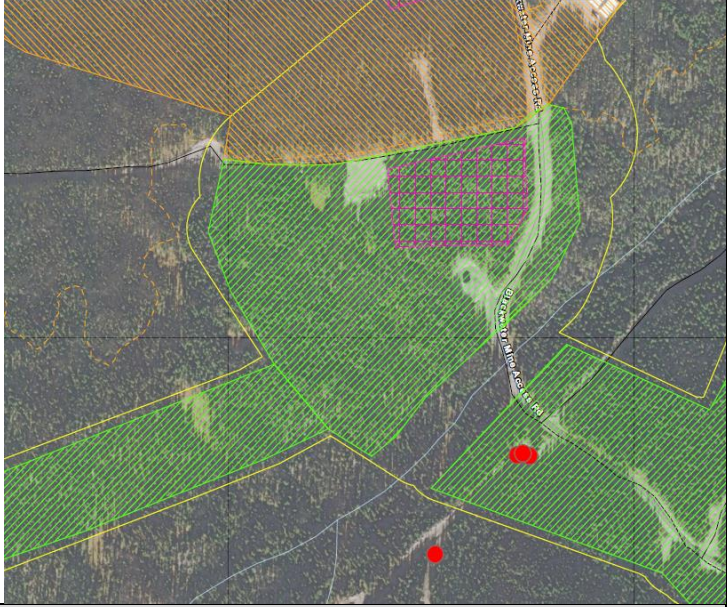
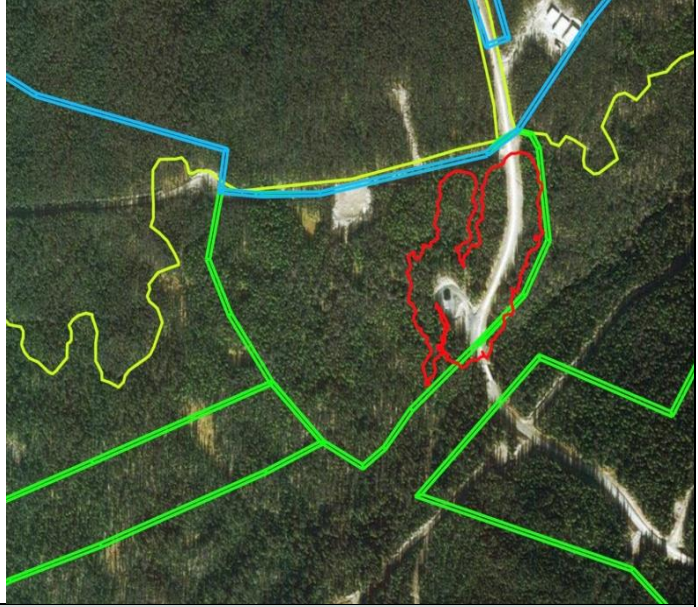
9.1.3 Week of March 29th-31st, 2023

Table 15. Sequence 8 - Pre-clearing Wildlife Survey, March 29th – March 30th, 2023.

Name	Area
<i>Sequence 8 and additional area</i>	<i>Approx. 32.8 ha</i>
Survey Date	Survey Start and End Time
<i>March 29th – 30th, 2023</i>	<i>12:00 - 17:30 pm; 8:30 – 12:00 PDT</i>
Weather	Conditions
<i>Clear and -6 - +2° C</i>	<i>Snow covered</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<p><i>Tracks of Snowshoe hare, Red squirrel, Pine Marten, Red Fox, and Spruce Grouse were observed. Spruce Grouse and Dark-Eyed Junco were visually identified as well.</i></p>	<p><i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed. The northern portion was completed by another crew.</i></p>

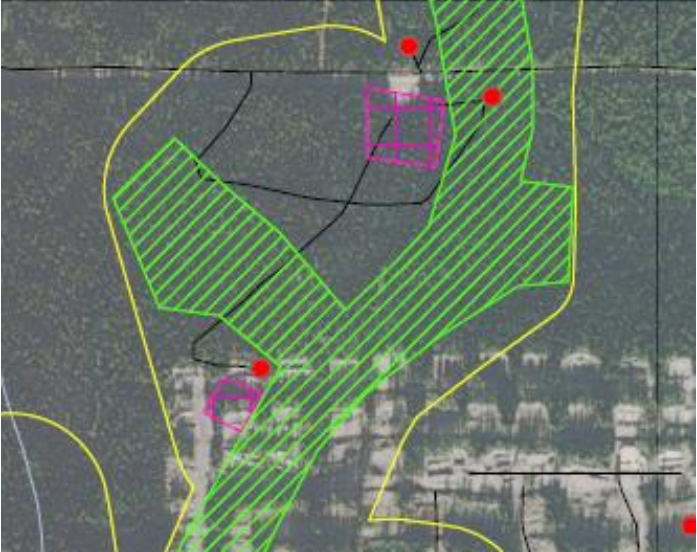

2023 Annual Pre-clearing Wildlife Survey Report

Table 16. Sequence 3 - Pre-clearing Wildlife Survey, March 30th, 2023.

Name	Area
<i>Sequence 3</i>	<i>Approx. 10.3 ha</i>
Survey Date	Survey Start and End Time
<i>March 30th, 2023</i>	<i>12:30 pm - 2:45 pm</i>
Weather	Conditions
<i>Clear and +4°C</i>	<i>Snow Covered</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<i>Tracks of Snowshoe hare, Red squirrel, Red Fox, Pine Marten, and Spruce Grouse were observed. White-winged Crossbill was identified by call.</i>	<i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed.</i>

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Table 17. Sequence 4 - Pre-clearing Wildlife Survey, March 31st, 2023.

Name	Area
Sequence 4	Approx. 26 ha
Survey Date	Survey Start and End Time
March 31 st , 2023	8:15 – 11:45 PDT
Weather	Conditions
Snowing and -3°C	Snow Covered
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<p>Tracks of Spruce Grouse, Snowshoe Hare, Pine Marten, Red Squirrel, and Red Fox were observed in the area. White-Winged Crossbill, American Three-toed Woodpecker, Common Raven, and Canada Jay were visually observed and identified by their call.</p>	<p>Lots of Red Fox tracks were observed in the area covered but no den was found. The pin location had 3-4 White-winged Crossbill and will be revisited to further investigate potential nesting in the area. Otherwise, no dens, nests, or hibernacula were observed.</p>

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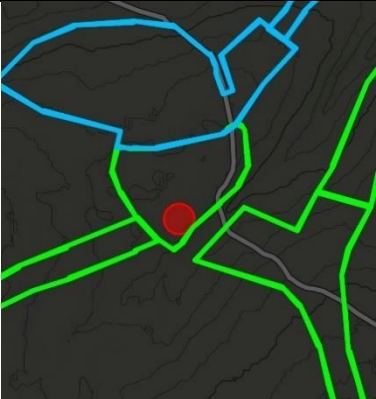
9.1.4 Week of April 3rd-6th, 2023

Table 18. Sequence 8 Amendment - Pre-clearing Wildlife Survey, April 3rd – April 4th 2023.

Name	Area
<i>Sequence 8 amendment</i>	<i>Approx. 4 ha</i>
Survey Date	Survey Start and End Time
<i>April 3rd – April 4th 2023</i>	<i>12:00 – 15:30 and 10:00 – 11:00 PDT</i>
Weather	Conditions
<i>Clear and -1° C</i>	<i>Snow covered</i>
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<p><i>Tracks of Snowshoe hare and Pine Marten were observed. A Bald Eagle was visually identified flying over the area.</i></p>	<p><i>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed. The bird nests that potentially identified were re-evaluated with infrared camera and remote camera. No signs of use or activity were noted</i></p>

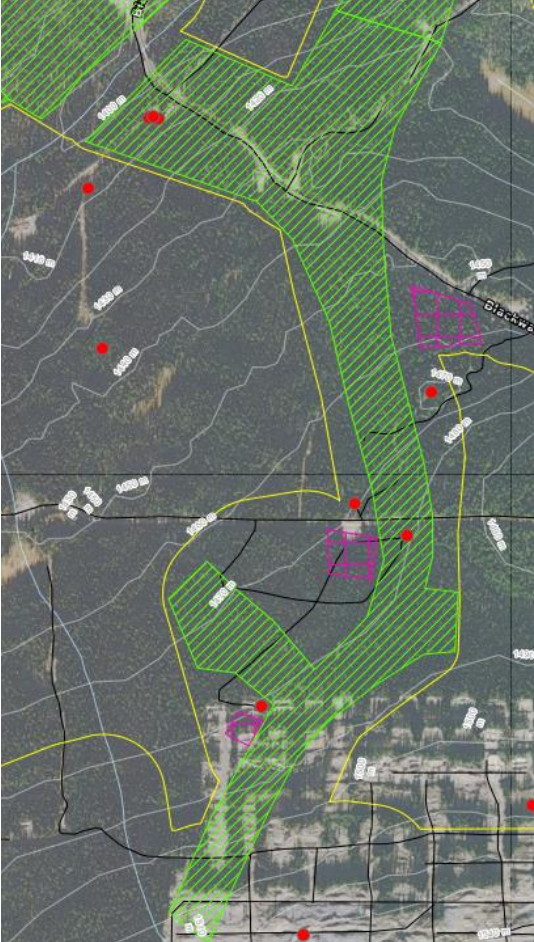
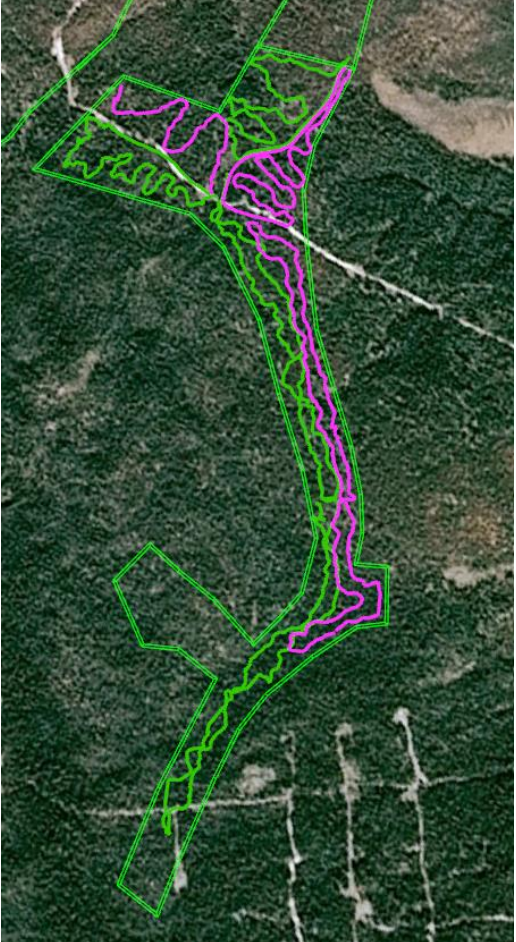
2023 Annual Pre-clearing Wildlife Survey Report

Table 19. *Sequence 3 Re-assessment of potential White winged crossbill nesting area - Pre-clearing Wildlife Survey, April 4th, 2023.*

Name	Area
<i>Sequence 3 potential White winged crossbill nesting area</i>	<i>Approx. 0.5</i>
Survey Date	Survey Start and End Time
<i>April 4th 2023</i>	<i>8:00 am – 9:30 am</i>
Weather	Conditions
<i>Clear and -14°C</i>	<i>Snow Covered</i>
Proposed Clearing Area Map	Survey Track
	<i>N/A</i>
Observed Wildlife	Comments
<i>The survey crew confirmed the presence of several White winged crossbills in the area. At least 3 individual birds of such species were observed. All bird behaviours noted at the time of the survey were similar to those previously reported by the other survey crew.</i>	<i>This area had been previously flagged by a separate surveying crew as potentially containing a white-winged crossbill nest. Avison’s Wildlife Crew was asked by Artemis to conduct an intensive search of the area. This search did not yield the location or identification of any active or inactive nests, however, surveyors did observe and note several white-winged crossbill’s in the area. Although the crew could not locate a nest the crew could not say with 100% certainty that there was not a nest and referred the information to the Artemis environmental department. Following deliberation on the matter, Artemis directed the Avison wildlife crew to remove the ribbon around the machine free zone.</i>

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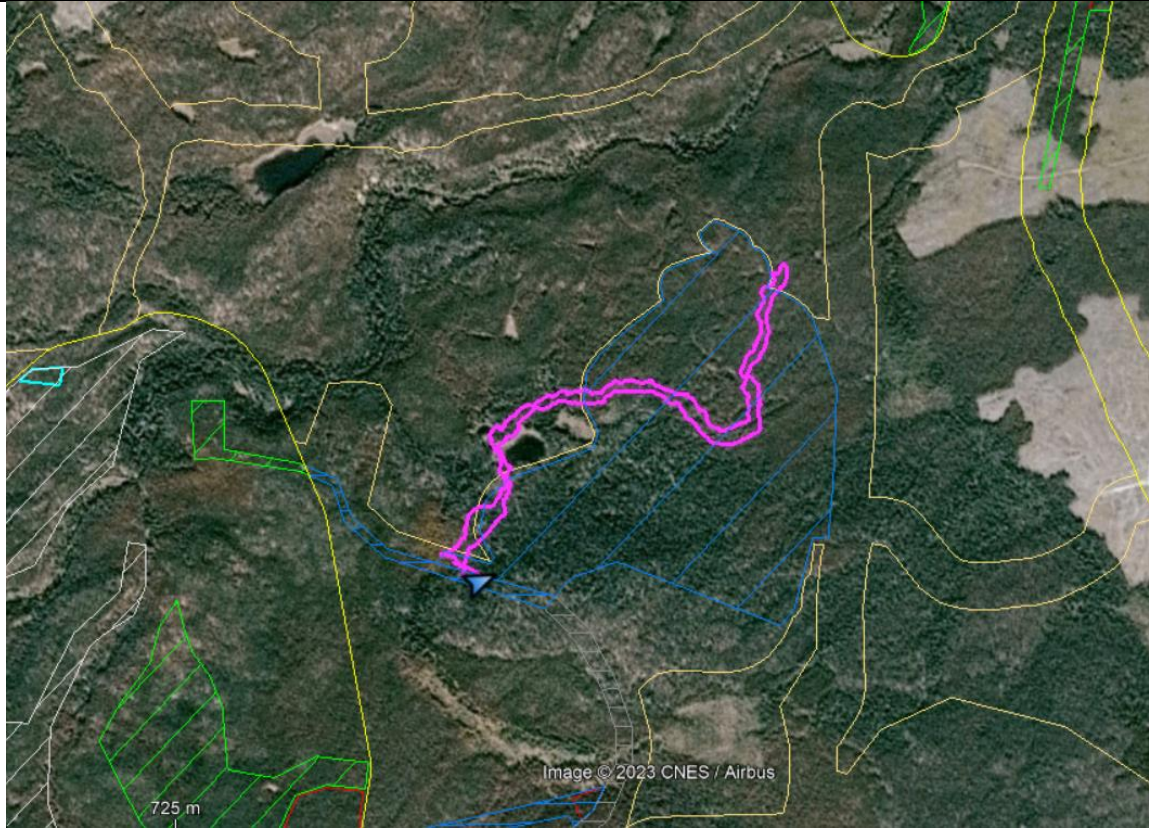
Table 20. Sequence 4 - Pre-clearing Wildlife Survey, April 4th - 5th, 2023.

Name	Area
Sequence 4	Approx. 26 ha
Survey Date	Survey Start and End Time
April 4 th and April 5 th 2023	13:00 – 15:00 and 8:00 – 15:30 PDT
Weather	Conditions
Clear and -2°C	Snow Covered
Proposed Clearing Area Map	Survey Track
	
Observed Wildlife	Comments
<p>Tracks of Spruce Grouse, Foxes, and Snowshoe Hare were observed in the area. Dark-Eye Junco, Chipping Sparrow, and Boreal Chickadee were identified by their call. Woodpecker drumming (unable to identify species) was also reported but not observed.</p>	<p>Although tracks were observed in the proposed clearing area, no dens, nests, or hibernacula were observed. Surveyor ended after the tree line at the south portion at the current “ore body). No trees or habitat is in the area and the surveyor had full visibility of the area. No concerns were noted.</p>

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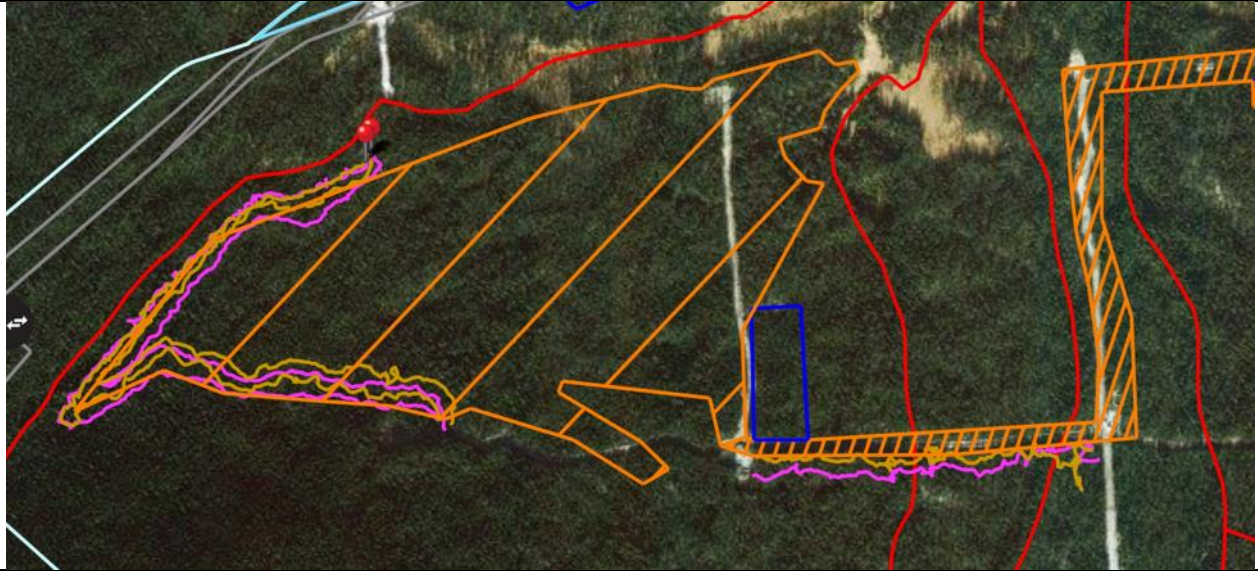
9.1.5 Week of April 17th-21st, 2023

Table 21. TS4B - Pre-clearing Wildlife Survey, April 17th 2023.

Area Name	Surveyor
TS4B	Fernando Villegas/ Scott Klassen
Survey Date	Survey Start and End Time
April 17, 2023	12:00 – 18:00 PDT
Weather	Conditions
Clear, +2C	Snow covered
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<p><i>Tracks of snowshoe hare, grouse, red squirrel and pine marten, but no dens. As for birds, Dark-Eyed Junco identified by call, American 3-toed woodpecker sighting near the 'lake'. Lake and wetland completely snow/ice covered.</i></p>	<p><i>No nest, hibernacula or dens have been found during this survey. Coverage was doubled vs. the image above, as 2nd surveyor did not have active track recording device.</i></p>

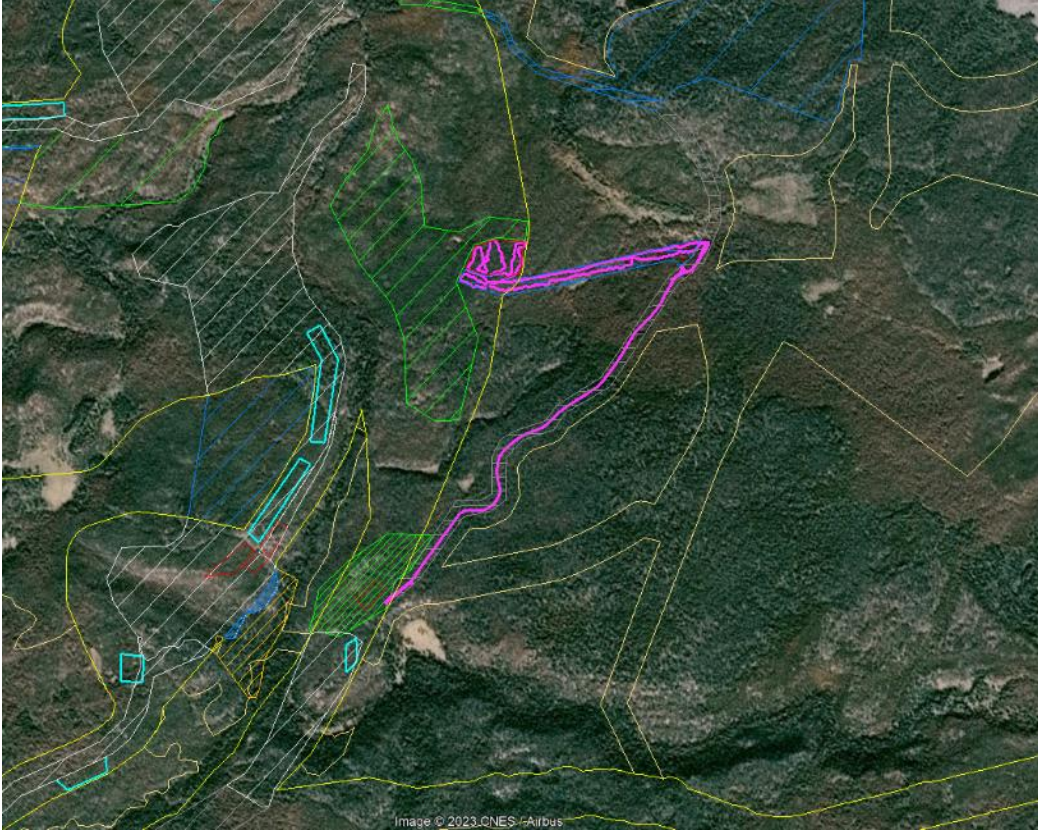
2023 Annual Pre-clearing Wildlife Survey Report

Table 22. TS2 area - Pre-clearing Wildlife Survey, April 18th, 2023.

Area Name	Surveyor
TS2	Fernando Villegas/ Scott Klassen
Survey Date	Survey Start and End Time
April 18, 2023	11:00 – 16:00 PDT
Weather	Conditions
Intermittent snow, -6C to -2C	Snow covered
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<p>Tracks of Snowshoe hare, Wolverine, Pine Marten, Red Squirrel, and Fox were observed. Dark-Eyed Junco, Boreal Chickadee, Clark's Nutcracker were identified by call. Recent bark scaling activity by woodpeckers observed on several mature dead spruce trees.</p>	<p>No nest, hibernacula or dens have been found during this survey. The spatial boundaries of the TS-2 road shape were slightly different at the time of the survey: the underlay on the above image is more recent. Also ribboned off the 30m buffer of the stream at the west end of TS-2, and the two streams crossing the existing road west of the blue laydown rectangle in the above image.</p>


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Table 23. Access to Sequence 9 - Pre-clearing Wildlife Survey, April 19th, 2023.

Area Name	Surveyor
Access to Sequence 9	Fernando Villegas
Survey Date	Survey Start and End Time
April 19, 2023	6:30 – 13:30 PDT
Weather	Conditions
Clear	Snow covered
Proposed Clearing Area Map and Survey Track	
 <p>The image is an aerial satellite photograph of a rugged, forested landscape. A prominent pink line traces a path through the terrain, likely representing the survey track. Several areas are outlined in green and yellow, indicating proposed clearing zones. The terrain is characterized by steep slopes and dense vegetation. A small copyright notice 'Image © 2023 CNES - Airbus' is visible at the bottom center of the map.</p>	
Observed Wildlife	Comments
Tracks of Snowshoe hare were observed. Dark-Eyed Junco, Boreal Chickadee and White-winged Crossbill were identified by call.	No nest, hibernacula or dens have been found during this survey.


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Table 24. ROM Pad - Pre-clearing Wildlife Survey, April 19th, 2023.

Area Name	Surveyor
ROM Pad	Fernando Villegas
Survey Date	Survey Start and End Time
April 19, 2023	14:00 – 16:30PDT
Weather	Conditions
Clear	Snow covered
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
Tracks of Snowshoe hare were observed. Dark-Eyed Junco, Boreal Chickadee and White-winged Crossbill were identified by call.	No nest, hibernacula or dens have been found during this survey.


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Table 25. TS2 - Complete with decking, April 19th – 20th, 2023

Name	Surveyor
<i>TS2 – completed with Decking</i>	<i>Dudley Phillips</i>
Survey Date	Survey Start and End Time
<i>April 20, 2023</i>	<i>6:30 – 18:00 PDT</i>
Weather	Conditions
<i>Snowing</i>	<i>Snow covered</i>
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<i>Tracks of Snowshoe hare and Pine Marten and wolverine were observed. Dark-Eyed Junco, Boreal Chickadee and Whit-Wing Crossbills were identified by call</i>	<i>No nests, hibernacula or dens have been found during this survey.</i>

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Table 26. Requested Areas, April 21st, 2023

Name	Surveyor
<i>Requested areas</i>	<i>Dudley Phillips</i>
Survey Date	Survey Start and End Time
<i>April 20, 2023</i>	<i>6:30 – 12:00PDT</i>
Weather	Conditions
<i>Clear</i>	<i>Snow covered</i>
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<i>Tracks of Snowshoe hare and Fox were observed. Dark-Eyed Junco, Boreal Chickadee were identified by call. Unknown woodpecker was noticed in the distance.</i>	<i>No nests, hibernacula or dens have been found during this survey.</i>

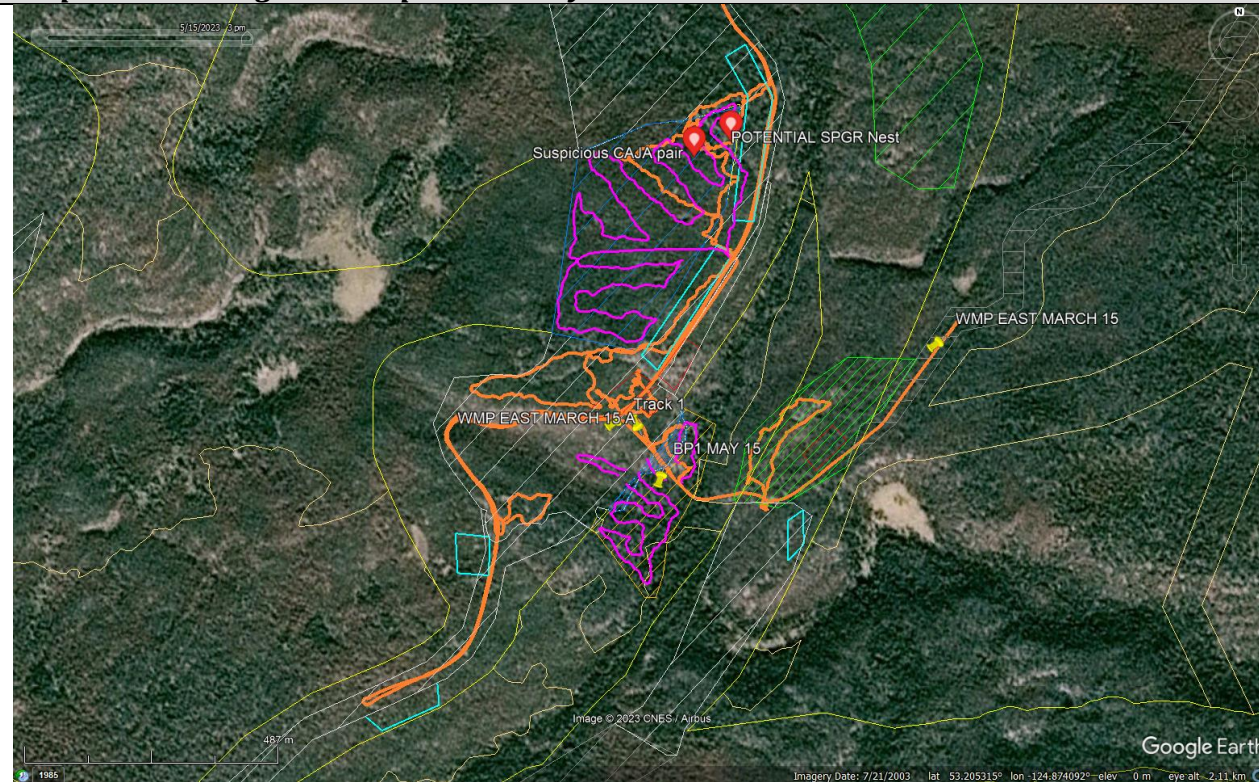
2023 Annual Pre-clearing Wildlife Survey Report

9.1.6 Week of May 15th-18th, 2023

Table 27. 2M-BP1 - Pre-clearing Wildlife Survey, May 15th 2023.

Area Name	Surveyor
2M – BP1 (Seq 8) and 3B - WMP	Olin Albertson/Sam Lynch
Survey Date	Survey Start and End Time
May 15, 2023	10:30 - 15:00 PDT
Weather	Conditions
Sunny, +25 C	No Snow and Dry

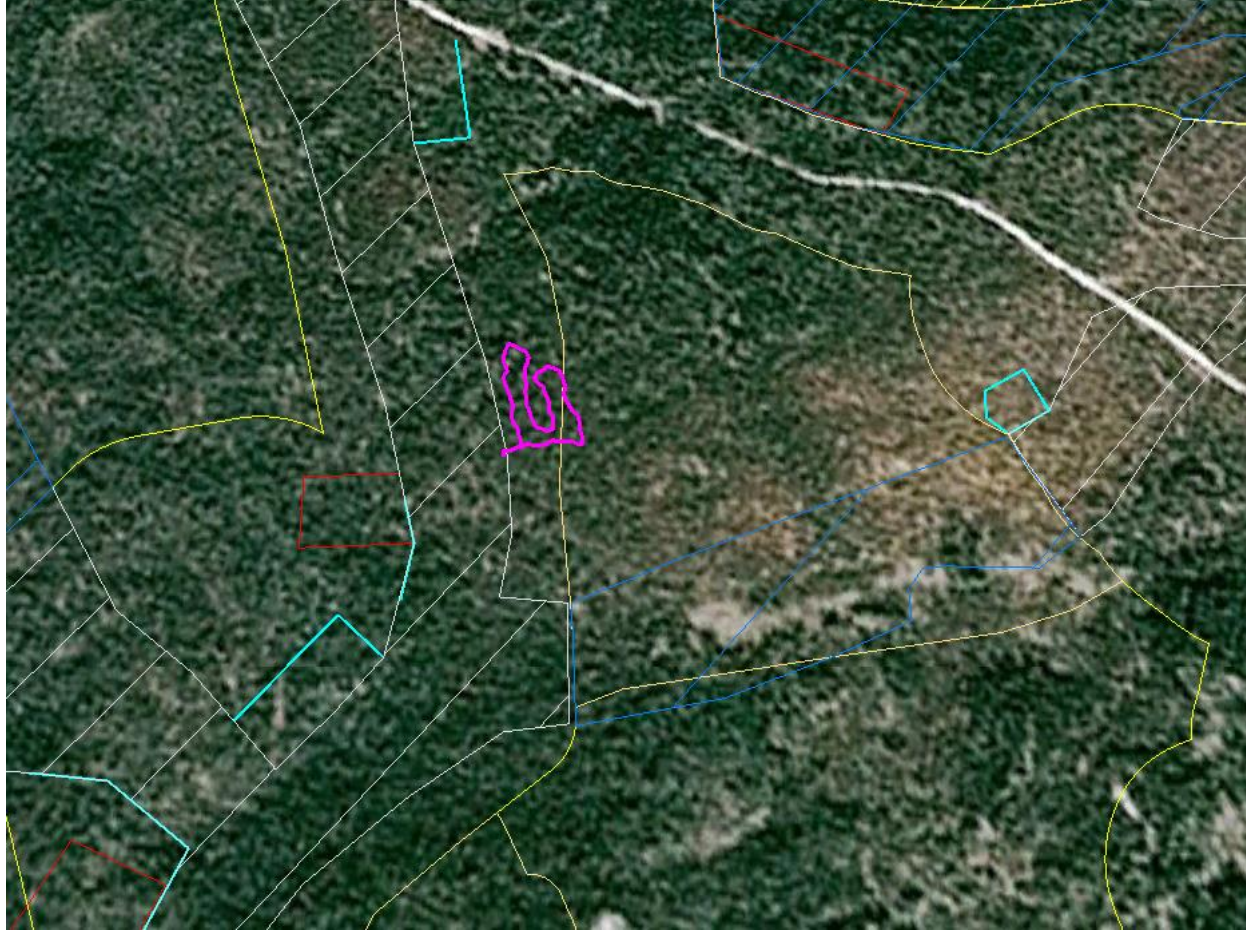
Proposed Clearing Area Map and Survey Track



Observed Wildlife	Comments
<p>The following birds were identified by sight or sound during the survey: Dark-Eyed Junco, Boreal Chickadee, Yellow-rumped Warbler, American Robin, Canada Jay, and Spruce Grouse,</p>	<p>No Nest were visually located, however, based on defensive behavior and vocalizations it is believed that there are nests of an American Robin, a Boreal Chickadee, and a spruce grouse in the Northeast tip of the 2M – BP1 (Seq 8) Mulching area map. This area was ribboned out to avoid any clearing inside the ribboned area during the remaining nesting window. Aside from this area, no other nests, nest cavities, hibernacula, or dens were identified or located during this survey. Clearing of the areas aside from the one that is machine free ribboned, is approved for up to 5 days including the day these areas were surveyed..</p>

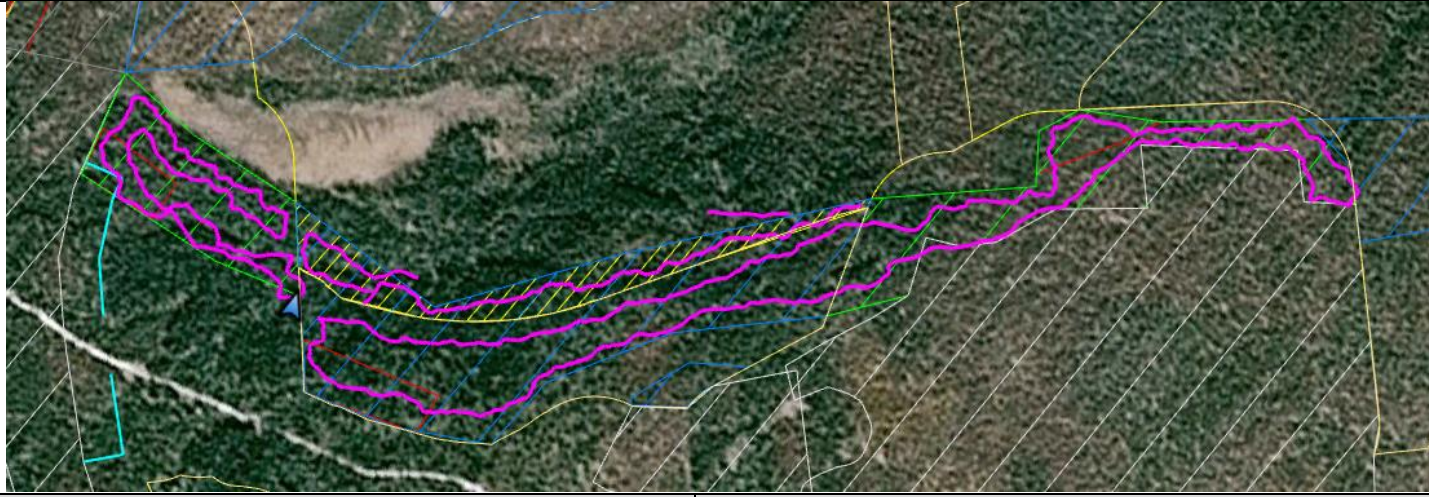
2023 Annual Pre-clearing Wildlife Survey Report

Table 28: Intersection of the M Road and the MAC to Pit Haul Road

Area Name	Surveyor
<i>Intersection of the M Road and the MAC to Pit Haul Road</i>	<i>Olin Albertson</i>
Survey Date	Survey Start and End Time
<i>May 15, 2023</i>	<i>15:45 – 16:15 PDT</i>
Weather	Conditions
<i>Clear, +25C</i>	<i>No Snow and Dry</i>
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<i>The following birds were identified by sight or sound during the survey: Yellow-rumped Warbler.</i>	<i>Construction was asking for a small triangle section of the unlogged area at the junction of the M Road and the MAC to Pit Haul Road to be surveyed and approved to clear. No nests, nest cavities, hibernacula, or dens were identified or located during this survey. Clearing of the areas, is approved for up to 5 days including the day these areas were surveyed.</i>

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Table 29. 4A-LV - Pre-clearing Wildlife Survey, May 18, 2023.

Name	Surveyor
4A-LV	Fernando Villegas
Survey Date	Survey Start and End Time
May 18, 2023	10:00 – 17:30 PDT
Weather	Conditions
Clear, +20	Dry
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
Robins, yellow-rumped warblers and sparrows were identified by their call. Spruce grouse was seen in the area.	No nests, nest cavities, hibernacula, or dens were identified or located during this survey. Clearing of the areas, is approved for up to 5 days including the day these areas were surveyed.

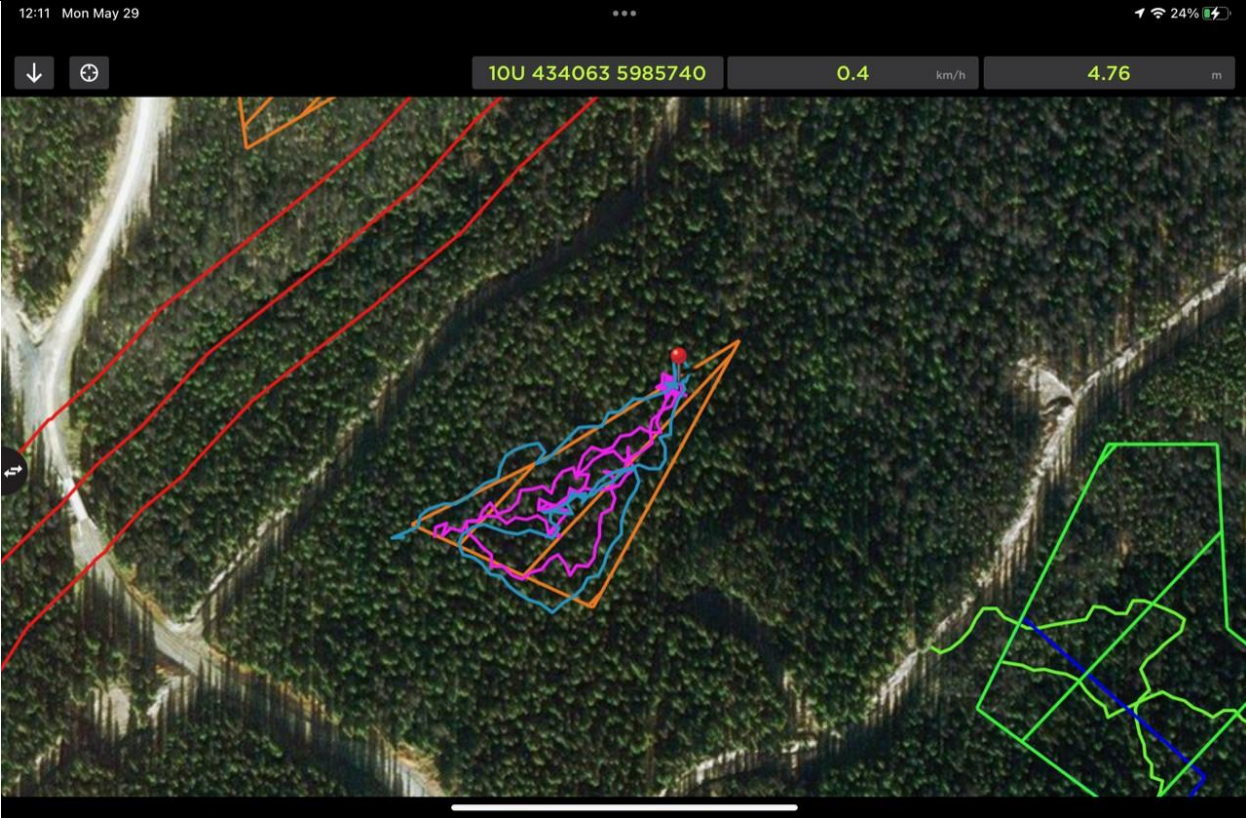
2023 Annual Pre-clearing Wildlife Survey Report

Table 30. Unnamed - Pre-clearing Wildlife Survey, May 25, 2023.

Area Name	Surveyor
<i>Unnamed small area just northeast of camp security and Health station</i>	<i>Scott Klassen / Adam Hall</i>
Survey Date	Survey Start and End Time
<i>May 25, 2023</i>	<i>7:30 am - 9:00 am PDT</i>
Weather	Conditions
<i>Clear, 12C</i>	<i>No Snow and Dry</i>
Proposed Clearing Area Map and Survey Track	
Observed Wildlife	Comments
<i>The following birds were identified by sight or sound during the survey: Dark-eyed Junco, Yellow-rumped Warbler, Wilson's Warbler, Canada Jay</i>	<i>No bird nests nor specific nesting behaviour were observed. No nest cavities, potential bat hibernacula, or dens were identified during this survey. Clearing of the area is approved for up to 5 days including the day these areas were surveyed.</i>

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Table 31. Unnamed - Pre-clearing Wildlife Survey, May 25, 2023.

Area Name	Surveyor
<i>Unnamed small triangular area near 15.25km, north of the access road</i>	<i>Scott Klassen / Adam Hall</i>
Survey Date	Survey Start and End Time
<i>May 25, 2023</i>	<i>9:30 am – 10:30 am PDT</i>
Weather	Conditions
<i>Clear, +15C</i>	<i>No Snow and Dry</i>
Proposed Clearing Area Map and Survey Track	
	
Observed Wildlife	Comments
<i>The following birds were identified by sight or sound during the survey: American Robin, Spruce Grouse, Wilson’s Warbler, Yellow-rumped Warbler.</i>	<i>No active bird nests nor specific nesting behaviour were observed. However, an old Canada Jay nest was observed (red pin location in the image above); this not observed to be occupied and appeared to be in disrepair. No nest cavities, potential bat hibernacula, or furbearer dens were identified during this survey. Clearing of the area is approved for up to 5 days including the day these areas were surveyed.</i>



2023 Pre-Clearing Bird Nest Survey Summary Report

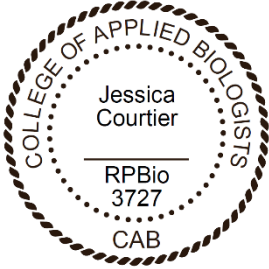
Blackwater Gold Mine – Blackwater Gold Ltd.



Revision History			
Project Name		Blackwater Gold Mine	
Project Number		11743	
Report Title		2023 Pre-Clearing Bird Nest Survey Summary Report	
Document #		P5743	
Report Author(s)		Jessica Courtier, RPBio, BSc	
Version	Date	Document Stage	Description/Notes
A	Jan 4, 2024	Draft	
A	Jan 9, 2024	Internal Review	
1	Jan 10, 2024	Final	
		Choose an item.	
		Choose an item.	

Document Reviews			
Version	Date	Review Type	Reviewed by
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This report is based on facts and opinions contained within the referenced documents, including the results of any data collection programs carried out in relation to this report. We have attempted to identify and consider facts and documents relevant to the scope of work, accurate as of the time period during which we conducted this analysis. However, the results, our opinions, or recommendations may change if new information becomes available or if information we have relied on is altered.

We applied accepted professional practices and standards in developing and interpreting data. While we used accepted professional practices in interpreting data provided by BWG or third-party sources, we did not verify the accuracy of any such data.

This report must be considered as a whole; selecting only portions of this report may result in a misleading view of the results, our opinions, or recommendations.

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1.0 Introduction

1.1 Scope of Work

In support of pre-construction and construction activities at the Blackwater Gold Mine Project location (the Project), Triton Environmental Consultants Ltd. (Triton) was retained by Blackwater Gold Ltd. (BWG) to conduct pre-clearing bird nest surveys to identify, and mitigate disturbance to, active bird nests within the Project footprint during July and August 2023.

Triton avian specialists were tasked with undertaking pre-clearing surveys, identifying species, assessing breeding bird activity, identifying nest locations, and providing recommendations on mitigation measures.

It is Triton's understanding that BWG and/or other environmental consulting companies may have completed additional pre-clearing bird nest surveys during the 2023 season; these are not reported upon in this document.

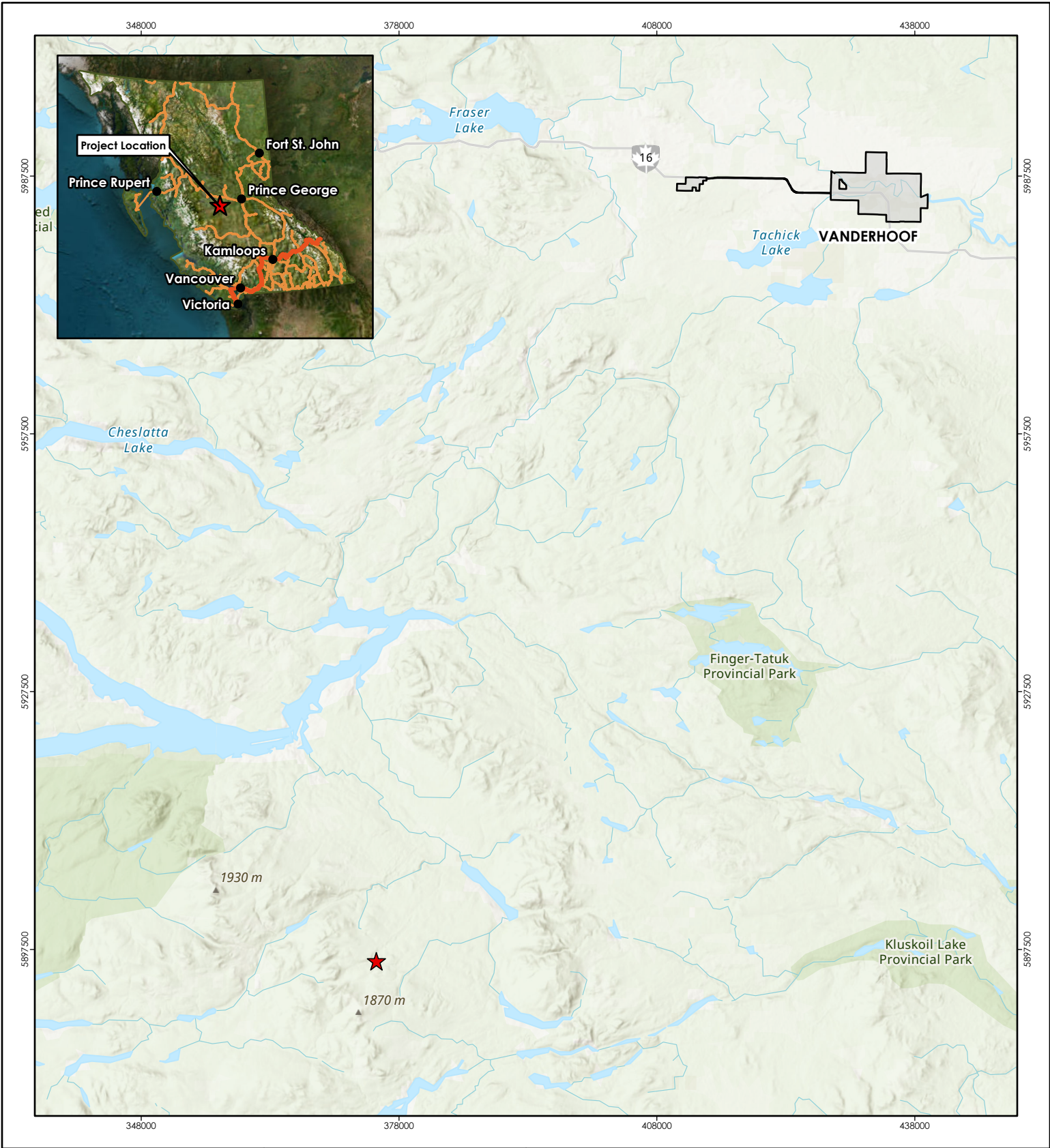
1.2 Project Location

The Project footprint is located approximately 160 km southwest of Prince George, British Columbia (BC; Figure 1). The Project footprint includes mature coniferous forests, mixed successional forests, riparian and wetland habitats, and anthropogenic features such as cleared land and infrastructure (e.g., roads, industrial camp facilities), all of which provides habitat for breeding birds.

1.3 Purpose and Regulatory Framework

Pre-clearing bird nest surveys were implemented during the Project's period of higher risk of disturbance to breeding birds in the area ('breeding bird window'; April 15 to August 31 [BWG 2023]). The primary objective of the surveys was to assess and mitigate against the disturbance or destruction of any bird, bird nest, or eggs.

The pre-clearing surveys supported the Project in maintaining compliance with the Federal and Provincial regulatory framework that provides protection to birds and their nests; including Canada's *Migratory Birds Convention Act* (MBCA; Government of Canada 1994), the *BC Wildlife Act* (Province of BC 1996), and Canada's *Species at Risk Act* (SARA; Government of Canada 2002) as well as Project conditions, commitments, and best management practices (BMPs).



Blackwater Gold Mine

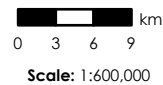
Figure 1.
Project Location

Sources and Disclaimer

1. Base map Source: Esri Base Maps
 2. Disclaimer: This map is a visual aid only to be used together with the accompanying report, including and incorporating any disclaimer contained therein. This map has been prepared to illustrate the results of Triton Environmental Consultants Ltd. work, and is not intended to be used for navigational purposes. Information displayed on this map is based, in whole or in part, on geographic information that may have been provided by third parties, including government data. Triton Environmental Consultants Ltd. disclaims (without limiting the generality of the foregoing) all responsibility for the accuracy of any such third party information, regardless of the source.

★ **Project Location**

Project No: 11743
Date: Jan 09, 2024
Revision: 00
Projection: NAD 1983 UTM Zone 10N
File Path: G:\1.0 Projects\11743 Blackwater Gold Mine - Environmental Support\11743 Blackwater Gold Mine - Environmental Support.aprx



Prepared By: GF

Reviewed By: JC

2.0 Methods

Pre-clearing bird nest surveys were conducted in accordance with Triton's internal Bird Nest Survey Standard Operating Procedure (BNS SOP). Methods described in the BNS SOP are summarized below. Survey data was recorded using Triton's digital data collection systems.

2.1 Survey Effort and Area (Extent)

Generally, pre-clearing surveys were conducted by two experienced avian field surveyors. Survey duration and average daily coverage depended on access, terrain, habitat diversity, bird species, and numbers present (some species are more secretive than others), vegetation density (visibility), and nest searcher experience. The field lead was responsible for determining effort required within these parameters.

Surveys were conducted within the area proposed to be affected by the clearing activities and approximately 30 m beyond these limits. Survey locations were determined by BWG.

2.2 Timing

Nest surveys were ideally conducted within five hours following sunrise, when birds are most active. Nest surveys conducted beyond five hours post-sunrise occurred on a case-by-case basis under scenarios such as:

- If weather conditions remained appropriate and birds remained active
- In very simple, easy to search habitats

2.3 Weather

Surveys were typically conducted during fair to good weather conditions (good visibility, little to no precipitation, and light winds). When weather conditions deteriorated (thunderstorms/lightening, high winds, heavy rain), surveys were halted and resumed once conditions improved.

2.4 Search Methods

Pre-clearing nest surveys were conducted using a combination of passive and active searching techniques. Surveys typically began with a passive search involving surveyors listening for territorial songs and using binoculars to visually search for nests or birds exhibiting nesting behaviour. Depending on habitat type and search area size, a "sit and watch" or "stand and watch" approach was utilized where the surveyors listened and watched bird behaviour and observed for breeding evidence. This method also included "slow walking", stopping whenever potential breeding behaviour was observed, regardless of distance, habitat, or time elapsed. Active searches were conducted in conjunction with passive searches by walking the survey area in a systematic fashion (e.g., transects) visually searching for nests.

2.5 Nest Identification

Bird nests were identified using behavioural cues (e.g., singing males; bird carrying nesting materials, food, or fecal sacs; pairs; displays of defensive behaviour; etc.) and by observation with binoculars or the naked eye to identify nests, eggs, nestlings, and/or fledglings.

3.0 Results

3.1 Pre-clearing Bird Nest Surveys Conducted

Pre-clearing bird nest surveys were requested throughout the Project footprint in advance of trail clearing activities (to facilitate fish salvage) as well as other construction activities (e.g., septic upgrades). Triton avian specialist crews conducted surveys over 20 days between July 1 and August 22, 2023. No surveys were conducted between July 9 and August 1 following a site wide evacuation due to a wildfire in the immediate area.

Additional details (e.g., survey dates/duration, description of area surveyed) regarding the pre-clearing bird nest surveys are provided in Appendix 1. Following completion of each survey, BWG was provided with information on any active nests identified and recommended mitigation measures (e.g., buffers).

3.2 Surveyed Habitat

Habitat types surveyed varied throughout the Project footprint; representative photos are included in Appendix 2. The time and effort required to complete each survey depended on several factors, including: the size of the area (Ha), habitat complexity (i.e., open vegetation vs. mature mixed forest), time of year (e.g., fewer birds singing in August), and weather conditions (e.g., temperature, wind speed, and precipitation).

In general, surveyed habitat encountered on the Project site can be categorized as the following:

- Recently disturbed soil surfaces
- Shrub layer – variety of densities, heights, complexities, coverage
- Wetland vegetation - perennial and seasonal
- Riparian habitats – shrubbed and treed
- Mature/late seral mixed forests
- Seedling/early seral coniferous dominant forest
- Young/mid seral coniferous dominant forest
- Mature/late seral coniferous dominant forest

3.3 Bird Species Identified

There were 43 protected bird species identified within the Project site as being potential, probable, or confirmed breeding birds. These birds are summarized in below.

Table 1. Protected birds identified on the Project Site – July 1 to Aug 22, 2023

Common Name	Scientific Name	Alpha Code	Date First Observed
American Redstart	<i>Setophaga ruticilla</i>	AMRE	2023-08-01
American Robin	<i>Turdus migratorius</i>	AMRO	2023-07-04
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	ATTW	2023-07-04
Barn Swallow	<i>Hirundo rustica</i>	BASW	2023-07-04
Black-capped Chickadee	<i>Poecile atricapillus</i>	BCCH	2023-08-14
Boreal Chickadee	<i>Poecile hudsonicus</i>	BOCH	2023-07-02
Brown Creeper	<i>Certhia americana</i>	BRCR	2023-08-04
Cedar Waxwing	<i>Bombycilla cedrorum</i>	CEWA	2023-08-04
Chipping Sparrow	<i>Spizella passerina</i>	CHSP	2023-07-04
Clark's Nutcracker	<i>Nucifraga columbiana</i>	CLNU	2023-07-05
Dark-eyed Junco	<i>Junco hyemalis</i>	DEJU	2023-07-01
Dusky Flycatcher	<i>Empidonax oberholseri</i>	DUFL	2023-08-12
Fox Sparrow	<i>Passerella iliaca</i>	FOSP	2023-08-03
Golden-crowned Kinglet	<i>Regulus satrapa</i>	GCKI	2023-07-01
Gray Jay	<i>Perisoreus canadensis</i>	GRJA	2023-07-04
Hairy Woodpecker	<i>Dryobates villosus</i>	HAWO	2023-08-14
Hammond's Flycatcher	<i>Empidonax hammondii</i>	HAFL	2023-08-04
Hermit Thrush	<i>Catharus guttatus</i>	HETH	2023-07-04
Lincoln's Sparrow	<i>Melospiza lincolni</i>	LISP	2023-07-04
Northern Flicker	<i>Colaptes auratus</i>	NOFL	2023-07-05
Northern Waterthrush	<i>Parkesia noveboracensis</i>	NOWA	2023-07-01
Olive-sided Flycatcher	<i>Contopus cooperi</i>	OSFL	2023-07-04
Pacific Wren	<i>Troglodytes pacificus</i>	PAWR	2023-07-02
Pine Grosbeak	<i>Pinicola enucleator</i>	PIGR	2023-07-05
Pine Siskin	<i>Spinus pinus</i>	PISI	2023-07-01
Red Crossbill	<i>Loxia curvirostra</i>	RECR	2023-07-04
Red-breasted Nuthatch	<i>Sitta canadensis</i>	RBNU	2023-07-02
Red-eyed Vireo	<i>Vireo olivaceus</i>	REVI	2023-08-12
Ruby-crowned Kinglet	<i>Corthylio calendula</i>	RCKI	2023-07-05
Ruffed Grouse	<i>Bonasa umbellus</i>	RUGR	2023-07-04
Rufous Hummingbird	<i>Selasphorus rufus</i>	RUHU	2023-08-02
Savannah Sparrow	<i>Passerculus sandwichensis</i>	SAVS	2023-07-09
Sharp-shinned Hawk	<i>Accipiter striatus</i>	SSHA	2023-08-04
Solitary Sandpiper	<i>Tringa solitaria</i>	SOSA	2023-07-04
Song Sparrow	<i>Melospiza melodia</i>	SOSP	2023-08-03
Sooty Grouse	<i>Dendragapus fuliginosus</i>	SOGR	2023-08-01
Spruce Grouse	<i>Canachites canadensis</i>	SPGR	2023-08-03
Swainson's Thrush	<i>Catharus ustulatus</i>	SWTH	2023-07-04
Townsend's Solitaire	<i>Myadestes townsendi</i>	TOSO	2023-07-08
Townsend's Warbler	<i>Setophaga townsendi</i>	TOWA	2023-07-02
Tree Swallow	<i>Tachycineta bicolor</i>	TRSW	2023-07-09
Varied Thrush	<i>Ixoreus naevius</i>	VATH	2023-07-02
Yellow-rumped Warbler	<i>Setophaga coronata</i>	YRWA	2023-07-01

3.4 Active Nests Identified

Triton avian specialist crews identified four nests during the pre-clearing surveys (Table 2).

Table 2. Nests identified by Triton at Blackwater Gold Mine

Species	Date Found	Nest Status	UTM	Nest Description	Contents	Mitigation	Comments
Dark-eyed Junco	2023-07-04	Active	10U 376043 5895851	Cup nest located on ground	Three freshly hatched chicks	30 m buffer installed	
Dark-eyed Junco	2023-07-06	Active	10U 375855 5893701	Cup nest located on ground	Four nestlings with feathers forming	30 m buffer installed	
Dark-eyed Junco	2023-08-01	Inactive	10U 375915 5896143	Cup nest located on stream bank	Three eggs: 2 broken, 1 intact	N/A	Nest abandoned.
Pacific Wren	2023-08-04	Inactive	10U 375380 5897079	Burrow located in rotten log on ground	unknown	N/A	Monitoring conducted over two days to determine nest status. Bird displayed no defensive habits. Single male singing for territory.

3.5 Mitigation Measures

To reduce the likelihood of disturbance to nests and nesting birds from Project related activities, Triton recommended and erected buffers around active nests. Buffer sizes were determined by BMPs and at the discretion of the avian specialists on a case-specific basis. Generally, breeding bird nests were buffered on all sides by a 30 m radius. As most surveys conducted were to facilitate clearing activities for trail systems along watercourses requiring fish salvage, the route was adjusted around the buffers; this allowed for continued progression of trail construction while avoiding disturbance to the active nests.

4.0 Recommendations for Improvement

Triton would recommend the following to improve effectiveness, efficiency, and reduce risks associated with the breeding bird window:

- Pre-clearing bird nest surveys be conducted following the Pre-clearing Standard Operating Procedure (SOP) in Blackwater Gold Mine's Wildlife Mitigation and Monitoring Plan – Appendix F (BWG 2023), to ensure consistency.
- Survey requests, including map of area to be surveyed, be provided in written format (i.e., email) rather than verbally to facilitate tracking of survey requests.
- Planning and sequencing construction to avoid clearing of high-risk habitat during high-risk times of year.
- Vigilant inspection and potential implementation of bird deterrents around infrastructure and materials to prevent breeding birds from nesting as the Project creates more anthropogenic habitat.

5.0 References

[BWG] Blackwater Gold Ltd. 2023. Blackwater Mine Wildlife Mitigation and Monitoring Plan VI.1. Available from:

https://www.blackwatergoldmine.com/_resources/eac/Wildlife-Management-and-Monitoring-Plan.pdf?v=0.719

[Province of BC] Province of British Columbia. 1996. Wildlife Act [RSBC 1996] c. 488. Queen's Printer, Victoria, BC.

Government of Canada. 1994. Migratory Birds Convention Act [S.C. 1994] c. 22. Queen's Printer, Ottawa, ON.

Government of Canada. 2002. Species at Risk Act [S.C. 2002] c. 29. Queen's Printer, Ottawa, ON.

APPENDIX 1
PRE-CLEARING BIRD NEST SURVEY INFORMATION

Survey Date	Survey Start Time	Survey End Time	Wind (Beaufort Scale)	Precipitation	Point Count/Transect Info									
					Start Time	End Time	Total Survey Time (minutes)	UTM Zone	Easting	Northing	General Habitat	Habitat Modifier	Birds Observed	Comments
2023-07-01	11:43	14:01	3 – Gentle Breeze	Intermittent rain/hail	11:43	12:13	30	10	374015	5894005	Coniferous - Dominant	Mature/Late Seral	Yes	No nesting behaviour observed.
2023-07-01	11:43	14:01	3 – Gentle Breeze	Intermittent rain/hail	12:41	13:25	44	10	374014	5894082	Coniferous - Dominant	Mature/Late Seral	Yes	No nesting behaviour observed.
2023-07-02	05:26	06:55	2 – Light Breeze	None	05:26	06:55	88.3	10	374521	5894036	Coniferous - Dominant	Mature/Late Seral	Yes	No nest or nesting behaviour observed.
2023-07-04	04:54	12:14	2 – Light Breeze	None	04:54	07:00	125.6	10	376090	5895956	Coniferous - Dominant	Mature/Late Seral	Yes	"A Trail"; DEJU nest found with chicks.
2023-07-04	04:54	12:14	2 – Light Breeze	None	07:50	09:33	102.6	10	374947	5894916	Coniferous - Dominant	Mature/Late Seral	Yes	704 Stream. Potential DEJU nest in area, moved buffer trail back. SOSA nest in area, could not find exact location, buffered area.
2023-07-04	04:54	12:14	2 – Light Breeze	None	10:12	12:14	122.8	10	375874	5893680	Coniferous - Dominant	Mature/Late Seral	Yes	Behind camp. Found chipping sparrow fledgling. Pair of DEJU carrying food and nesting material but did not appear agitated.
2023-07-05	05:01	11:11	3 – Gentle Breeze	None	05:01	06:09	68.4	10	375895	5895900	Mixed Forest	Mature/Late Seral	Yes	No nests or nesting behaviours observed. 704 Stream North Side.
2023-07-05	05:01	11:11	3 – Gentle Breeze	None	08:33	09:36	63.5	10	374014	5893012	Coniferous - Dominant	Mature/Late Seral	Yes	No nests or nesting behaviours observed. 704 Stream Vertical South.
2023-07-05	05:01	11:11	3 – Gentle Breeze	None	10:04	11:11	67	10	372984	5893518	Mixed Forest	Mature/Late Seral	Yes	No nests or nesting behaviours observed. End of M Trail.
2023-07-06	05:15	08:25	1 – Light Air	None	05:15	06:11	56.4	10	375865	5893709	Mixed Forest	Mature/Late Seral	Yes	One active DEJU nest with chicks found and a 30m buffer was installed.
2023-07-07	07:27	12:11	2 – Light Breeze	Intermittent rain	07:50	10:17	147	10	374018	5894014	Coniferous - Dominant	Mature/Late Seral	Yes	No nests or nesting behaviours observed. Sweeping ahead of chainsaw crew, 704 stream.
2023-07-07	07:27	12:11	2 – Light Breeze	Intermittent rain	10:56	12:11	75	10	374020	5894255	Coniferous - Dominant	Mature/Late Seral	Yes	No nests or nesting behaviours observed.
2023-07-08	04:50	12:27	1 – Light Air	None	04:50	07:50	179.4	10	373922	5898230	Coniferous - Dominant	Mature/Late Seral	Yes	TS6 area. No nests or nesting behaviours observed.
2023-07-08	04:50	12:27	1 – Light Air	None	09:43	12:27	163.8	10	373477	5893801	Coniferous - Dominant	Mature/Late Seral	Yes	TS2 cut block. No nests observed.
2023-07-09	04:44	12:26	2 – Light Breeze	None	04:44	07:20	156	10	375574	5894028	Coniferous - Dominant	Mature/Late Seral	Yes	Widening M Trail Road. No nests observed.
2023-07-09	04:44	12:26	2 – Light Breeze	None	08:21	10:14	112.1	10	374779	5893393	Coniferous - Dominant	Mature/Late Seral	Yes	7-11 Road cut block. Potential SOSA nest in the 7-11 cut block but could not located. Buffered off south section of survey area.
2023-08-01	06:02	12:31	2 – Light Breeze	None	06:04	06:09	5.7	10	375970	5893677	Coniferous - Dominant	Young/Mid Seral	Yes	Mountain spruce.
2023-08-01	06:02	12:31	2 – Light Breeze	None	06:18	06:23	5.6	10	376023	5893723	Coniferous - Dominant	Mature/Late Seral	Yes	Burnt forest edges.
2023-08-01	06:02	12:31	2 – Light Breeze	None	06:35	06:42	7	10	376008	5893783	Coniferous - Dominant	Mature/Late Seral	Yes	Adjacent to a forest fire area.
2023-08-01	06:02	12:31	2 – Light Breeze	None	06:52	06:57	4.9	10	376039	5893816	Coniferous - Dominant	Mature/Late Seral	Yes	Adjacent to a forest fire area.
2023-08-01	06:02	12:31	2 – Light Breeze	None	07:00	07:05	4.2	10	376017	5893843	Coniferous - Dominant	Mature/Late Seral	Yes	
2023-08-01	06:02	12:31	2 – Light Breeze	None	07:09	07:13	4.7	10	376049	5893851	Coniferous - Dominant	Mature/Late Seral	Yes	Adjacent to a forest fire area.

Survey Date	Survey Start Time	Survey End Time	Wind (Beaufort Scale)	Precipitation	Point Count/Transect Info									
					Start Time	End Time	Total Survey Time (minutes)	UTM Zone	Easting	Northing	General Habitat	Habitat Modifier	Birds Observed	Comments
2023-08-01	06:02	12:31	2 – Light Breeze	None	09:38	09:43	4.5	10	375964	5897042	Coniferous - Dominant	Mature/Late Seral	Yes	By a stream, sweeping the RDB.
2023-08-01	06:02	12:31	2 – Light Breeze	None	09:52	09:57	4.6	10	375956	5897108	Coniferous - Dominant	Mature/Late Seral	Yes	Stream nearby which is loud and may affect ability to hear avifauna.
2023-08-01	06:02	12:31	2 – Light Breeze	None	10:04	10:14	10.1	10	375970	5897183	Coniferous - Dominant	Mature/Late Seral	Yes	Loud stream nearby. Trail has been cut with heavy machinery approx. 30m from spot count.
2023-08-01	06:02	12:31	2 – Light Breeze	None	10:37	10:42	4.4	10	375998	5897236	Coniferous - Dominant	Mature/Late Seral	Yes	Stream flowing beside.
2023-08-01	06:02	12:31	2 – Light Breeze	None	11:19	11:24	5.7	10	376029	5897299	Coniferous - Dominant	Mature/Late Seral	No	Loud stream nearby limiting hearing ability. Heavy machinery cleared trail recently 5 m away.
2023-08-02	05:22	12:15	1 – Light Air	None	05:23	05:28	4.5	10	376062	5897404	Coniferous - Dominant	Mature/Late Seral	No	Loud stream, start before sunrise, cold morning, birds are quiet.
2023-08-02	05:22	12:15	1 – Light Air	None	05:31	05:37	5.1	10	376052	5897358	Coniferous - Dominant	Mature/Late Seral	No	Loud stream nearby. Heavy machinery cleared area recently approximately 30m. Hearing heavy machinery. All vegetation is wet.
2023-08-02	05:22	12:15	1 – Light Air	None	05:46	05:52	5.8	10	376133	5897465	Coniferous - Dominant	Mature/Late Seral	Yes	Loud stream, birds started calling at 5:45am.
2023-08-02	05:22	12:15	1 – Light Air	None	05:58	06:03	4.6	10	376149	5897494	Coniferous - Dominant	Mature/Late Seral	No	Loud stream.
2023-08-02	05:22	12:15	1 – Light Air	None	10:43	10:48	5.3	10	376183	5897592	Coniferous - Dominant	Mature/Late Seral	Yes	Loud stream.
2023-08-02	05:22	12:15	1 – Light Air	None	11:03	11:09	6.3	10	376189	5897695	Coniferous - Dominant	Mature/Late Seral	Yes	Loud stream.
2023-08-02	05:22	12:15	1 – Light Air	None	11:20	11:25	4.7	10	376162	5897764	Coniferous - Dominant	Mature/Late Seral	Yes	At confluence. Loud streams. Excavator working about 200m away.
2023-08-03	05:27	11:30	0 – Calm Air	None	05:28	05:33	5	10	376071	5897730	Coniferous - Dominant	Mature/Late Seral	Yes	Recent cut adjacent.
2023-08-03	05:27	11:30	0 – Calm Air	None	05:40	05:47	6.4	10	376000	5897610	Coniferous - Dominant	Mature/Late Seral	Yes	Just into forested area.
2023-08-03	05:27	11:30	0 – Calm Air	None	07:42	07:47	4.8	10	375942	5897522	Coniferous - Dominant	Mature/Late Seral	Yes	By a stream.
2023-08-03	05:27	11:30	0 – Calm Air	None	08:16	08:21	5	10	375847	5897489	Coniferous - Dominant	Mature/Late Seral	Yes	Old woodpecker cavity across Davidson creek from here. Not active, not PIWO.
2023-08-03	05:27	11:30	0 – Calm Air	None	08:49	08:55	6.1	10	375716	5897412	Coniferous - Dominant	Mature/Late Seral	Yes	
2023-08-03	05:27	11:30	0 – Calm Air	None	09:23	09:29	6.2	10	375672	5897268	Coniferous - Dominant	Mature/Late Seral	Yes	Near a wetland.
2023-08-03	05:27	11:30	0 – Calm Air	None	09:46	09:53	7	10	375598	5897230	Coniferous - Dominant	Mature/Late Seral	Yes	Near a stream.
2023-08-03	05:27	11:30	0 – Calm Air	None	10:13	10:18	4.6	10	375485	5897218	Coniferous - Dominant	Mature/Late Seral	Yes	Recent cut adjacent.
2023-08-04	06:12	14:19	0 – Calm Air	None	06:13	06:18	4.5	10	375478	5897208	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB).
2023-08-04	06:12	14:19	0 – Calm Air	None	06:41	06:46	4.8	10	375366	5897128	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB).
2023-08-04	06:12	14:19	0 – Calm Air	None	07:00	07:06	6.4	10	375374	5897055	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB); at small tributary confluence.
2023-08-04	06:12	14:19	0 – Calm Air	None	08:29	08:34	4.8	10	375461	5896980	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB) – grass mixed wood riparian.

Survey Date	Survey Start Time	Survey End Time	Wind (Beaufort Scale)	Precipitation	Point Count/Transect Info									
					Start Time	End Time	Total Survey Time (minutes)	UTM Zone	Easting	Northing	General Habitat	Habitat Modifier	Birds Observed	Comments
2023-08-04	06:12	14:19	0 – Calm Air	None	08:49	08:54	5	10	375471	5896889	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB).
2023-08-04	06:12	14:19	0 – Calm Air	None	09:13	09:17	4.3	10	375418	5896851	Grass/Herb Dominant	Herb	Yes	Along Davidson Creek (LDB) - beside a tributary confluence and small beaver dam.
2023-08-04	06:12	14:19	0 – Calm Air	None	10:00	10:05	4.1	10	375265	5896876	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB); previous forest fire within 100 m.
2023-08-04	06:12	14:19	0 – Calm Air	None	10:25	10:31	6.2	10	375126	5896849	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB); previous burn adjacent to it.
2023-08-04	06:12	14:19	0 – Calm Air	None	10:45	10:50	4.1	10	375110	5896762	Coniferous - Dominant	Mature/Late Seral	Yes	Along Davidson Creek (LDB).
2023-08-04	06:12	14:19	0 – Calm Air	None	11:19	11:24	5.2	10	375058	5896631	Coniferous - Dominant	Mature/Late Seral	No	Along Davidson Creek (LDB); intermittent burnt area next to stream.
2023-08-05	05:40	08:13	1 – Light Air	None	06:45	06:50	5.3	10	375481	5897235	Coniferous - Dominant	Mature/Late Seral	Yes	Near a stream.
2023-08-05	05:40	08:13	1 – Light Air	None	07:03	07:08	5.2	10	375614	5897281	Coniferous - Dominant	Mature/Late Seral	Yes	Pine beetle area.
2023-08-05	05:40	08:13	1 – Light Air	None	07:24	07:29	5.4	10	375669	5897409	Coniferous - Dominant	Mature/Late Seral	Yes	Buncher approximately 200 m ds. Lot of noise.
2023-08-06	05:50	11:08	1 – Light Air	None	05:53	05:58	5.1	10	374936	5894997	Coniferous - Dominant	Mature/Late Seral	Yes	Near stream. Can hear road traffic.
2023-08-06	05:50	11:08	1 – Light Air	None	06:11	06:16	4.3	10	375001	5895104	Coniferous - Dominant	Mature/Late Seral	Yes	Adjacent to a stream and recent forest fire.
2023-08-06	05:50	11:08	1 – Light Air	None	06:35	06:40	4.5	10	375058	5895208	Coniferous - Dominant	Mature/Late Seral	Yes	Recent forest fire adjacent.
2023-08-06	05:50	11:08	1 – Light Air	None	06:49	06:54	5	10	375158	5895284	Coniferous - Dominant	Mature/Late Seral	Yes	Near stream and hear a brusher in the distance.
2023-08-06	05:50	11:08	1 – Light Air	None	07:07	07:12	5.5	10	375228	5895373	Coniferous - Dominant	Mature/Late Seral	Yes	Adjacent to a stream, a previous fire, and construction noise in the distance.
2023-08-06	05:50	11:08	1 – Light Air	None	07:50	07:55	4.9	10	375454	5895491	Coniferous - Dominant	Mature/Late Seral	No	Near stream in deep valley.
2023-08-06	05:50	11:08	1 – Light Air	None	10:03	10:08	4.8	10	374851	5894928	Coniferous - Dominant	Mature/Late Seral	Yes	Near a stream.
2023-08-06	05:50	11:08	1 – Light Air	None	10:20	10:26	6	10	374783	5894886	Coniferous - Dominant	Mature/Late Seral	Yes	Near stream and near previous fire.
2023-08-09	07:08	10:56	0 – Calm Air	None	07:09	07:15	5.5	10	375002	5897043	Coniferous - Dominant	Mature/Late Seral	Yes	Near a well site.
2023-08-09	07:08	10:56	0 – Calm Air	None	07:27	07:32	4.2	10	375121	5897049	Coniferous - Dominant	Mature/Late Seral	Yes	
2023-08-09	07:08	10:56	0 – Calm Air	None	07:50	07:56	5.7	10	375271	5897029	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Recent fire through the area.
2023-08-09	07:08	10:56	0 – Calm Air	None	08:22	08:27	4.3	10	375356	5896868	Coniferous - Dominant	Mature/Late Seral	Yes	Edge of fire zone beside a stream.
2023-08-09	07:08	10:56	0 – Calm Air	None	08:58	09:03	4.3	10	375434	5896980	Coniferous - Dominant	Mature/Late Seral	Yes	Mature old growth about 60cm DBH.
2023-08-09	07:08	10:56	0 – Calm Air	None	09:24	09:31	6.5	10	375371	5897035	Coniferous - Dominant	Mature/Late Seral	Yes	Old growth mature.
2023-08-10	06:21	09:56	4 – Moderate Breeze	None	06:22	06:27	4.8	10	375050	5896647	Coniferous - Dominant	Mature/Late Seral	Yes	Davidson Creek area. Recent forest fire and near stream confluence.
2023-08-10	06:21	09:56	4 – Moderate Breeze	None	06:47	06:53	6.2	10	375043	5896714	Coniferous - Dominant	Mature/Late Seral	Yes	Davidson Creek area. In recent fire area.

Survey Date	Survey Start Time	Survey End Time	Wind (Beaufort Scale)	Precipitation	Point Count/Transect Info									
					Start Time	End Time	Total Survey Time (minutes)	UTM Zone	Easting	Northing	General Habitat	Habitat Modifier	Birds Observed	Comments
2023-08-10	06:21	09:56	4 – Moderate Breeze	None	08:05	08:10	4.8	10	375337	5897070	Coniferous - Dominant	Mature/Late Seral	Yes	Davidson Creek area. Mature forest near stream.
2023-08-10	06:21	09:56	4 – Moderate Breeze	None	08:21	08:26	5.3	10	375346	5897133	Coniferous - Dominant	Mature/Late Seral	Yes	Davidson Creek area. Loud water and wind present.
2023-08-11	06:05	07:18	0 – Calm Air	None	06:19	06:24	4.5	10	375031	5896729	Coniferous - Dominant	Mature/Late Seral	Yes	Near fire area and a stream.
2023-08-11	06:05	07:18	0 – Calm Air	None	06:33	06:38	4.2	10	375073	5896704	Coniferous - Dominant	Mature/Late Seral	Yes	Near a stream and next to a recently burnt area.
2023-08-11	06:05	07:18	0 – Calm Air	None	06:45	06:50	4.7	10	375056	5896622	Coniferous - Dominant	Mature/Late Seral	No	Burn area around location. Small green patch near stream.
2023-08-14	07:38	10:18	1 – Light Air	None	07:15	10:18	183.8	10	376242	5897913	Coniferous - Dominant	Young/Mid Seral	Yes	Crew surveying area for potential pileated woodpecker nesting cavity in area identified by previous crew that located a roosting cavity and feeding evidence.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	06:14	06:19	5.6	10	376317	5898046	Coniferous - Dominant	Mature/Late Seral	Yes	Right at confluence of Mine Creek and Davidson Creek. Loud streams.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	06:36	06:42	6.2	10	376254	5897980	Coniferous - Dominant	Mature/Late Seral	Yes	Near a loud stream.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	06:58	07:03	4.3	10	376202	5897962	Coniferous - Dominant	Mature/Late Seral	Yes	Large trees, near a steam.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	07:27	07:32	5.2	10	376159	5897876	Coniferous - Dominant	Mature/Late Seral	Yes	
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	08:11	08:17	5.5	10	376128	5897774	Anthropogenic	Treed	Yes	Mature forest on north side of creek. Previous cutblock on other side. Chainsaw working upstream.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	08:41	08:46	4.4	10	376040	5897751	Coniferous - Dominant	Mature/Late Seral	Yes	In mature area across from an area that is being cut.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	09:11	09:17	5.6	10	375980	5897641	Coniferous - Dominant	Mature/Late Seral	Yes	Chainsaw operating in background causing birds to go quiet.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	09:39	09:44	5.4	10	375905	5897533	Wetland/Riparian	Forested wetland	Yes	Beaver dam downstream. Increased wind.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	10:26	10:31	5	10	375725	5897485	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Lodgepole pine area with younger pine. Wind is keeping birds quiet.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	11:27	11:32	4.8	10	375556	5897491	Anthropogenic	Treed	Yes	Next to recently cleared road.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	11:48	11:53	4.6	10	375618	5897466	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Adjacent to a disturbed area. Birds are no longer singing.
2023-08-12	06:12	15:50	3 – Gentle Breeze	None	12:23	14:18	115.9	10	375630	5897380	Coniferous - Dominant	Mature/Late Seral	Yes	General species observation only due to time of day.
2023-08-22	06:25	07:59	1 – Light Air	Smoke	06:27	06:32	5.2	10	376897	5894039	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Near septic tank.
2023-08-22	06:25	07:59	1 – Light Air	Smoke	06:39	06:44	4.3	10	377011	5894023	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	
2023-08-22	06:25	07:59	1 – Light Air	Smoke	06:55	07:00	4.5	10	377146	5894084	Coniferous - Dominant	Mature/Late Seral	Yes	Quiet but machinery noise in background.
2023-08-22	06:25	07:59	1 – Light Air	Smoke	07:11	07:16	4.7	10	377041	5894002	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Quiet but with machinery noise in background.
2023-08-22	06:25	07:59	1 – Light Air	Smoke	07:23	07:28	4.8	10	376908	5893998	Coniferous - Dominant	Seedling/Pole Sapling/Early Seral	Yes	Machinery noise in background.

APPENDIX 2
PHOTOGRAPHS OF SURVEYED HABITAT



Photo 1. Example of wetland habitat survey area - August 2, 2023.



Photo 2. Example of coniferous dominant survey area – August 3, 2023.



Photo 3. Example of riparian habitat in survey area August 4, 2023.



Photo 4. Example of mature coniferous forest habitat survey area August 9, 2023.



Photo 5. Example of previously cleared survey area August 12, 2023.



Photo 6. Work area surveyed near septic field August 22, 2023.

APPENDIX 3
PHOTOGRAPHS OF BIRD NESTS



Photo 1. Active Dark-eyed Junco nest with three nestlings found during survey on July 4, 2023.



Photo 2. Active Dark-eyed Junco nest with four nestlings found during survey on July 6, 2023.



Photo 3. Abandoned Dark-eyed Junco nest found during survey on August 1, 2023.



Photo 4. Inactive Pacific Wren nest found during survey on August 4, 2023.



Whisky Jack Consulting

2023 AVIAN PRE-CLEARING SURVEY SUMMARY

ROBERT ST. JEAN, P.BIO.



2023 Avian Pre-Clearing Survey Summary

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Version	1
Creation Date	01/02/2024
Review Date	01/002/2024
Document Owner:	Robert St. Jean
Document Approver:	Robert St. Jean

1.0 Introduction

BW Gold Ltd. (BW Gold) is constructing an open-pit gold and silver mine, the Blackwater Project (the Project), 112 kilometres (km) southwest of Vanderhoof, and approximately 160km west-southwest of Prince George, British Columbia.

The Blackwater Project received a paragraph 35(2)(b) *Fisheries Act* authorization (FAA) (No. 21-HPAC-01447) from Fisheries and Oceans Canada (DFO) on June 30, 2023. Fish salvage activities commenced on July 1, 2023, utilizing Provincial Fish Collection Permit SM23-790601. To ensure safe access for salvage crews to complete the required fish salvage activities for the project, various trails, paths, and danger trees were required to be cleared. Prior to completing the clearing activities, avian nest surveys were conducted by Whisky Jack Consulting Ltd. (Whisky Jack) and North River Consulting Ltd (North River).

2.0 Purpose

This report is intended to provide a summary of the 2023 pre-clearing avian surveys completed by Whisky Jack and North River in accordance with the WMMP, Decision Statement conditions 4.1, 8.9, 8.10 and 8.14, and EAC condition 23.

3.0 Methodology

Avian surveys comprised of both passive and active searches occurred along flagged trails marked for clearing. Passive efforts included a sit and watch approach looking for bird behavioural observations that indicated a potential nesting location. Between passive effort locations, an active search methodology was utilized. Active searches comprised of walking the area in a systematic fashion, visually searching for potential nests. The entire footprint was covered, including additional area beyond the impacted area. Detection included visual searches for nest structures, observing behavioural cues and birds flushing from nesting sites. A survey track was recorded using a 'track' feature on a cell phone app.

4.0 Summarized Information

Pre-clearing avian surveys by Whisky Jack and North River occurred between July 25, 2023, and July 30, 2023, along Creek 704454. With no active or potential nests being observed during this period. Table 1 provides a summary of the surveys completed during this period, while Appendix A provides the raw survey report information.

Survey Date	Site	Survey Team	Sum of Nests Found
2023-07-25	Creek 704454	Robert St Jean, P.Bio.; Jason Hooft, R.P.Bio.	0
2023-07-26	Creek 704454	Robert St Jean, P.Bio.	0
2023-07-27	Creek 704454	Robert St Jean, P.Bio.; Jason Hooft, R.P.Bio.	0
2023-07-28	Creek 704454 (Lower)	Robert St Jean, P.Bio.	0
2023-07-28	Creek 704454 (Upper)	Robert St Jean, P.Bio.	0
2023-07-30	Creek 704454 (Confluence)	Robert St Jean, P.Bio.	0
2023-07-30	Creek 704454	Robert St Jean, P.Bio.	0
Grand Total			0

Table 1: 2023 Pre-clearing Avian Survey Summary

Post July 30, 2023, all pre-clearing avian surveys required for the fish salvage program were conducted by Triton Environmental Services Ltd.

Appendix A

Pre-Clearing Survey Field Reports

Approval Signature Record

Reviewer Role	Name	Signature	Date
Senior Biologist	Robert St. Jean	<i>Robert St Jean</i>	01/02/2024

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

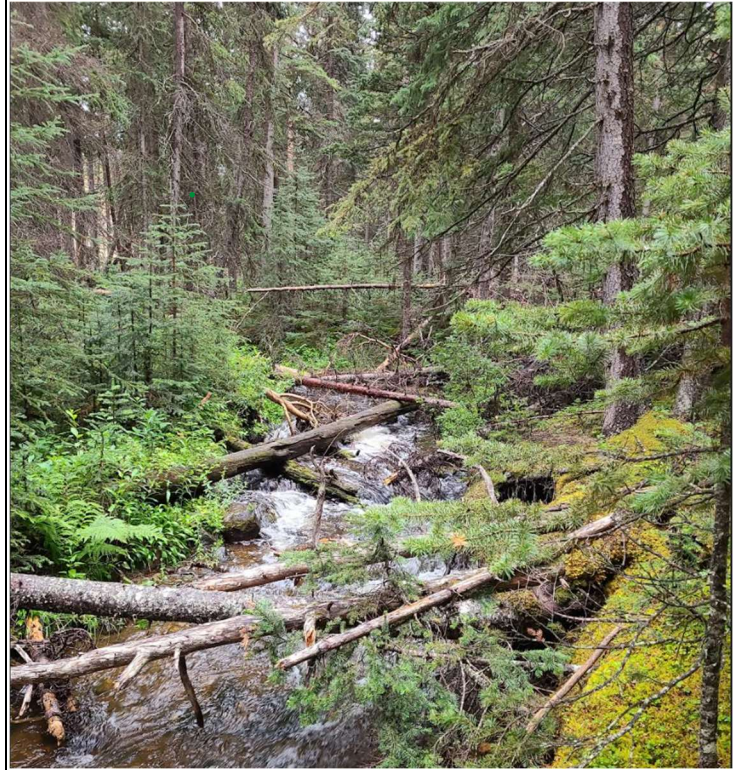
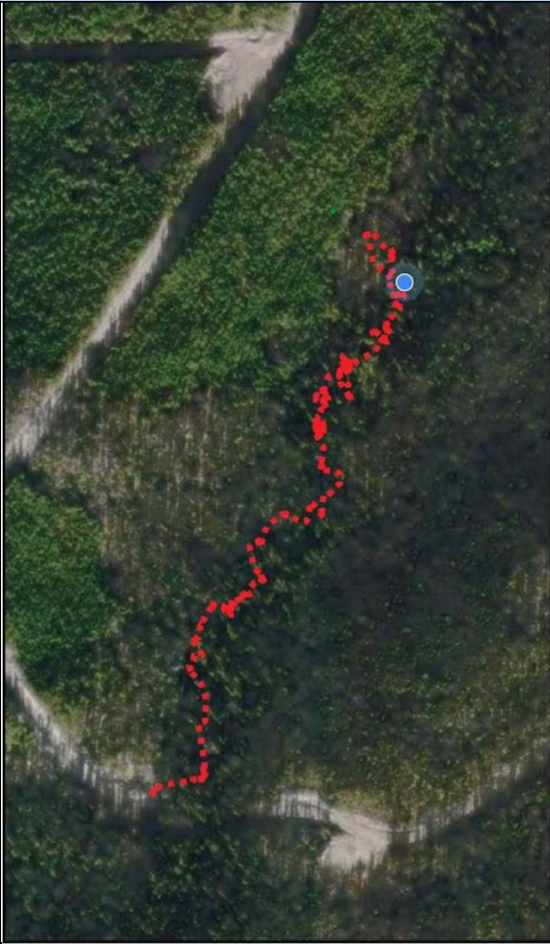
Date	July 25, 2023	Time Start	11:00	Time End	12:15
Survey Expiry Date	July 28, 2023				
Location	BWG – Creek 704; downstream of A trail Bridge				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber (Pine, Spruce, Balsam Fir)				
QEP & Other Crew	Robert St Jean P.Bio; Jason Hooft R.P.Bio				
Weather	Windy, Overcast, 6c				

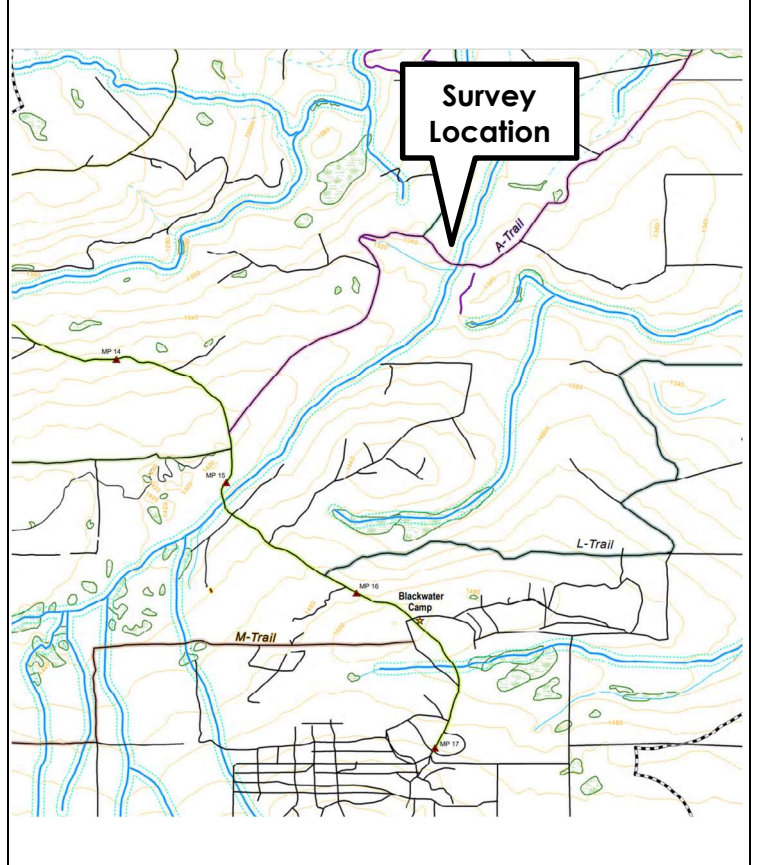
Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Spruce Grouse	Sitting, flushed the area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dark-Eyed Junco	Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)





Comments

- No Nests Observed
- Centre line of clearing trail flagged with PINK ribbon; surveyed approx. 10m on each side.
- Survey start: [53.199586, -124.859071](#)
- Survey end: [53.202815, -124.856516](#)

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

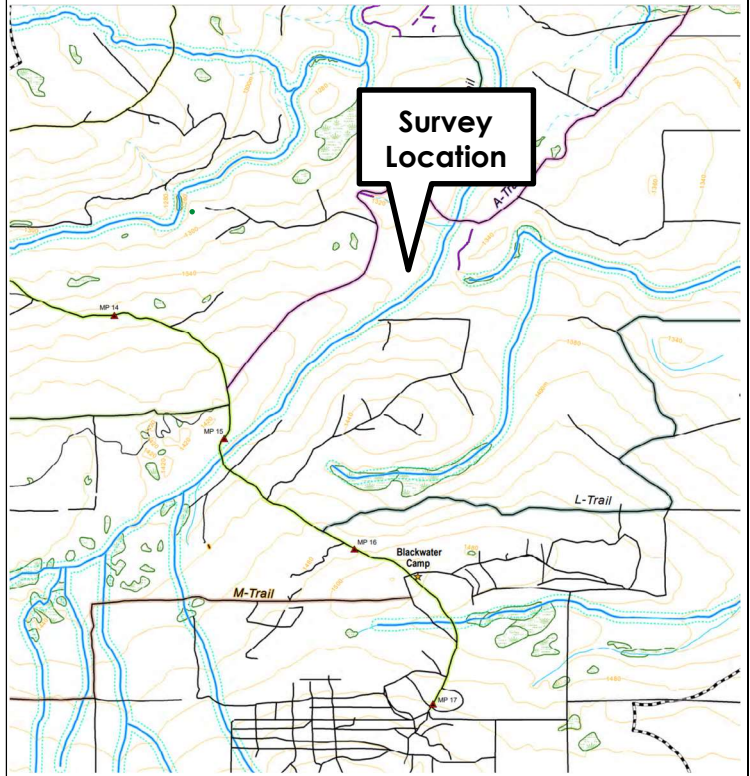
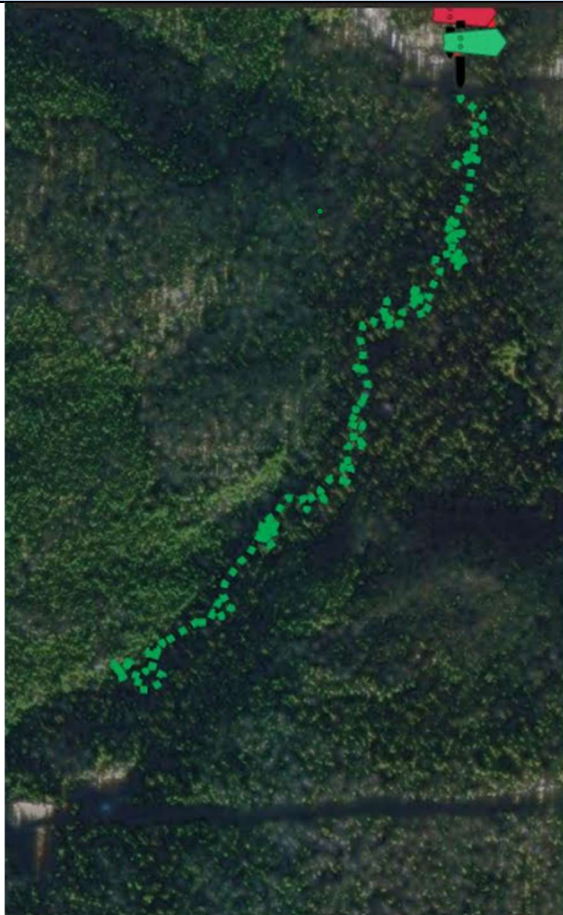
Date	July 26, 2023	Time Start	8:00	Time End	10:15
Survey Expiry Date	July 29, 2023				
Location	BWG – Creek 704; Upstream of A trail Bridge				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber (Pine, Spruce, Balsam Fir)				
QEP & Other Crew	Robert St Jean P.Bio				
Weather	Windy, Overcast, 10c				

Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Dark-Eyed Junco	Flying, foraging, mainly outside of clearing area in previously cleared windrow.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)



Comments

- No Nests Observed
- Centre line of clearing trail flagged with PINK ribbon; surveyed approx. 10m on each side or right to stream edge.
- Survey start: 53.199042, -124.858927
- Survey end: 53.195175, -124.863374
- End of clearing / survey is marked with Pink / Orange / Pink Flagging on single tree.

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

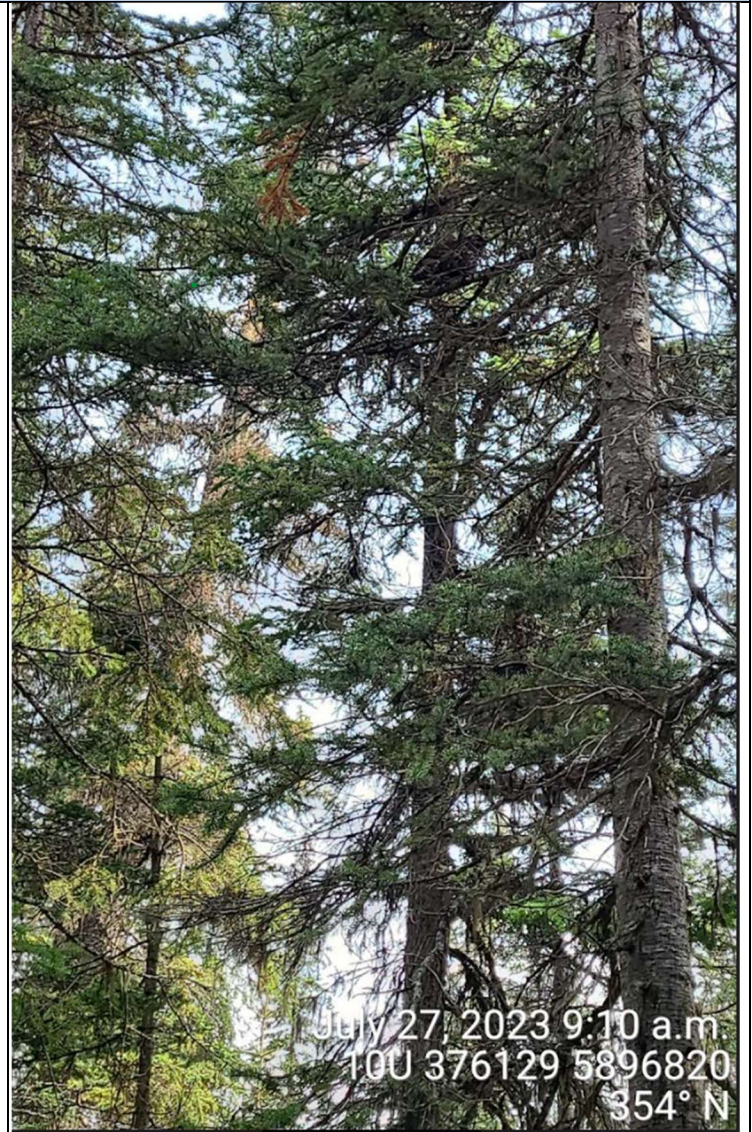
Date	July 27, 2023	Time Start	07:00	Time End	10:15
Survey Expiry Date	July 30, 2023				
Location	BWG – Creek 704; downstream of A trail Bridge, downstream of 07-25 survey (blue line work)				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber (Pine, Spruce, Balsam Fir)				
QEP & Other Crew	Robert St Jean P.Bio; Jason Hooft R.P.Bio				
Weather	Sunny, clear skies, 20c				

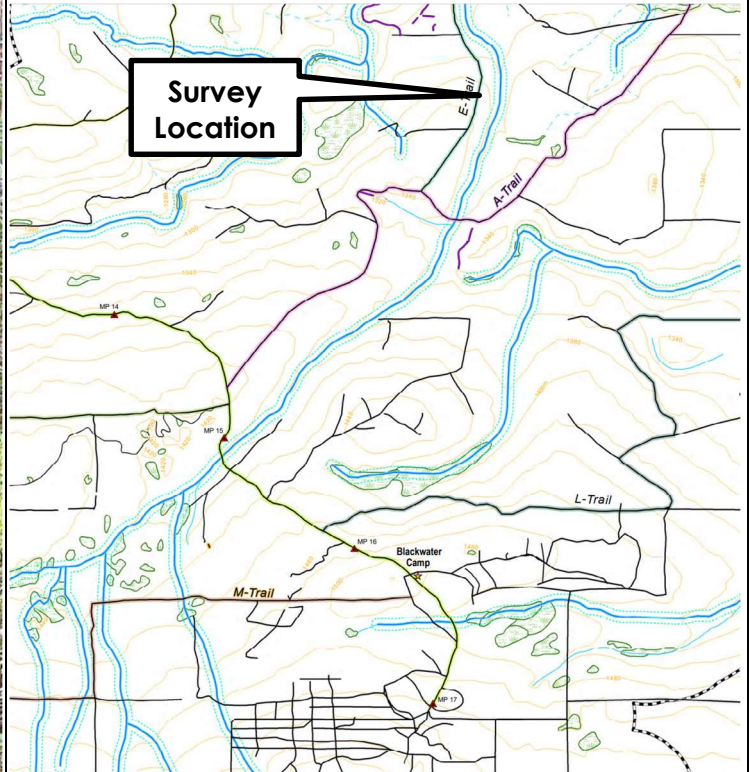
Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Spruce Grouse	Sitting, flushed the area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dark-Eyed Junco	Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gray Jay (Whisky Jack)	Foraging, flying,	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)





Comments

- No Nests Observed
- Centre line of clearing trail flagged with PINK ribbon; surveyed approx. 10m on each side.
- Blue line work in above figure
- Survey start: [53.202815, -124.856516](#)
- Survey end: [53.206353, -124.855873](#)

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

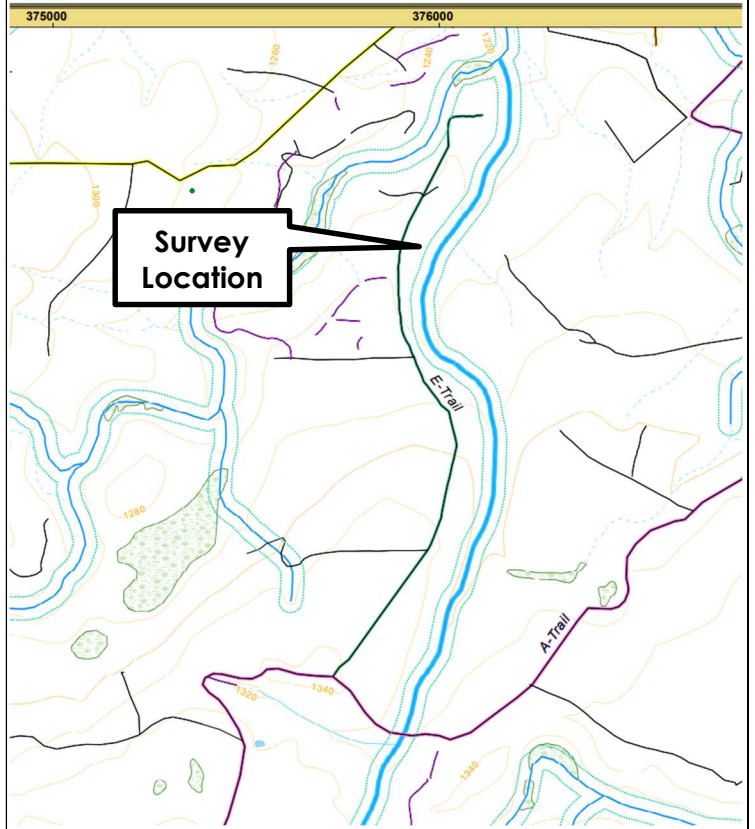
Date	July 28, 2023	Time Start	13:00	Time End	15:40
Survey Expiry Date	August 1, 2023				
Location	BWG – Creek 704; downstream of A trail Bridge closer to confluence with Davidson				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber primarily pine that has blown down from beetle kill. Minimal understory. Some pine regen				
QEP & Other Crew	Robert St Jean P.Bio				
Weather	Windy, Overcast, 6c				

Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Gray Jay (Whisky Jack)	Flying through survey area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Crow	Flying high above survey area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)



Comments

- No Nests Observed
- Access into clearing area is flagged with PINK flagging. Natural boundaries will be used in clearing area.
- Survey start: [53.209530, -124.857452](#)
- Survey end: [53.211716, -124.856689](#)

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

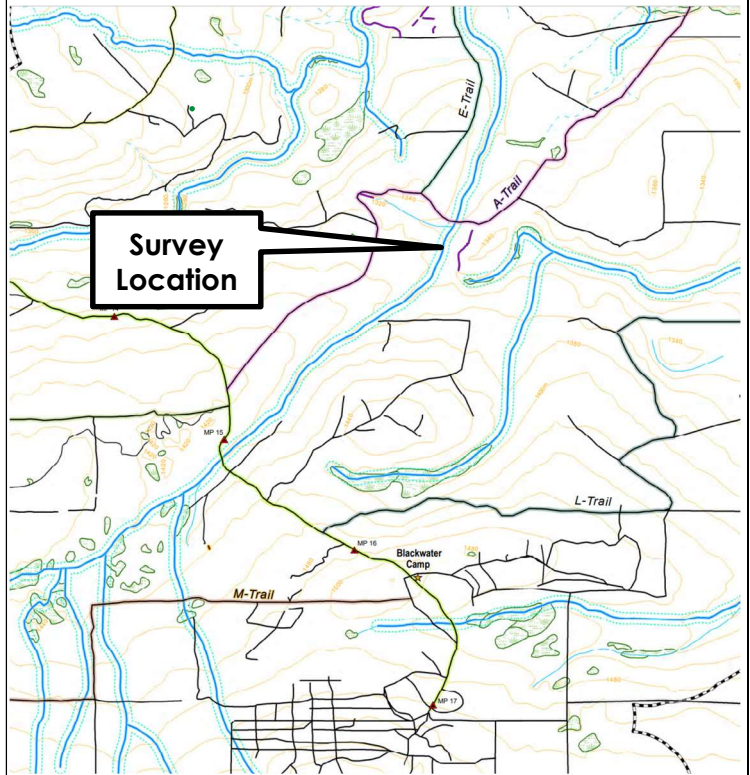
Date	July 28, 2023	Time Start	06:45	Time End	09:10
Survey Expiry Date	August 1, 2023				
Location	BWG – Creek 704; upstream of A trail Bridge, (Blue and Red)				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber (Pine, Spruce, Balsam Fir)				
QEP & Other Crew	Robert St Jean P.Bio				
Weather	Sunny, clear skies, 11c				

Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Song Sparrow	Audio, sitting on slash pile, foraging on previous cleared ground	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dark-Eyed Junco	Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gray Jay (Whisky Jack)	Foraging, flying,	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Golden-crowned Kinglet	Perched, flying, singing	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)



Comments

- No Nests Observed
- Clearing area had natural boundaries; no flagging used
- Blue line work:
 - Survey start: 53.199001, -124.857414
 - Survey end: 53.196256, -124.859289
- Red line work:
 - Survey start: 53.197430, -124.859177
 - Survey end: 53.198860, -124.858490

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

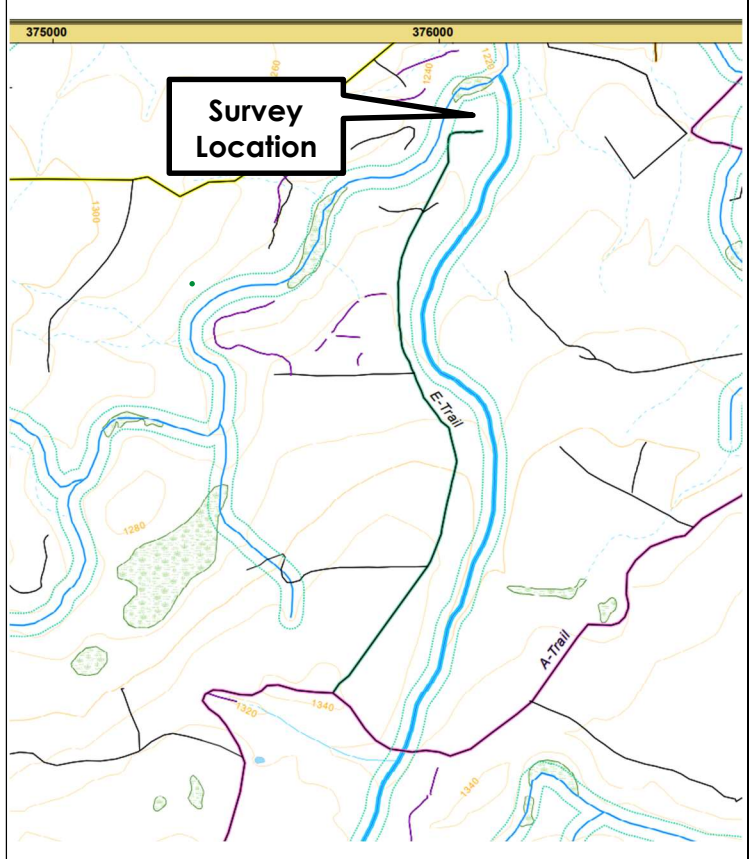
Date	July 30, 2023	Time Start	13:00	Time End	13:45
Survey Expiry Date	August 4, 2023				
Location	BWG – Creek 704; downstream of A trail Bridge at the to confluence with Davidson				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber primarily pine that has blown down from beetle kill. Minimal understory. Some pine regeneration.				
QEP & Other Crew	Robert St Jean P.Bio				
Weather	Windy, Overcast, 15c				

Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Gray Jay (Whisky Jack)	Flying through survey area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dark-Eyed Junco	Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Song Sparrow	Sitting, Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)



Comments

- No Nests Observed
- Access into clearing area is flagged with PINK flagging. Natural boundaries will be used in clearing area.
- Activities are not to disturb existing previous logged windrows
- Survey start: [53.213112, -124.856064](#)
- Survey end: [53.213393, -124.855846](#)

Pre-Clearing Bird Nest Survey Form



Whisky Jack Consulting

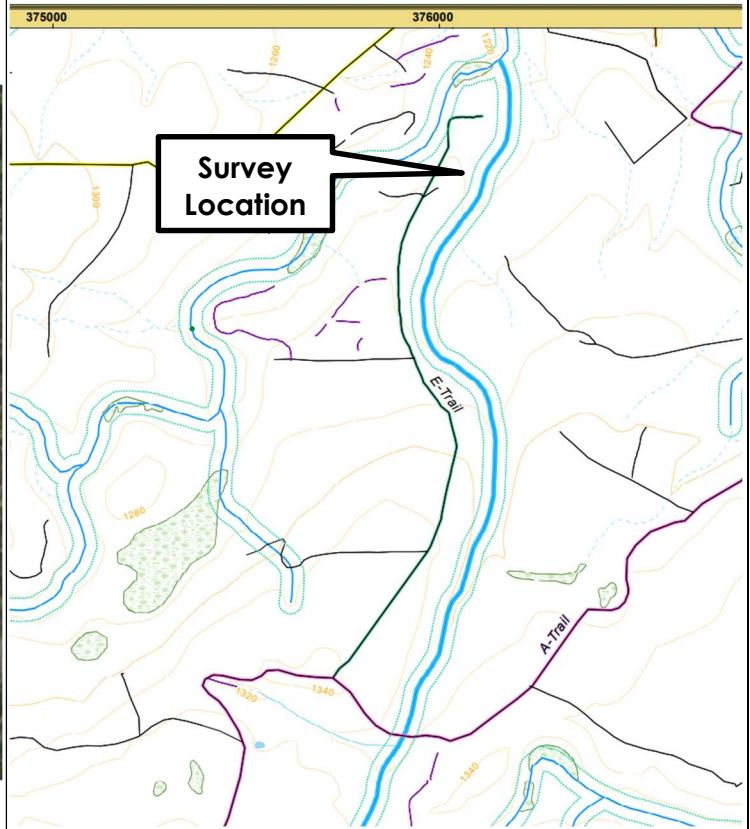
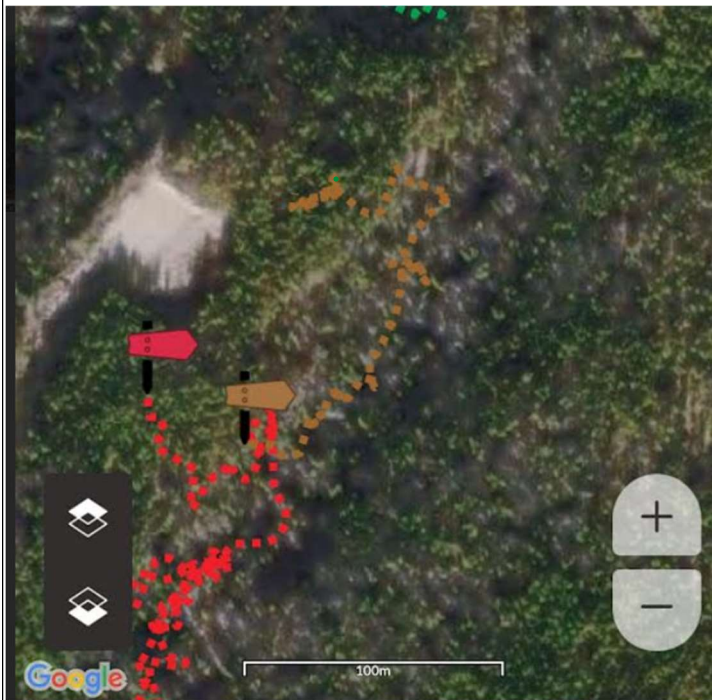
Date	July 30, 2023	Time Start	11:20	Time End	12:10
Survey Expiry Date	August 4, 2023				
Location	BWG – Creek 704; downstream of A trail Bridge closer to confluence with Davidson				
Habitat type and description (ex. grass, forest, wetland etc.)	Conifer dominate – Mature Timber primarily pine that has blown down from beetle kill. Minimal understory. Some pine regeneration.				
QEP & Other Crew	Robert St Jean P.Bio				
Weather	Windy, Overcast, 15c				

Bird Sightings			
Species	Description of Activity	Potential Nesting Bird?	
		YES	NO
Gray Jay (Whisky Jack)	Flying through survey area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Crow	Flying high above survey area	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Dark-Eyed Junco	Flying	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Nest Sightings			
Species	UTM Coordinates	Location of Nest	Description of Nest
N/A			

Active Nest Assessment					
Nest #	Species	UTM Coordinates	Buffer Size	Follow up required?	Comments

Map (Draw location of nest, buffers)



Comments

- No Nests Observed
- Access into clearing area is flagged with PINK flagging. Natural boundaries will be used in clearing area.
- Survey start: [53.211540, -124.856125](#)
- Survey end: [53.212354, -124.855960](#)

Blackwater – Wildlife Pre-Clearing Trip Report, November-December 2023

Attention	Blackwater Gold, ERM
From	Sean Sharpe, R.P.Bio., M.Sc.
Date	January 15, 2024
Project	Blackwater Gold Pre-disturbance Wildlife Surveys Nov-Dec 2023
Reference	
Trip Dates	November 1-3, November 6-12, Nov 27-Dec 4.
Personnel	Sean Sharpe, R.P.Bio.(lead)
Assistants	Cindy Lewis, Lis Rach (Sean Sharpe Environmental Consulting Ltd.)
Summary	Bear den and wildlife pre-clearing surveys were conducted within the Project site. Wildlife surveys included surveying and identifying wildlife features (e.g. bear dens, bat hibernacula, stick nests, mineral licks, rub trees, cavity nests, wallows). The trip was executed safely and successfully within the designated time and budget. No occupied or active bear dens or bat hibernacula were identified during the November-December surveys.

Objectives

The objectives of all trips were to:

- Survey for presence of bear dens in and near construction footprint and in areas scheduled for clearing or construction during the winter.
- Survey identified permit areas scheduled for clearing and construction for the presence of wildlife features, including bear dens, stick nests, bat hibernacula structures, mineral licks, rub trees, cavity nests, wallows, and other wildlife features.

Survey Methodology

Survey methodology included ground surveys by experienced crew walking through the polygons, such that we had visual coverage of the entire area and a 20-50 m buffer outside the polygons. As the crew walked slowly through polygons, they searched for tracks, visual observations of wildlife features (e.g. scat, mineral licks, tree nests, rub trees, cavities, tree piles, root wads, rock piles, etc.) and bear tracks or sounds. Sites with high potential included natural cavities at the base of trees and rocks, piles of downed trees, trees with diameters >0.5 m. Any potential den was investigated for use (e.g. recent use included tracks, scat, lack of cobwebs or vegetation in the entrances, water vapour / ice near a suitable entrance). We also conducted a fibre optic camera check of the burrow interior and Thermal camera scans to check for any heat signatures within cavities. Den checks were not considered reliable once snow cover was greater than 1 m on potential denning structures.

Tasks

November 1-3, 2023

November 1, 2023

- Sean travelled to Blackwater Mine Site Camp.

November 2, 2023

- Sean and Quane attended the Blackwater environmental group safety meeting at 07:00.
- Sean and Quane conducted area surveys of ground accessible sites throughout the day, traversing the footprint and buffer area of the proposed transmission line corridor north of camp.
- Ground surveys were conducted in potential denning habitat and to identify bear dens other wildlife features and activity.
- Sean departed the mine site in late afternoon for Vanderhoof.

November 3, 2023

- Sean travelled from Vanderhoof to Smithers, demobilized, reviewed survey results and planned for next crew field survey trip.

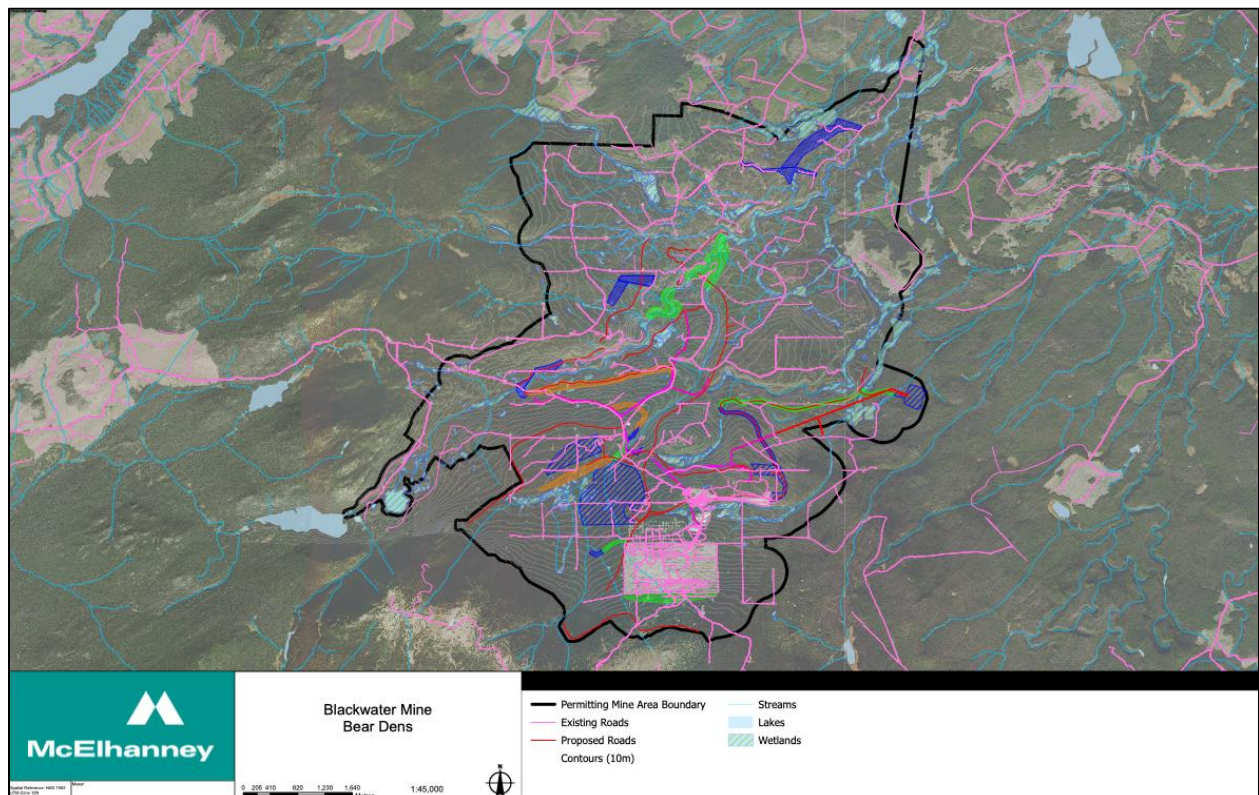
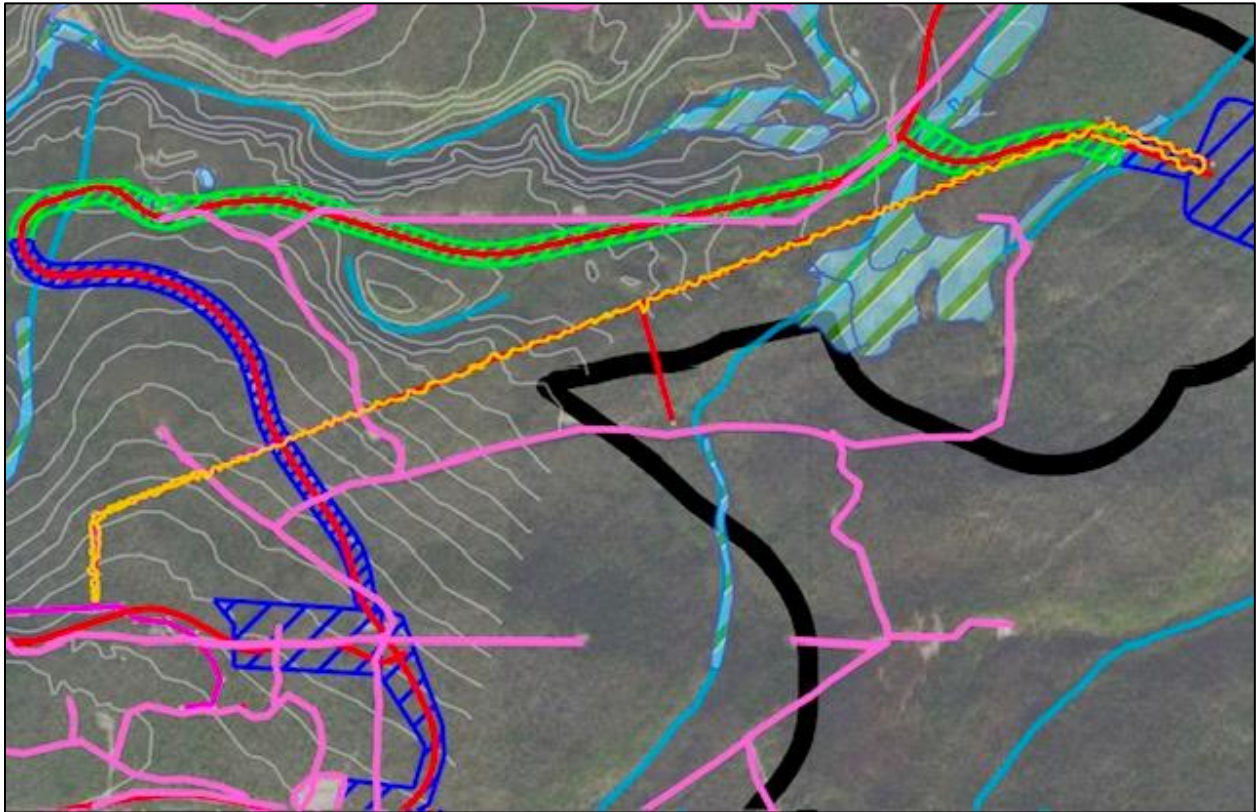


Figure 1. Mine Permitting Survey area for bear dens, bat hibernacula and wildlife features.



Yellow corridor indicates area transmission line surveyed November 2.

November 6-12, 2023

November 6, 2023

- Pick up field truck, radios, and den detection equipment.
- Lis Rach and Cindy Lewis travel day from Smithers to BWG.

November 7, 2023

- New site orientation (0700-1215).
- Conduct surveys along planned clearing areas behind the new plant construction area.
- Search time was approximately 3 hours.

November 8, 2023

- Lis and Cindy attended morning safety toolbox meeting with Quane in the Environment office.
- Conducted surveys along planned clearing areas behind the new plant construction area and adjacent to the Mine Access Rd.
- Search time was approximately 8 hrs.

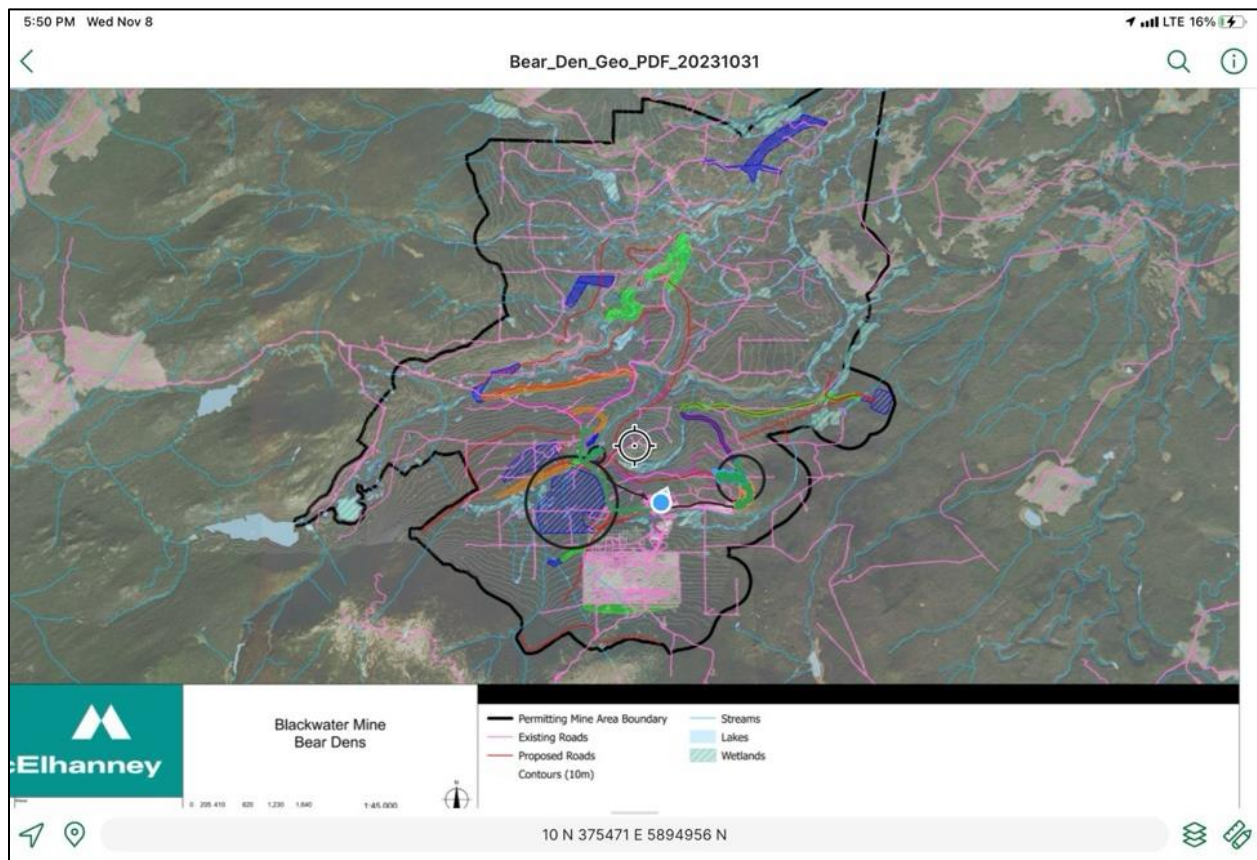


Figure 2. Survey transects and areas surveyed are marked with a black circle.

November 9, 2023

- Cindy and Lis attended the morning safety toolbox meeting with Braden at the Environment office.
- Conducted surveys along planned clearing areas behind the new plant construction area.
- Search time was approximately 8 hours with 8.3 km traversed over the 3 km of proposed road. Areas surveyed are shown in **yellow** (north-east of the ore body).

November 10, 2023

- Lis and Cindy attended morning safety toolbox meeting with Braden at the Environment office.
- Conducted surveys along planned clearing areas behind the new plant construction area and other areas.
- Search time was approximately 6.8 hrs today with 9 km traversed over the 2 surveyed areas.
- Areas surveyed today are shown in **orange** (north-east of the ore body and near Access Rd at 15 km). All areas that have been surveyed (Nov 7-10) and can be cleared are shown on the map with \$ sign (the polygons are not named).
- These pre-clearing surveys for bear dens are good until spring except in the area near 15km on the access road. Recent high bear use was noted in this area. It is recommended that the stream gully and adjacent polygon (blue tracks - Nov 8) be re-surveyed in the coming week if it hasn't already been cleared of trees.

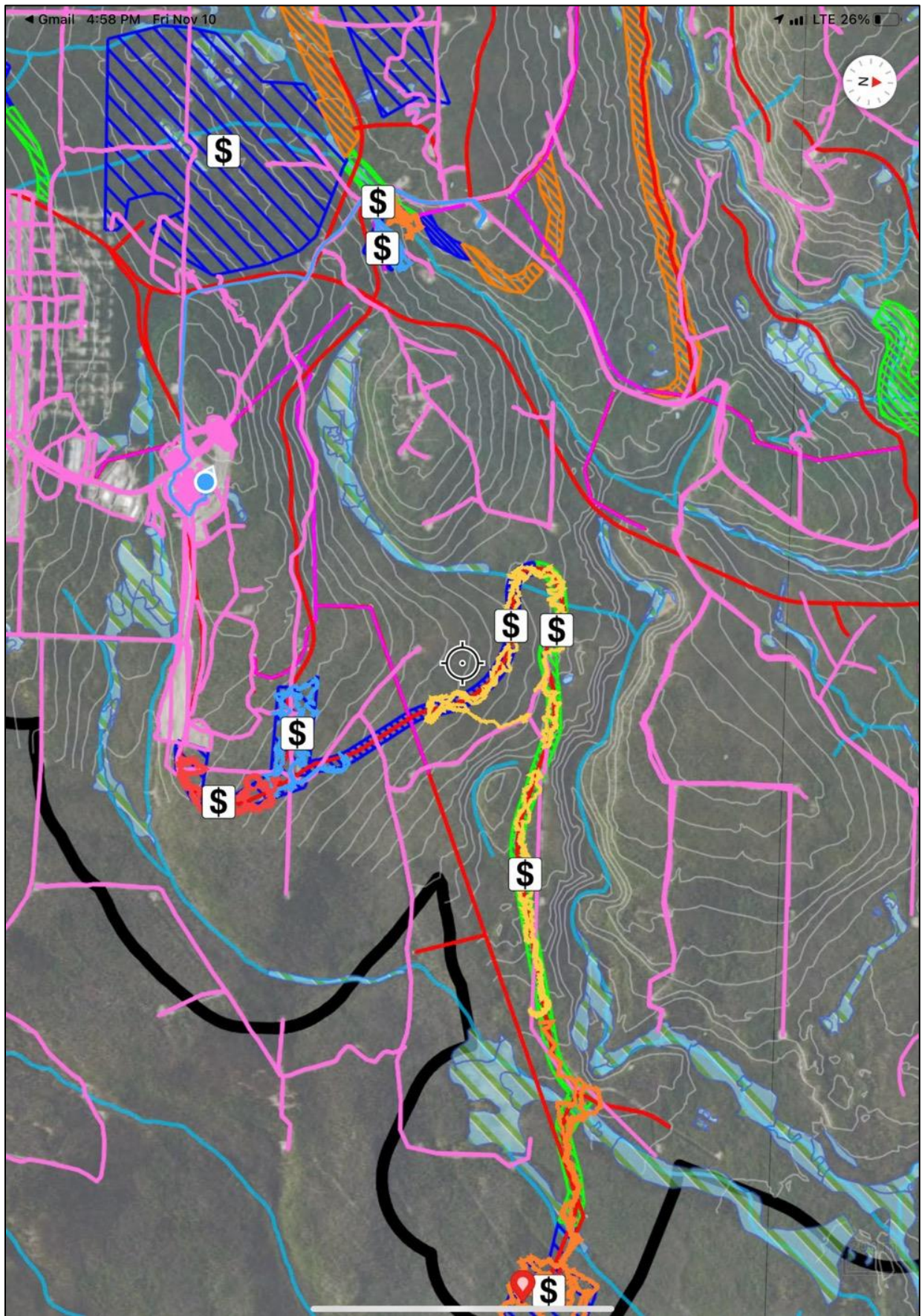


Figure 3. November 7-10 survey tracks.

November 11, 2023

- Lis and Cindy attended the morning safety toolbox meeting with Braden in the Environment office.
- Conducted surveys within planned clearing areas.
- Lis and Cindy met with Braden in the early afternoon to debrief regarding survey to date and plan for next field session due to limited space available in camp.
- Areas surveyed today are shown in **Yellow outlined boxes** on the attached map figure. All areas that have been surveyed (Nov 7-11) and can be cleared of vegetation are shown on the map with \$ sign (the polygons are not named).
- Two polygons visited today were already cleared of all vegetation – these are identified with asterisks * on the map figure.
- Search time was approximately 3.5 hrs.

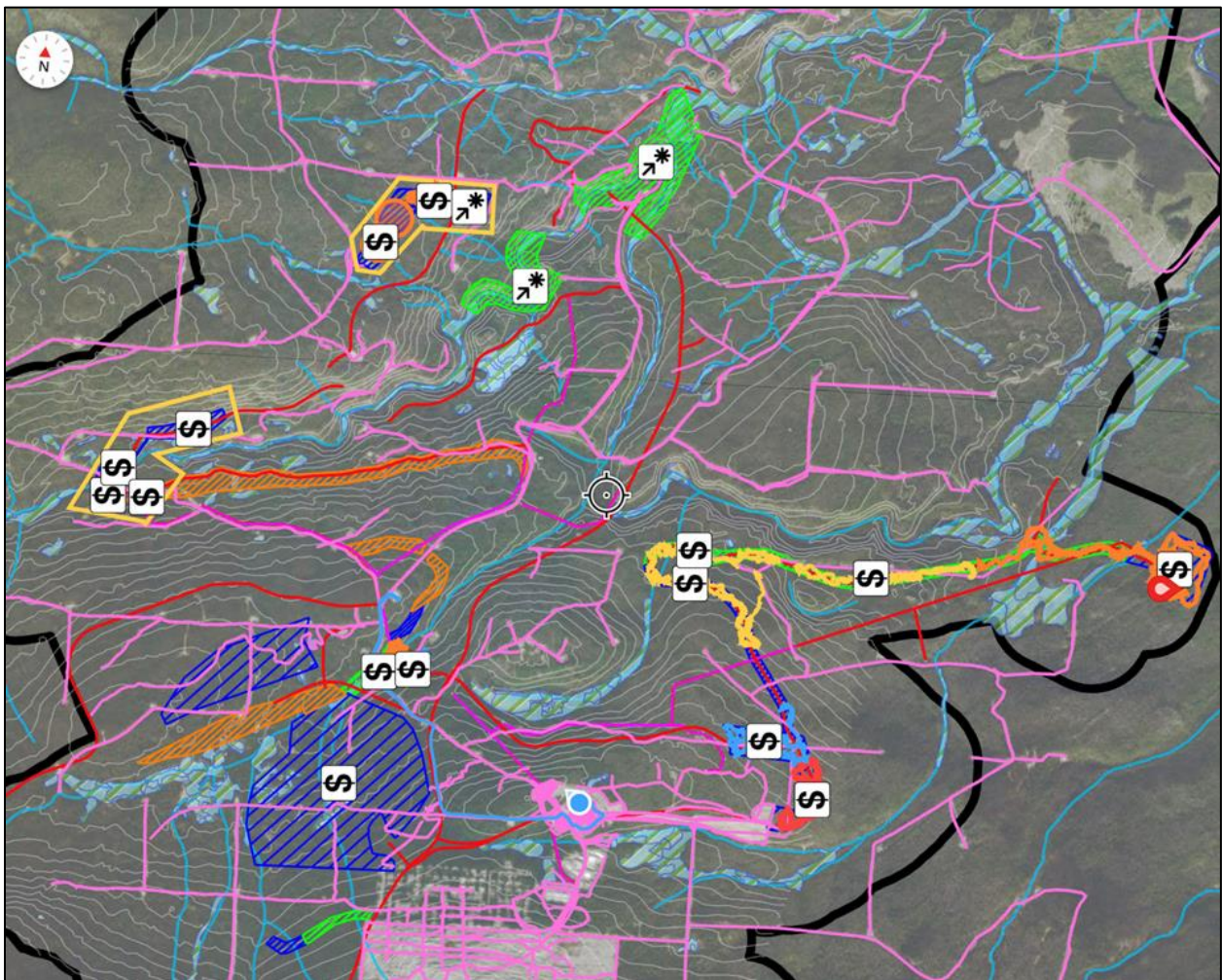


Figure 4. Summary map of areas surveyed and authorized for proceeding with clearing and construction.

November 12, 2023

- Lis Rach and Cindy Lewis travel complete from BWG to Smithers and demobilize field gear and truck.

November 27 – December 4, 2023

November 27, 2023

- Pick up field truck, radios, and den detection equipment.
- Lis Rach and Cindy Lewis travel day from Smithers to BWG.

November 28, 2023

- Cindy and Lis attended the morning safety meeting with Eric at the Environment office.
- Conducted surveys within identified priority clearing areas for Blackwater Gold.
- Search time was approximately 7.5 hrs.
- Areas surveyed included Line 4 (and adjacent polygons and polygons on both sides of A-trail at 350 m) and Line 2. Line 1 was a survey priority but was not surveyed, as it was already cleared (bunchers were on site piling the cut trees).
- Line 4 and the polygons can be cleared of vegetation (see map figure).

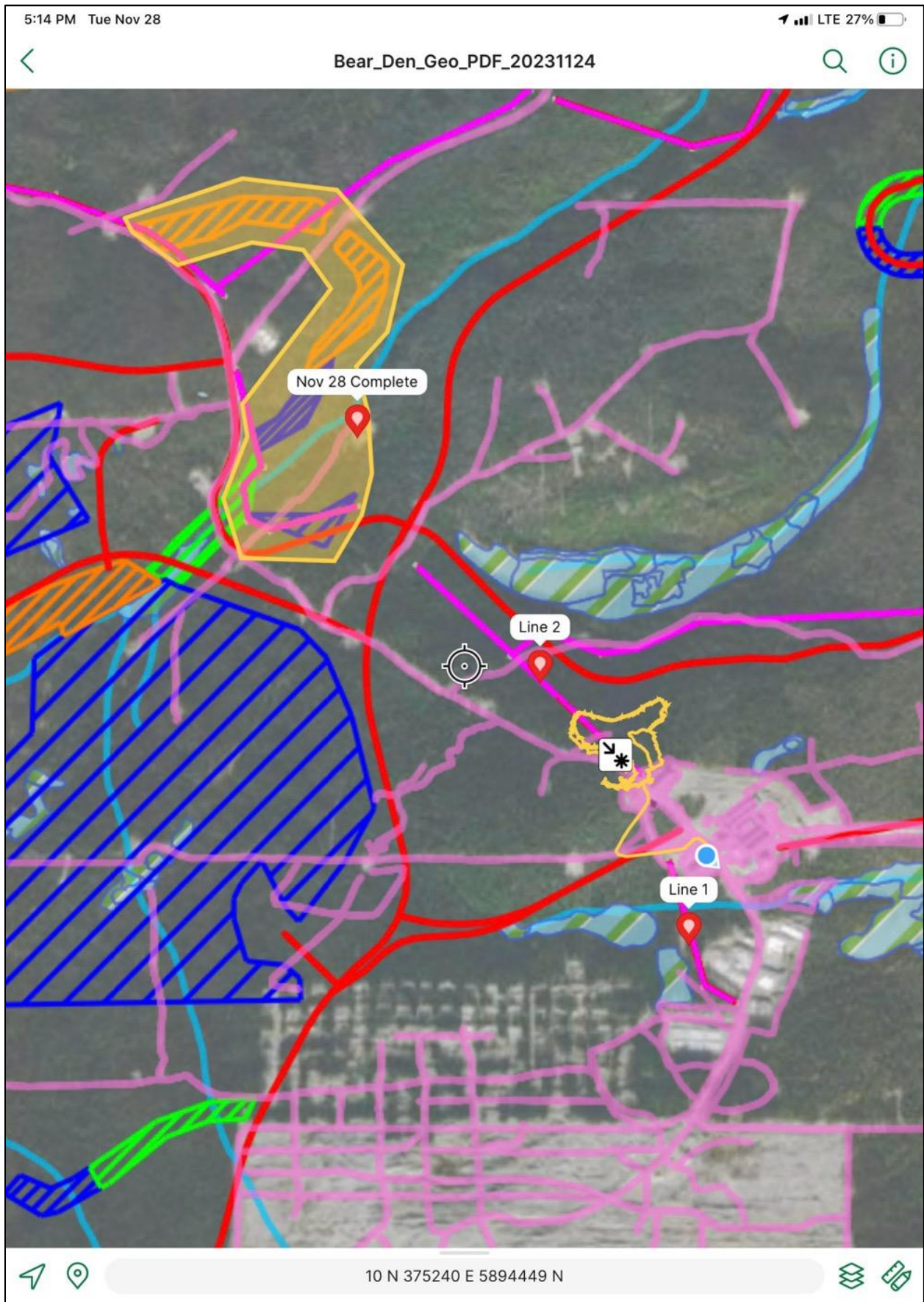


Figure 5. November 28 wildlife clearing transects.

November 29, 2023

- Lis and Cindy attended the morning safety meeting with Steven at the Environment office.
- Conducted surveys within priority clearing areas.
- Burned areas are all surveyed. The method may be modified depending on visibility, burn severity/safety, and terrain/habitat suitability.
- Search time was approximately 6 hrs today.
- Areas surveyed include all but the northern section adjacent to Davidson Creek. The yellow polygons on the map were surveyed and the green polygon was not surveyed as it was already cleared of vegetation. The surveyed areas include 25KV ROW Line 5 and Line 6.
- 25KV ROW Line 3 was also confirmed to have been cleared of vegetation, so no survey occurred at this location.

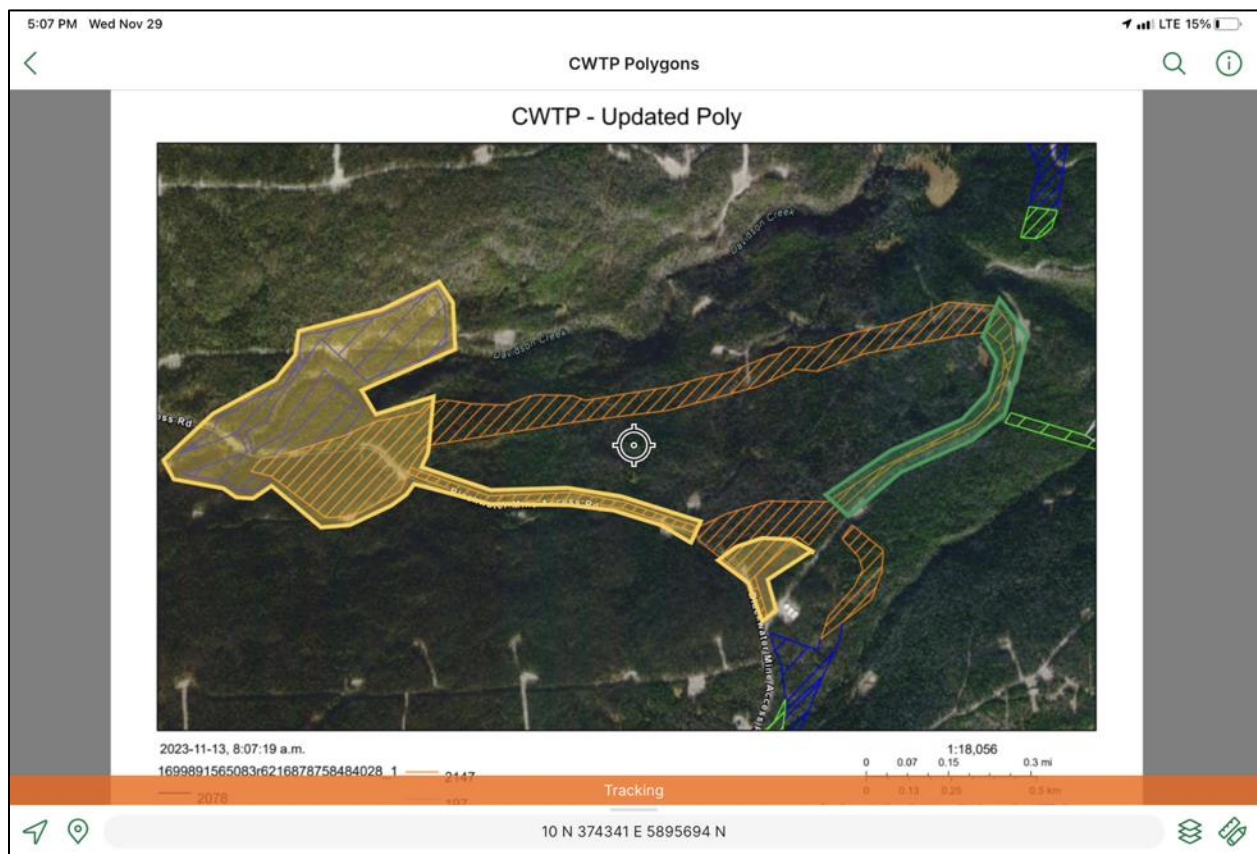


Figure 6. November 29 areas cleared for construction.



Figure 7. November 29 areas surveyed map 2.

November 30, 2023

- Lis and Cindy attended the morning safety meeting with Steven at the Environment office.
- Conducted surveys within identified priority clearing areas.
- Search time was approximately 6 hours.
- Areas surveyed today complete the CWTP area. The yellow polygon was surveyed today.

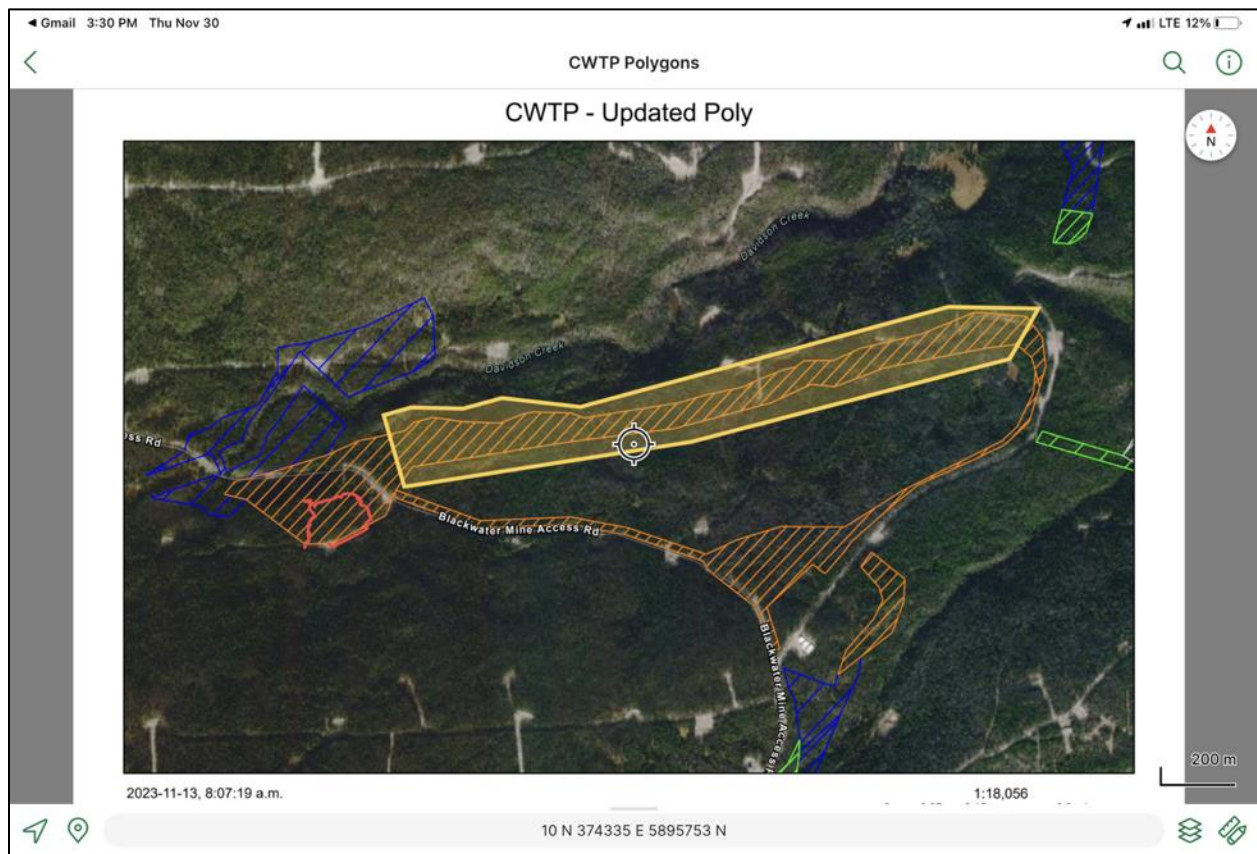


Figure 8. November 30 surveyed areas.

December 1, 2023

- Cindy and Lis attended the morning safety meeting with Steven at the Environment office.
- Conducted surveys within priority clearing areas.
- Search time was approximately 6.5 hrs today.
- Areas surveyed are shown in yellow boxes. These will not have to be re-surveyed until February (for potential marten natal denning).
- A debris pile located on C-Trail was smoldering. The location is shown on the map with an exclamation mark and if not deliberately set should be put out.
- Areas remaining for pre-disturbance surveys include the polygon above the ore body and the polygons on the northwest corner of the ore body.

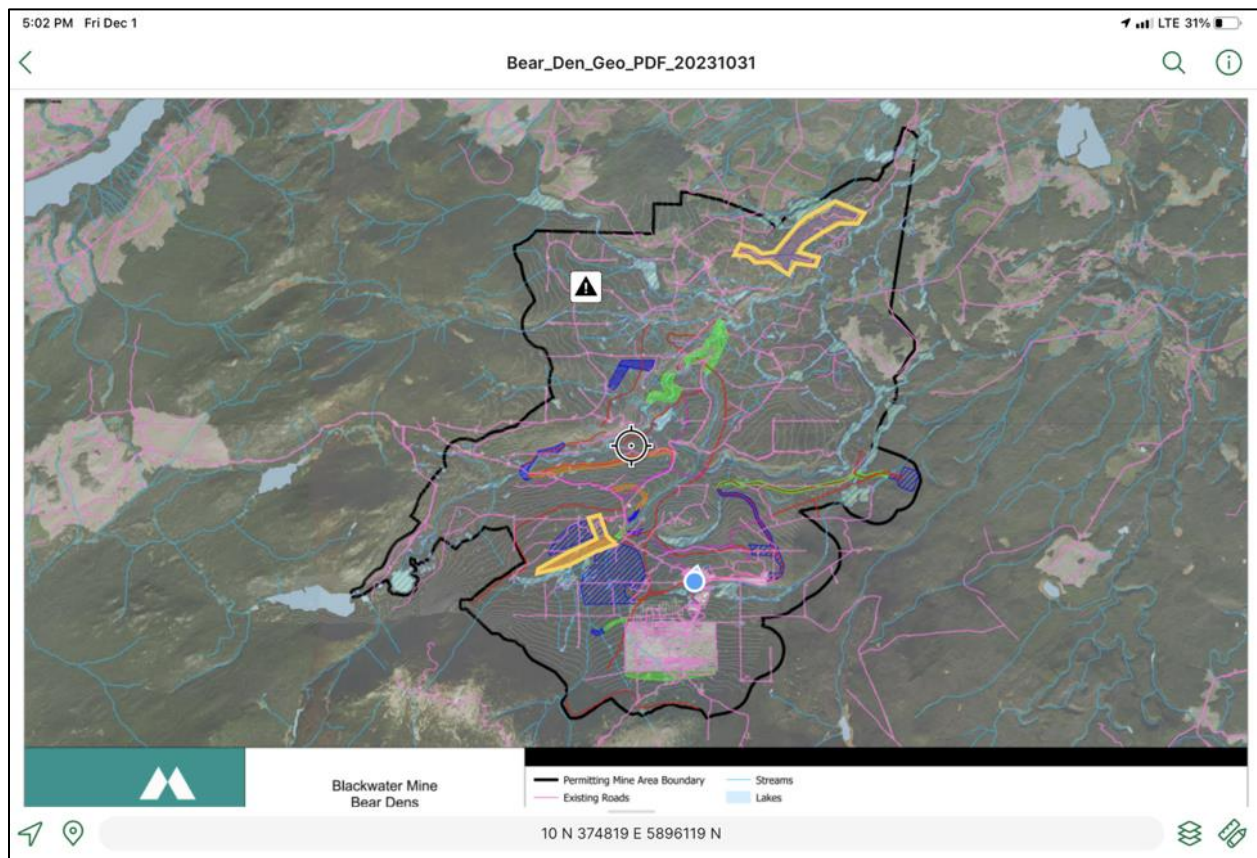


Figure 9. December 1 survey areas.

December 2, 2023

- Lis and Cindy attended the morning safety meeting with Steven at the Environment office.
- Conducted surveys within identified priority clearing and construction areas.
- Conducted survey in new area identified by Blackwater Environment.
- Search time was approximately 7 hrs today.
- Areas surveyed are shown on the attached map figure in yellow boxes. Two of the polygons are partially completed. The completed polygon located at the northeast corner of the ore body will not have to be re-surveyed until February for marten natal denning.
- Visit two bear dens that were identified and occupied in 2013. This will conclude the pre-disturbance surveys for this trip.

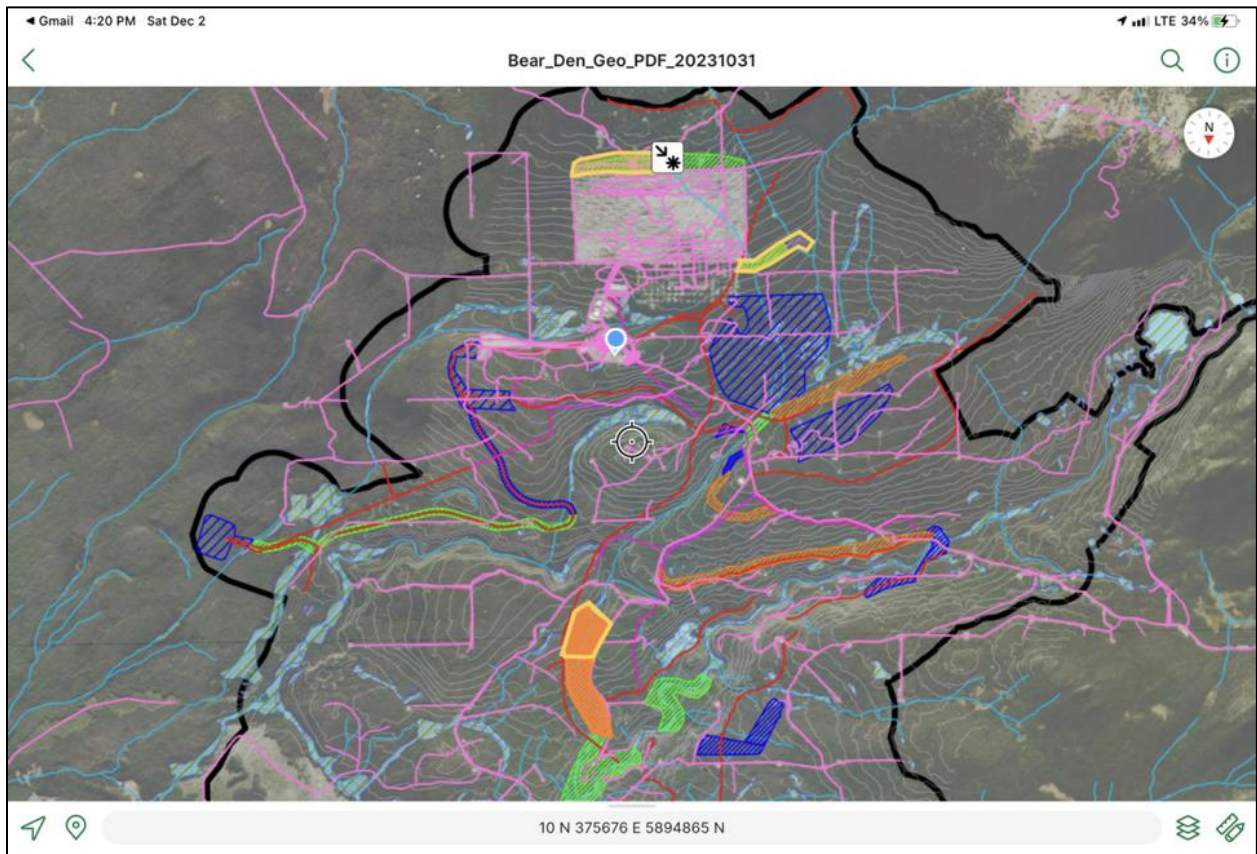


Figure 10. December 2 surveyed areas.

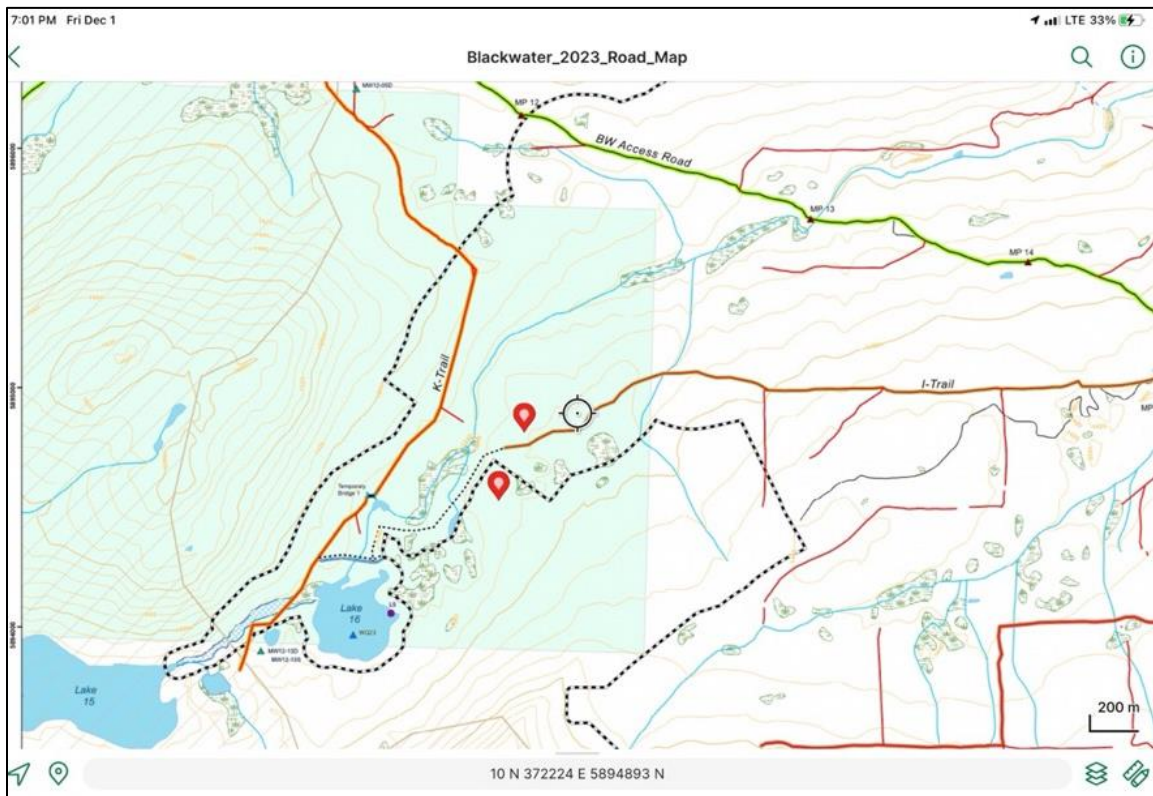


Figure 11. Locations of 2013 occupied bear dens.

December 3, 2023

- Cindy and Lis attended the morning safety meeting with Steven at the Environment office.
- Completed surveys within priority clearing areas.
- Completed bear den survey in new area identified.
- Visited 2013 bear dens located above Lake 16 and assessed activity and condition.
- Search time was approximately 5 hrs today.
- Polygon above the ore body remains to be surveyed (yellow box on Map Figure 1).
- All other areas surveyed are shown on the attached map (green blue and orange polys on Figure 12). Surveys will not have to be re-surveyed until February for marten natal denning.
- The ore body polygon was not completely surveyed. Due to current snow conditions, this poly is past the suitable survey window. Bear dens are difficult to locate when no sign is visible and so many potential locations are covered with snow. A survey here could not reliably determine that no bears are denning.
- The 2013 Bear den locations above Lake 16 (Figure 11 - Bear Den 1 is north side of I-Trail and Bear Den 2 is on the south side) are not currently occupied (photos attached Figures 14 and 15). The mountainside was burned in the 2023 wildfires, leaving no habitat in the vicinity of the dens. The dens are intact and may be used in the future.

December 4, 2023

- Lis and Cindy returned to Smithers and demobilized equipment and field vehicles and checked notes and data.

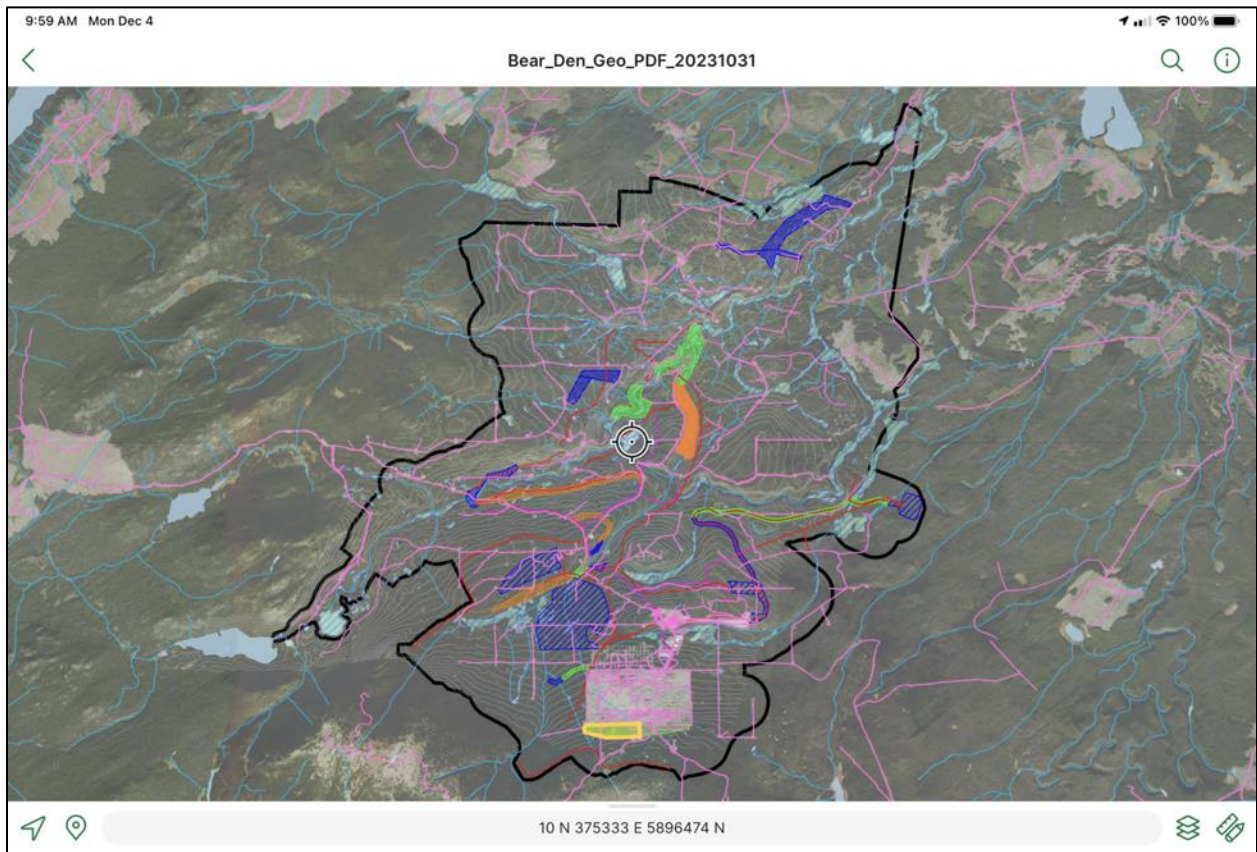


Figure 12. Dec 3 completed survey areas.



Figure 13. Flagged special management area.



Figure 14. Photo of bear den from 2013 (bottom) and area in 2023 (burned by wildfire and unoccupied).

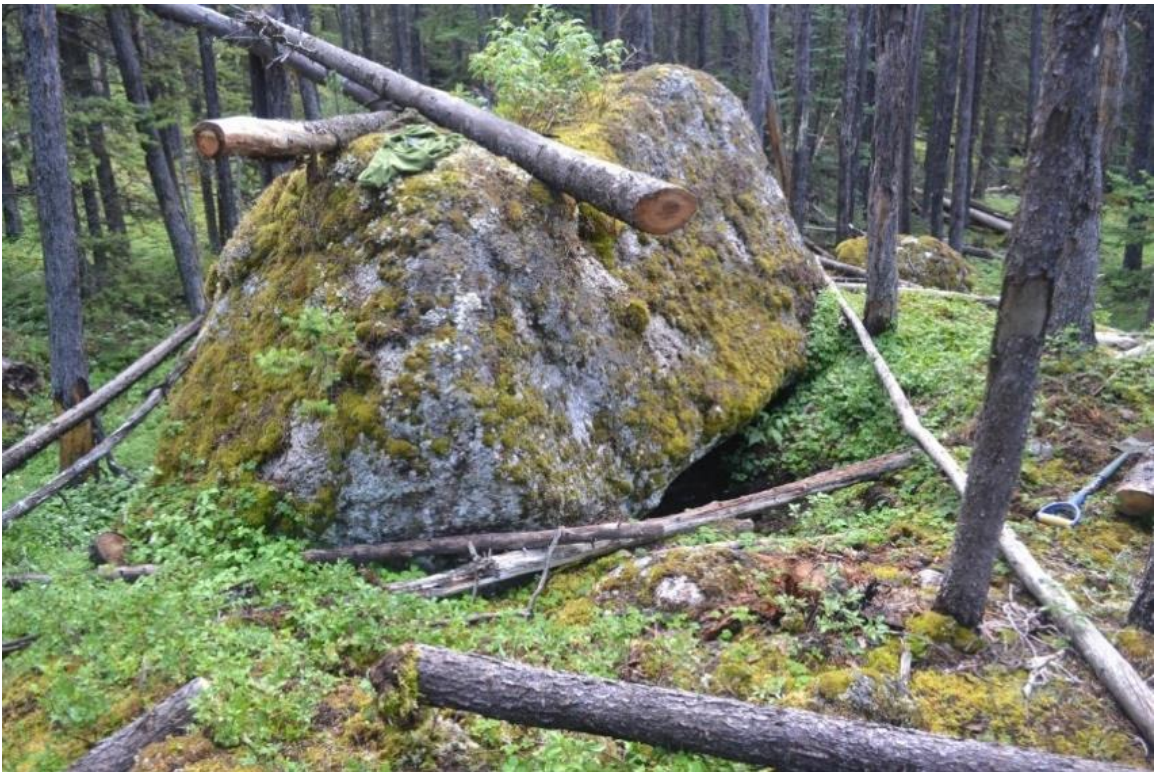


Figure 15. Bear den 2 from 2013 (lower picture) and current unoccupied site (2023) above after wildfire.

Summary

Across November and December field trips, surveys and observations included:

Wildlife Observations

November 1-3, 2023

- No bear dens or bat hibernacula were detected. No tracks or wildlife activity were noted other than some foraging birds (Canada jays, Stellar's jay, Boreal Chickadee).
- Wet snow (approximately 5 cm and freezing rain) fell during the survey making footing slippery and conditions cold / wet. Search time was approximately 5 hours for the transmission line surveyed (attached figure yellow line).

November 7-11, 2023

- No bear dens or bat hibernacula were detected.
- Moose tracks and recent bear sign (tracks) were detected in the polygon located near 14.8 km on the access road. Numerous tracks from hare and marten were identified in all surveyed areas – with the exception of the large, burned polygon adjacent to the access road at 15 km. Activity was also noted for Canada jay, Stellar's jay, Boreal Chickadee, grouse and an unidentified hawk).
- Numerous tracks from hare and marten were identified in portions of the surveyed area. Activity was noted for red squirrel, Canada jay, boreal chickadee, pine grosbeak, golden-crowned kinglet, and spruce grouse.
- These pre-clearing surveys for bear dens are good until spring except in the area of the gully (stream end) at the west end of the November 9 survey area. The gully provides good denning features that may still be used by bears when the snow accumulates. It is recommended that the gully be re-surveyed once snow accumulates within the area if it hasn't already been cleared of trees.
- Numerous tracks from hare and marten were identified in portions of the November 10 surveyed area. Activity was noted for red squirrel, Canada jay, pine grosbeak, golden-crowned kinglet, and spruce grouse. Hare and grouse were observed in the L-Trail polygon.
- A high black bear use area was identified in the polygon below the bridge at ~15km Access Rd. The area was searched thoroughly, with no denning identified. It should also be noted that some of the debris piles along the road cutting through the burned polygon (near Access Rd 15 km) may provide bear denning habitat for late hibernators.
- Two moose (yearling and adult) and a short-tailed weasel were observed December 1 in the polygon above the orebody. Birds observed include boreal chickadees and black-backed woodpecker (northeast corner of ore body polygon).

November 27 – December 4, 2023

- No bear dens or bat hibernacula were detected.
- Digging and scat from bear were identified in the line 4 polygon (map figure - yellow polygon). Sign was between 2 and 1 week old. This sign is in addition to the scat, beds, and other digging noted in this area during our Nov 8 survey. No recent (less than a week) sign was identified.

- Very high activity was noted for fox and hare on line 2. The fox den found is an excavation, used as a resting site and although used recently, appears to be unoccupied. The area is a very high-use area for both fox and hare. This area is considered a habitat island due to the disturbance surrounding it (wildfire, land clearing) and is currently an important winter habitat.
- Clark's nutcracker was identified on Line 6, near the CWTP polygons.
- Current activity was observed throughout the surveyed areas from red squirrel, marten, fox, boreal chickadee, grouse, white-winged crossbill and pine grosbeak.
- Black-backed woodpecker was identified within the CWTP polygon.

Bear Denning

All areas identified for clearing and construction were surveyed on the ground for sign of bear denning. Any potential sites were checked for activity by using track observations near potential entrances, presence of spider webs or vegetation growth indicating abandonment, thermal scans and use of a fibre optic camera. The daily maps show polygons surveyed in 2023.

Permit-related Wildlife Surveys prior to Mine Development

All mine development areas scheduled for clearing and construction in 2023 and winter 2024 were surveyed for the presence of wildlife features, including bear dens, bat hibernacula, stick nests, cavity nests, mineral licks, rub trees, moose rut wallows, and any other wildlife features present. None of these features were identified in the areas pending clearing and construction.

Follow-up and Recommendations

As discussed with Braden (Blackwater Gold Environment), an attempt will be made to reduce the tree debris piles to eliminate potential bear denning throughout the site, but particularly in the areas near recent bear sign (e.g. Km 15 on the Access Road). There are many large debris piles in the areas that have already been cleared. Small mammals, including marten will make use of the piles for the winter. Bears can potentially den within the larger debris piles containing LWD. It is recommended to reduce or remove these piles to avoid any issues with denning animals and nesting birds during construction after sites are cleared of standing trees. Figure 16 shows pile locations (Yellow pins and lines) - these were mapped opportunistically while traveling through the site to survey areas and do not represent a complete inventory of debris piles on site. Alternatively, logging debris may be:

- Mulched/chipped and used as ground cover on new or temporary roads and trails to support equipment and avoid soil damage.
- Used as a source of energy as woody biomass.
- Store to be used as a source of nutrients for soil development on reclaimed land and aid in primary ecological succession.

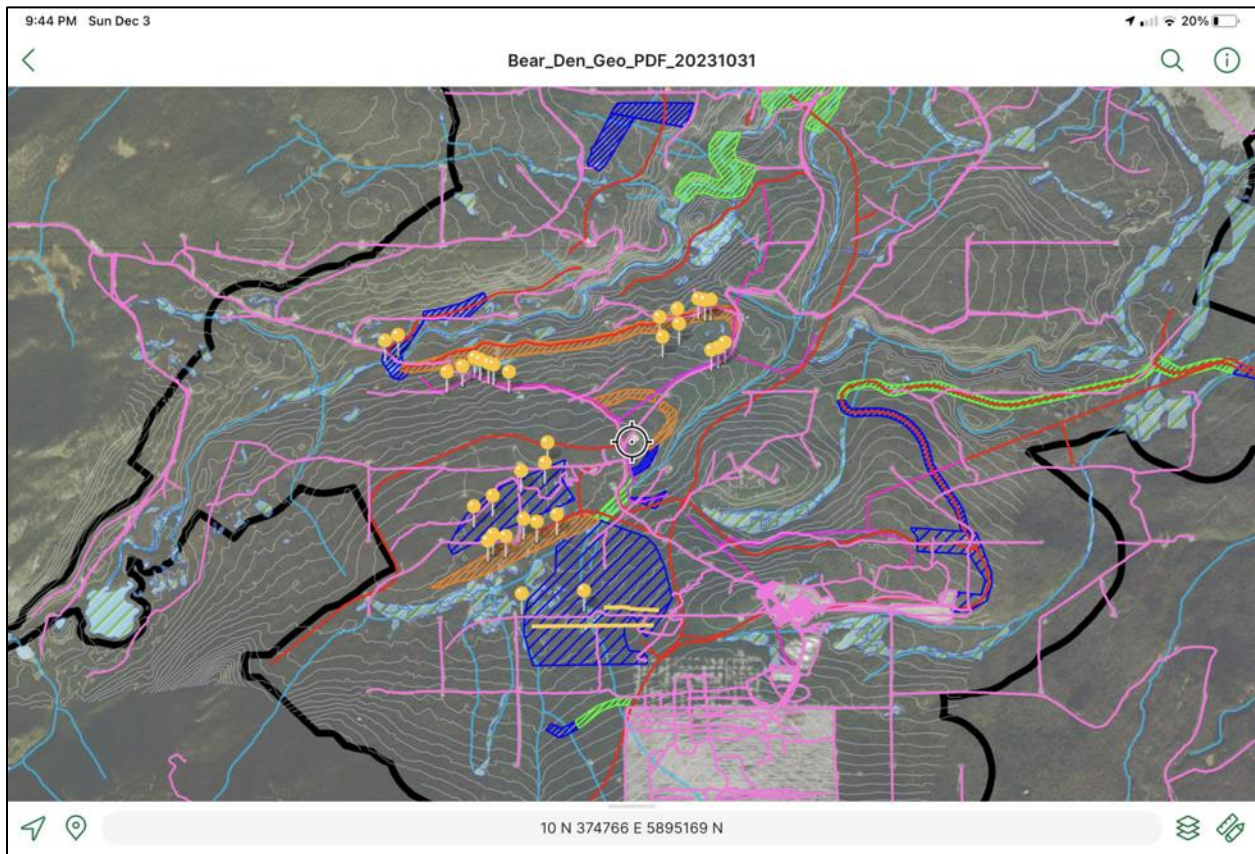


Figure 16. Wood debris pile locations encountered during wildlife surveys.

We recommend avoiding disturbing the habitat area along Line 2 (blue polygon, flagged with orange/white flagging tape). If this is not possible, cut the necessary trees by reaching into the area (MFZ) or hand cutting and leaving 2-3m stumps rather than clearcut. This area should be re-surveyed for natal marten dens if not cut/disturbed prior to mid-February. All other surveyed areas will not require additional bear den or bat hibernacula surveys if trees are removed this season. Some areas with older forest structure will need to be surveyed for marten natal denning if not cleared by February 2024.

Blackwater Environment has established a special management area for the very high use fox/hare use area (habitat island) identified during the surveys.

Monitor for the moose in the ore body polygon just before disturbing it. If they are present, wait until they leave the area to start mobilizing equipment and clearing trees. There has been evidence of moose overwintering in the isolated wetland openings near the ore body (evidence of cast-off antlers) as well as the late season observations of the moose.

The ore body polygon was not completely surveyed (Figure 17). Due to current snow conditions, this poly is past the suitable survey window. Bear dens are difficult to locate when no sign is visible and so many potential locations are covered with snow. A survey here could not reliably determine that no bears are denning. A best management practice of careful clearing may be sufficient to protect any potential denning bears if clearing must occur during the winter. Avoiding the wood piles or moving them "slowly" while looking for any signs of activity is a reasonable management option. From

previous visits to the area above the ore body, the suitability for denning in the yellow polygon is low and very low (not likely) within the western third portion, especially since the wildfire through the area.

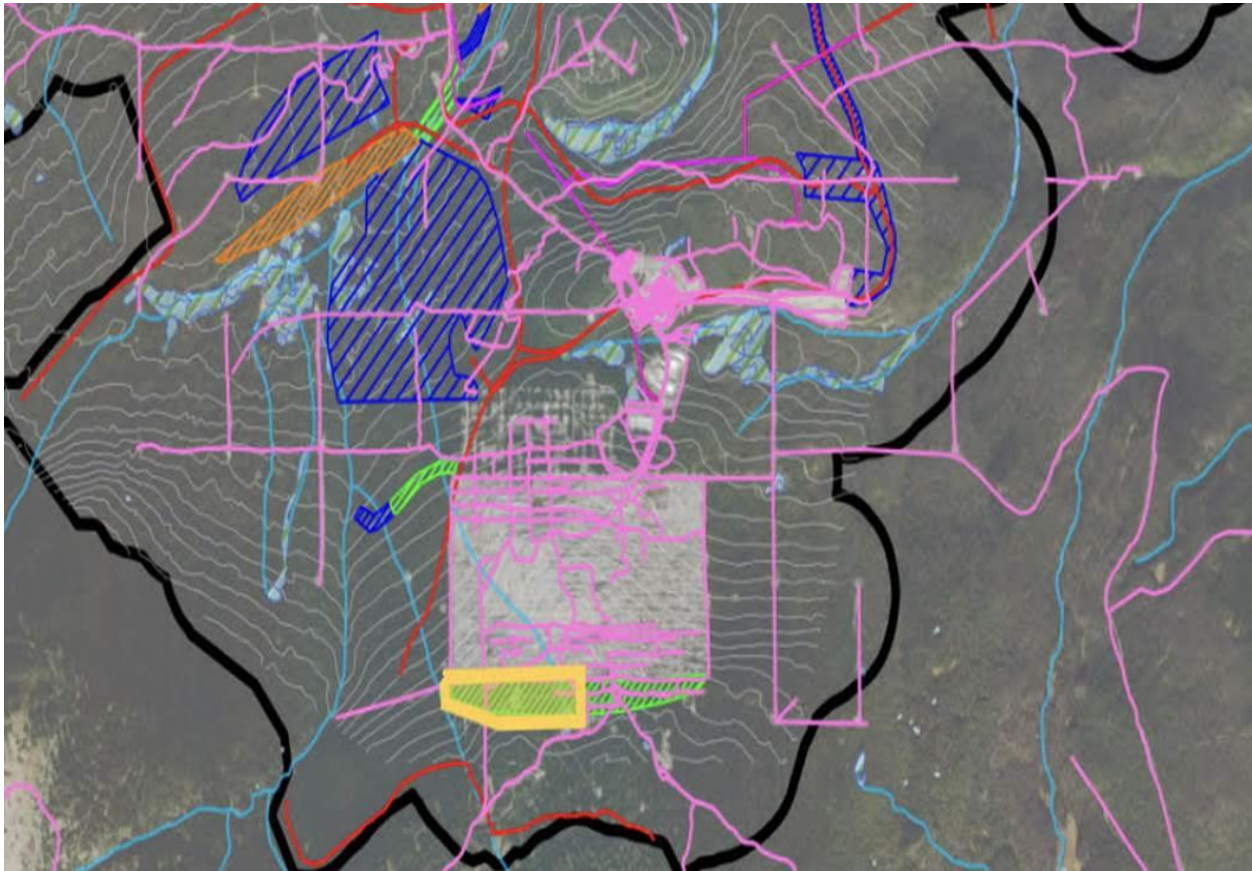


Figure 17. Area above the ore body with low bear denning potential, but poor conditions for completing the wildlife surveys due to snow depth.

The areas we are mainly concerned about are the remaining forested "islands" that have piles with tree debris. Original habitat would have been of low denning value but it increased with piling and pushing cut trees into the edges of remaining forested islands.

Although no activity was noted at the 2013 bear den sites, we recommend monitoring the locations above Lake 16 in fall 2024, especially once vegetation regrows after the wildfire.

Safety and Site Access

- Safety Concerns about working near late season grizzly and black bear activity was discussed during the morning safety meetings with Blackwater Environment staff and between Sean, Cindy and Lis at the daily tailgate meetings. Bear awareness and use of deterrents were discussed, and sites were planned to be avoided if bears were observed nearby. Fresh snow and freezing rain made roads slippery and field conditions wet/slippery when walking over blow-down. Cleats were worn on icy surfaces and snowshoes in areas with more than 20 cm of snow.

- November 9 communication via radio was unsuccessful with a feller/buncher operating on the L-Trail. The crew had no reply when attempting to alert the operator of their presence (passing on the road in close proximity to where the machine was operating). The frequency/channel posted for the work site was used (several others were tried after no response).
- Strong wind gusts in burned areas caused an increased risk of falling trees. These areas will be avoided during high and/or gusty winds.
- December 1, a debris pile located on C-Trail was smoldering and unattended.
- The crew were on site when the road and work communication changed from analog to digital radio and observed a smooth transition. Steven (Blackwater Gold Environment) provided the crew with a radio and gave clear information to assist them with the traffic and radio channel changes.

APPENDIX C PRE-CLEARING BIRD NESTING SURVEY – STANDARD OPERATING PROCEDURE (SOP)



Blackwater Mine

Pre-Clearing Bird Nesting Survey

STANDARD OPERATING PROCEDURE

ENVIRO-02

November 2022

Version B.1

Scope of Work: This SOP provides guidance for the avoidance of active upland bird, waterbird, and raptor nests during land clearing and construction of project infrastructure during sensitive breeding periods. It is intended for Environment personnel conducting pre-clearing surveys prior to land clearing and construction of project infrastructure.

Contacts:

Jack Love, Environmental Manager	jlove@artemisgoldinc.com
Sarah Harrison, Environmental Superintendent	sharrison@artemisgoldinc.com
Greg Sharam Technical Director, ERM	greg.sharam@erm.com 778-628-0974

1. INTRODUCTION

Development of the Blackwater Gold Project (the Project) including infrastructure, roads, and transmission corridors, will require the clearing of natural vegetation. The Project Wildlife Mitigation and Monitoring Plan (WMMP) follows the mitigation hierarchy to avoid, minimize, and mitigate effects of clearing:

- **Avoid:** clearing will primarily be completed outside of designated bird breeding and nesting seasons.
- **Minimize/Manage:** if clearing occurs during the bird breeding season, conduct pre-clearing surveys and establish buffers to avoid nests.

Birds and their nests are protected under provincial and federal legislation, such as the BC *Wildlife Act* (1996), the Canada *Migratory Birds Convention Act* (MBCA; 1994), and the Canada *Species at Risk Act* (SARA; 2002). Provincial and federal legislation prohibits the disruption or destruction of a bird, its nest, or eggs (Province of BC 1996; Government of Canada 1994) and protects designated species at risk (Government of Canada 2002). Environment and Climate Change Canada (ECCC) has developed the *Guidelines to reduce risk to migratory birds* (ECCC 2022), which provides recommendations on how to avoid or minimize risk to nesting and breeding birds. Implementation of pre-clearing nest surveys helps to ensure that all clearing activities align with current legislation.

1.1 Objectives

This Standard Operating Procedure (SOP) is intended to:

- Provide methodology for pre-clearing nest surveys to be completed prior to any clearing activities that are planned during designated bird breeding periods; and
- Provide mitigation to avoid potential impacts to nesting birds.



2. SEASONAL TIMING OF SURVEYS

Pre-clearing nest surveys outlined in this SOP will be completed when vegetation clearing is scheduled to occur during sensitive breeding periods designated for bird species occurring in the Project area (Table 1).

- Sensitive breeding periods for the Project area are designated for waterbirds and landbirds, raptors, northern goshawk, and Clark’s nutcracker (Birds Canada, 2021).
- Nesting periods may be modified to address specific requirements of migratory bird species at risk or local species of concern.
- Breeding periods for birds can be impacted by weather and seasonal migration across regions. The periods detailed in Table 1 should be used as a guideline in determining when pre-clearing bird nest surveys should be completed.
 - Potential fluctuations in bird breeding activity will be considered by a Qualified Professional, particularly with regards to weather conditions (e.g. a late spring may delay the sensitive breeding period).

Table 1: Sensitive Breeding Periods Applicable to the Project Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Waterbirds and Landbirds				15				31				
Raptors – (general)			15					15				
Northern Goshawk		15							15			
Clark’s Nutcracker			15					31				

Note: the date ranges of the nesting periods in the Table do not reflect the entire active nesting periods for all bird species as outlined in the Environment Canada Nesting Calendars (Birds Canada, 2021).

3. METHODS FOR PRE-CLEARING NEST SURVEYS

Pre-clearing surveys may include both aerial and ground-based surveys to ensure the identification of nests of various sizes and from different bird groups.

- Aerial surveys will be aimed at identifying larger nests such as raptor stick nests, while ground surveys are aimed at identifying songbird, waterbird, and cavity nests.
 - Some owl species are nocturnal and will require a different survey methodology (Section 3.3.4).
- Surveys will be led by a Qualified Professional that is knowledgeable and experienced in bird identification and behaviour, and completing bird nest surveys.
 - Additional survey crew assisting the lead will have a base knowledge in bird identification and be trained in or have experience conducting bird nest surveys.
- The survey team will establish a strong communication network with project personnel on-site conducting the clearing activities to ensure the survey team can easily inform construction crews on pre-clearing requirements and outcomes.

3.1 Indicators of Bird Breeding and Nesting

Many behaviors and visual signs are indicative of active breeding or nesting by birds in the area even if a nest is not initially identified. Generally, bird nests are well hidden or camouflaged to protect the nest from predators.

To best identify potential bird breeding in an area, survey teams will actively be looking for signs and behaviors that suggest nesting. Examples of signs and behaviors indicative of nesting occurring in the area include:

- Female flushed off of a nest (e.g., emerging suddenly from brush);
- Shorebirds displaying “broken-wing” behaviour;
- Birds defending a nest through behaviours such as alarm calls and acting aggressively to humans;
- Owls calling at night;
- Bird carrying nesting material;
- Bird carrying faecal sacs;
- Bird carrying food for young; and
- Birds feeding or rearing newly fledged young.

3.1.1 *Determining Nest Status*

Determining the status of a nest can typically be done by looking at the condition of a nest, and observing bird behaviour around the nest using binoculars at a safe distance to avoid nest abandonment.

Nest status will be categorized into the following three categories:

- **Active:** Nests with signs of new nest building (new branches or greenery) and presence of adults, juveniles, or eggs will be deemed as active.
- **Inactive:** Nests in poor condition or with visual signs that it hasn’t been recently used (e.g., presence of spider webs, ongoing decay of material with no other sign of use or repair) will be deemed as inactive.
- **Potentially Active:** Any nest that cannot clearly be deemed as active or inactive will be labeled as potentially active. Potentially active nests are nests that are generally in good condition but no bird presence or signs of breeding within were recorded. These nests require a second survey on a subsequent day prior to clearing to ensure they are truly inactive (see Section 3.1.1 for additional follow-up guidance).

3.1.2 *Potentially Active Nest Follow-up*

If an area was considered to be a “potential nesting location” or to have a “potentially active” nest, it can only be deemed inactive after a follow up ground survey of approximately 1 hr is conducted and no additional behaviors or signs suggesting active nesting or breeding are observed. Use the following framework to resolve potentially active nests:

- Revisit the location on a separate day;
- Conduct a ground survey of one hour, including a point count and spot mapping;
- For potentially active stick nests that cannot be observed from the ground, follow up surveys can be conducted by aerially revisiting the nest on two separate days;

- If an active nest or further signs of breeding (see above) are not recorded during the second survey on a separate day, the location will be classified as an inactive nesting location; and
- If at any point an adult bird displays aggressive behavior towards the surveyor, the surveyor should leave the area immediately and once clear of the area, the behavior should be recorded, and the nest recorded as “active”.

Ample distance should always be maintained between the surveyor and any identified nests. Surveyors should never touch or impede on nesting areas. To limit disturbance to nesting birds when an area is identified as a nesting area, but a nest has not been located, the area will be marked and buffered as a nesting location (Section 3.3, ECCC 2022).

3.2 Aerial Stick Nest Survey Methodology

Aerial surveys are optimal for the identification of larger nests, primarily raptor or heron stick nests. Stick nests are often positioned high in the tree canopy and can be difficult to see from the ground.

3.2.1 Pre-survey Planning

There are two survey components for the aerial stick nest methodology; an initial survey to determine potential nests during a period of high sightability (no leaves and some snow), and a second survey to confirm activity status immediately prior to clearing.

- Aerial surveys for stick nests should first be completed in the spring or earlier in the year, prior to leaf-out to increase the likelihood of seeing a nest, as deciduous trees have yet to grow their full summer foliage.
- Any potential nests identified during the spring survey will be re-surveyed prior to clearing activities. Follow-up ground or aerial surveys for nests deemed potentially active will be conducted within one week of the proposed start date for the clearing of the area.
- If the preliminary aerial surveys cannot be completed in the spring or earlier, they should be completed at least two weeks prior to commencement of clearing.

Any previously recorded stick nests or signs of raptor nesting will be compiled and continuously updated as additional surveys are completed. All members of the survey team will review this SOP, all datasheets, and the survey plan to ensure they are familiarized with the methods and standards outlined here. The team will establish a survey path or plan prior to starting aerial surveys to ensure the whole survey area is being properly covered.

3.2.2 Survey Execution

Pre-clearing aerial surveys will follow RISC (2001) methodology for aerial stick nest surveys:

- Surveys will follow aerial grid or linear lines when appropriate, and the survey path will be recorded.
- An appropriate distance (at least 100m) from nests must be maintained at all times in order to limit any potential disturbance to nesting birds.
- Survey teams should ensure that locations with previously recorded stick nests within 300 m of the planned clearing area are revisited to confirm whether the nests are currently active.
- Data collection will include survey effort (i.e., temporal and spatial effort) and details on all identified stick nests, as outlined in Section 4.2.3.

Some raptor species return to the same nest in reoccurring years, and are therefore protected year-round by the British Columbia *Wildlife Act* (1996):

- Buffers around these nests should be followed regardless of the sensitive breeding period.
- A permit is required to remove or relocate empty nests.

3.3 Ground Nest Survey Methodology

Ground surveys are optimal for the passive identification of nests, primarily of smaller forest bird species and cavity nesters.

Three types of ground surveys are described in this SOP:

1. Variable Radius Point Count Survey (Section 3.3.2)
2. Spot Mapping Survey (3.3.3)
3. Owl Survey (Section 3.3.4)

3.3.1 Pre-survey Planning

Ground surveys will be completed prior to the commencement of clearing. Table 2 shows an overview of a timeline for pre-clearing surveys and the preferred length of time that clearing can be conducted post-survey.

- Clearing is preferred within 3 days of the survey during the nest initiation period (May and early June).
- Clearing is preferred within 5 days during the rest of the bird breeding period (July and August).
- However, clearing is allowed for up to seven days following the completion of both components of the ground survey:
 - Clearing planned to occur outside of this timeframe requires an additional ground survey to be completed.

Table 2: Example Survey and Clearing Schedule

Breeding Period Day:	1	2	3	4	5	6	7	8
Nesting initiation period	Survey 1	Survey 2						
Nesting period	Survey 1	Survey 2						

Table Legend	Pre-clearing bird surveys completed	Clearing is allowed	No clearing until a new pre-clearing survey is completed (Start at day 1)
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- Surveys cover the proposed clearing area *and* an additional 100 m around the outer boundary.
- Site maps are used to predetermine survey transect and plot locations to ensure the whole survey area is being adequately covered.
- Point count plot and spot mapping surveys will occur at 200 m intervals along each survey transect. If transects are adjacent to each other, plot location will be staggered.
- Surveys are conducted within 4 hr of sunrise when birds are most active (RIC, 1999).
- Surveys are conducted only when the weather is fair (i.e., no rain, low winds, temperature at ~5 °C; RIC, 1999). Birds are less active and more difficult to detect in poor weather.

- Nocturnal owl surveys will occur along survey transects at 500 m intervals.
- Environment Staff will conduct pre-clearing surveys prior to commencement of construction activities if construction is to occur during an active timing window (Table 1). Surveys will be repeated if clearing activities do not occur within the post survey clearing window (Table 2).

3.3.2 *Point Count Survey*

A point count survey will be conducted using the Variable Radius Point Count method at each location identified during planning, using the following methods (RIC, 1999):

- Surveys will be conducted twice for each location at least one day apart, to increase the chance of observing nesting behaviour.
- A standard point count radius of 100 m from the survey location will be used.
- The surveyor will stand at each predetermined survey location and wait 2 minutes before beginning the survey to allow for bird activity to resume.
 - This waiting period can be used to quietly record data on weather and environmental conditions.
- A five-minute survey is completed at each point count survey location.
- All birds seen and heard, and any nesting behaviour observed during the survey will be recorded, including species ID, and their location relative to the surveyor estimated by 50 m intervals (i.e., 0 to 50 m, 50 to 100 m as outlined in the RIC 1999).
- If needed, surveying can continue beyond 5 minutes to ensure species identification and other information are confirmed.
- Point count survey data form is provided in Appendix A.

3.3.3 *Spot Mapping Survey*

After the completion of point count surveys, spot mapping surveys will be completed to further classify whether individuals observed during point counts are actively breeding and to locate/map breeding territories. Spot mapping surveys will be conducted following (RIC, 1999):

- Surveyors can quietly move around the survey area to get a better view of any potential nesting areas identified during the point count survey, but should attempt to be as quiet and non-impeding as possible to avoid disturbance.
- All individuals displaying nesting behaviour recorded during point count surveys will be further observed during spot mapping to confirm nesting.
- An attempt will be made to identify pairs of breeding birds (both male and female) and the associated nest. If a single male or female bird is identified, they will be further watched to determine presence of a partner and/or nest.
- If additional behaviours or signs indicative of breeding or nesting are not observed, it is recommended that the surveyor leave the area and observe the bird identified during the point count survey from afar with binoculars.
- If the surveyor is uncertain of nest presence after spot mapping, the location will be classified as a potential nesting area.
 - the surveyor will record the GPS location of the encounter area and what nesting signs were identified.

- The area will be re-surveyed on a following day (see Section 3.1.2).
- If the nest still cannot be located/identified (by a QP), the area should be marked and buffered (100 m) as a nesting location.

3.3.4 Owl Survey

Automated Recording Units (ARUs) will be deployed during pre-clearing surveys to determine use by nocturnal species not easily detectable during the day. ARU and deployment details are provided in Appendix B. Units will be deployed during daily pre-clearing surveys, then retrieved the following morning and re-deployed at the new day's locations:

- Units will be deployed in areas with suitable cavity nesting habitat at 500 m intervals along the ground survey transect line.

3.3.4.1 Deployment and Pick-up Timing

- On the first day, deploy units and leave them out overnight.
- On all subsequent days, retrieve the units in the morning prior to beginning the next pre-clearing area.
 - For each unit, open the cover and swap out the SD card to a fresh card.
 - Ensure that the new SD card is working and the programming schedule is intact.
 - Re-deploy the units at new sites during the day's pre-clearing work and leave out overnight.

3.3.4.2 Audio Data Listening

At the end of each day's pre-clearing field work, listen to the sound recordings from the previous day.

- Upload the recorded sound files to a laptop or hard drive where they will be safely stored.
- Open each sound file one by one and listen for the 5 minute duration. Each site should have 3 recordings for a total of 15 minutes.
 - To speed up the process, use a free spectrogram viewing program such as RavenLite or Audacity (free downloads available: <https://ravensoundsoftware.com/raven-lite-downloads/> or <https://www.audacityteam.org/download/>).
 - Spectrogram viewers allow you to visualize the sound recordings; therefore, it is possible to see which recordings have sound and which are blank, without spending the entire listening time. It is also possible to select locations in the recordings with sound and listen to those portions only.
- Clear the SD cards once the files have been loaded on the computer to ensure files do not get mixed between sites.

3.3.4.3 Site Assessment at Detection Locations

Any locations where an owl is detected by ARU should be noted on the deployment data forms immediately. The location should be returned to the following day for a detailed check. This includes:

- Searching trees in the area for signs of wildlife/owls, including pellets and cavities.
- Knocking on larger diameter trees or snags which may serve as roosts.
- Utilizing playback for the detected species to elicit a reaction from owls in the area.
- Deploying an ARU unit for an additional night to determine if owl presence is consistent at the site.

4. NEST BUFFERS

If a nest is identified, a setback buffer will be established following a risk-based approach that considers the sensitivity of different bird groups, the risk of a planned activity disturbing birds and, and whether the activity is “Project critical”.

- Preferred buffers are listed in Table 3.
- A QP will determine what types of birds are present, the types of planned activity and risk of disturbance (e.g., storing material may have a low risk and have a smaller buffer, blasting and crushing rock would have a high risk of disturbing birds and require a larger buffer).
- Project critical activities are those typically associated with road construction to allow for the passage of equipment past the bird nest to continue road construction further up the alignment.

Table 3: Preferred Nest Buffer Sizes

Bird Species or Group	Preferred Buffer Size ¹
Songbirds including Ground Nesters	50 m Radius
Waterbirds	50 m Radius
Cavity Nesters (e.g., tree holes)	50 m Radius
Clark’s Nutcracker (VEC)	100 m Radius
Raptors (e.g., stick nests)	100 m Radius
Raptors (e.g., cavity nests for owls)	100 m Radius
Bald Eagle, Osprey, and Peregrine Falcon	200 m Radius
Golden Eagle and Northern Goshawk	500 m Radius

¹: *Determining of buffer size was informed by: Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia 2013 (BC MFLNRO 2013); Buffer Zone and Setback Distances Recommendations (Environment Canada 2014b); and Develop With Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MFLNRO 2014b).*

4.1.1 Flagging of Buffer Areas

Flagging tape will be used to designate buffer areas where clearing will be avoided, following these steps:

- Flagging tape will be used to indicate the buffer boundaries. A predetermined colour or colour combination should be used to avoid confusion of flagging meaning.
 - Flagging tape is commonly used to identify and mark numerous project related boundaries and is known to cause confusion when colours overlap between setback buffers and clearing/construction boundaries.
- A highly visible waterproof label will be attached to the flagging tape delineating the buffer boundary and will provide the following information: distance, direction, and general height of nest, the associated species, and the unique ID assigned to the nest.
 - The nest should never be flagged to avoid attracting predators.
- The outer boundary of the buffer should clearly indicate the boundary as to not be missed. If dense vegetation makes the boundary flagging difficult to see, flagging tape should be run as a barricade strip through that area.

4.1.2 *Additional Monitoring of Active Nests*

Follow up surveys are required to be completed throughout the sensitive breeding period at all active and potential nesting locations. Follow up surveys will track the status of the nest and breeding activities and indicate once the nest is deemed fully inactive.

- If a nest was previously marked active, but is inactive during the most recent survey, it should be re-surveyed immediately prior (within 7 days) of clearing to ensure the nesting area is in fact inactive.
- Ample distance should always be maintained between the surveyor and nest. Surveyors should never touch or impede on nesting areas.
- If the nest belongs to a raptor species that reuses nesting locations (see Section 3.2) the buffer will be maintained throughout the year.
 - A permit is required to remove or relocate raptor nests
- If the nest does not belong to a species known to return to nesting locations, the nest buffer can be removed once deemed inactive by two surveys conducted on different days.

4.2 *Survey Prep and Data Management*

4.2.1 *Pre-field*

- Review survey SOPs and methodologies.
- Review sensitive time periods for species of concern and associated protocols and SOPs for the surveys being conducted.
- Obtain current geo-referenced pdf maps (20k scale) - map features include roads, Fresh Water Atlas streams, wetlands and lakes), mine infrastructure, mine LSA and RSA boundaries, private and FN lands, on top of orthophotos.
- Any previously recorded nests or breeding activity recorded throughout the year will be compiled and will be continuously updated as additional surveys are completed. Any areas identified with potential breeding during prior surveys should be revisited to confirm breeding activity.

4.2.2 *Field Gear*

- GPS enable tablet loaded with maps (Avenza App), SOPs, Survey123 forms, bird visual and auditory ID resources.
- Backup battery for the tablet.
- Field notebook, pencils, sharpie.
- ARU units, extra batteries and SD cards.
- Hand held GPS unit, binoculars, compass.
- 50m measuring tape.
- Flagging tape (pre-determined colour(s)).

4.2.3 *Data Collection*

4.2.3.1 *Survey Data*

The following habitat data is collected at identified nesting sites:

- Survey date and start/end time;
- Transect ID and start location;
- Weather;
- Observation type, species and location;
- Photo details;
- GPS track of survey; and
- GPS waypoints.

4.2.3.2 *Bird Nest Data*

The following bird and nest data will be collected at each nest location:

- Species, life stage, and sex, where possible; and
- Photographs (without approaching the nest).

4.2.3.3 *Monitoring Data*

Monitoring nest status to determine activity:

- Date and time of monitoring;
- Nest status; and
- Estimated time required for nesting completion.

4.2.4 *Deliverables*

- Daily field reports detailing progress, issues related to field sampling and safety issues emailed to PM or designated receiver along with scanned Health and Safety Field Safety Meeting daily forms.
- Survey123 forms will be uploaded daily.
- Database will be updated with new nest locations and monitoring status of previously identified nest locations daily.
- Scanned copies of all field notes, digital copies of all field forms, photographs and all track and waypoint files will be uploaded to a pre-determined location (e.g., SharePoint).
- Short trip report summarizing field activities, methodologies, team, and objectives achieved, delays, issues, or concerns using the trip report template will be provided upon field program completion.

5. REFERENCES

Birds Canada. 2021. *Nesting Calendar Query Tool*.

ECCC. 2017. *General Nesting Periods of Migratory Birds*.

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RIC. 1999. *Inventory Methods for Forest and Grassland Songbirds*. Standards for Components of British Columbia's Biodiversity No.15. Version 2. Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for Terrestrial Ecosystem Task Force, Resources Inventory Committee (RIC): Victoria, BC.

RIC. 2001. *Inventory Methods for Raptors: Standards for Components of British Columbia's Biodiversity No. 11. Version 2.0*. Prepared by Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee (RIC): Victoria, BC.

APPENDIX A VARIABLE RADIUS POINT COUNT DATA FORM

VARIABLE RADIUS POINT COUNT DATA SHEET

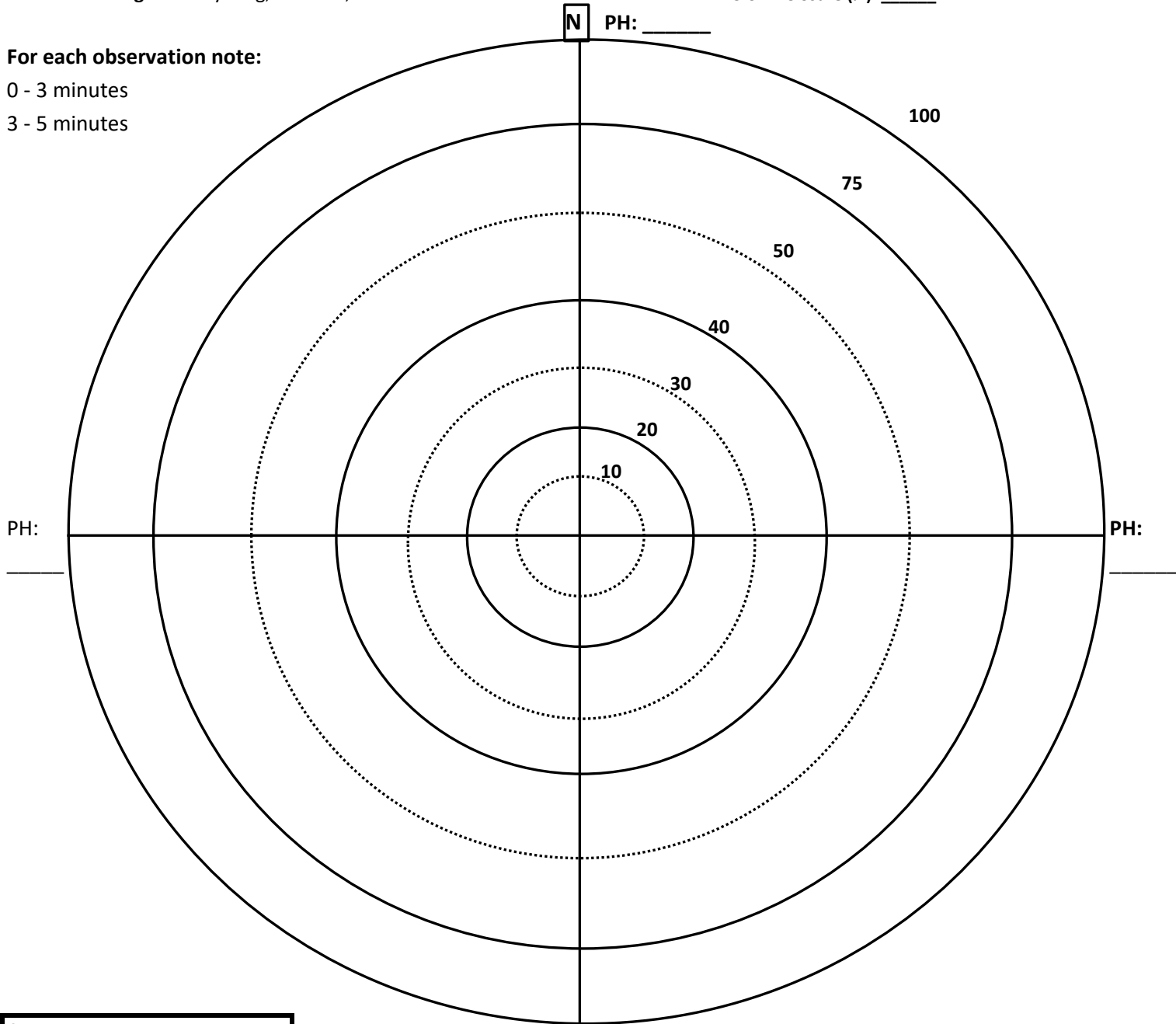
Date (ddmmyy):	Project:	BEC Subzone:
Transect ID:	Point Count ID:	Sky/Cloud Cover:
UTM Easting:	UTM Northing:	Waypoint number:
Observers:		
Start Time:	Wind:	Temp:
Noise:	Photo No:	General Habitat Description:
Dominant Plants:		

Vegetation/Cover Type (%):

Habitat Type: % River: ____; % Wetland: ____; % Marsh: ____; % Pond: ____; % Lake: ____;
 % Conifer Forest: ____; % Deciduous Forest: ____; % Mixed Forest: ____; % Mountain ____; % Tundra: ____
 Stand Age Class: young, medium, old
 Crown Closure (%): ____

For each observation note:

- 0 - 3 minutes
- 3 - 5 minutes



Cues	
S = Song	D = Drum
C = Call	V = Visual

PH: _____

Comments:	Flyovers	10	20	30	40	50	75	100	Nest predators:
									ie. gull, raven, raptors
	Before/After Survey Birds								

Wind: 0-1 None. 2 Felt on face, leaves rustle. 3 Leaves and small twigs in constant motion. 4 Small branches in motion. 5 Tall trees sway (no survey)
Noise: 0 None. 1 Stream/noise heard. 2 Moderate noise, doesn't affect detections. 3 Loud/very loud noise and does affect detections (no survey)
Sky: 0 Clear or very few clouds. 1 Partly cloudy. 2 Mostly cloudy. 3 Fog/smoke. 4 Light drizzle. 5 Rain (no survey)
Vegetation/Cover Types: Trees, shrubs, forbs, grasses and sedges, mosses and lichens, and bare ground

APPENDIX B ARU DEPLOYMENT – OWLS

Wildlife Autonomous Recording Unit (ARU) Deployment

Nocturnal Owl Surveys

November 2022

Version B.1

1. INVENTORY LIST

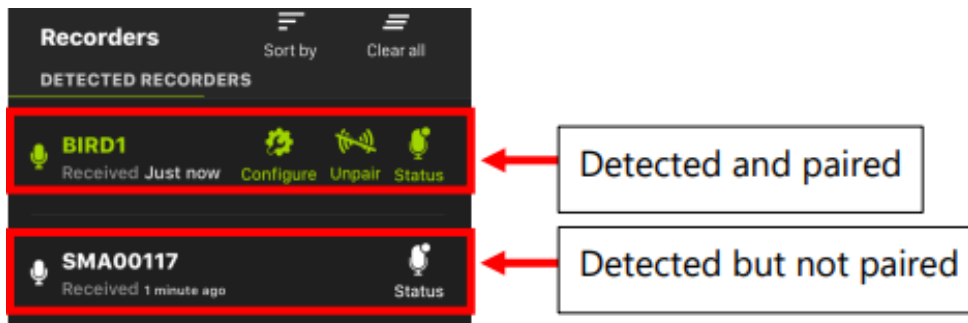
- 5 ARU units (SM minis).
- 30 AA batteries (4x AA batteries per unit, plus 10 extra) – lithium ion preferred.
- 12 SD memory cards (2 per unit for swapping during work, plus 2 extra).
- Bungee cords, zip ties, and/or cord for attaching units to trees/branches.
- WildlifeAcoustic’s SM-mini User Guide.
- Song Meter Configurator app (download on any android/iOS blue-tooth enabled mobile device).

2. UNIT PROGRAMMING

Open the unit and input the AA batteries and memory card; turn on one unit at a time to set programming.

Settings and schedules must be set via the Song Meter Configurator app (available on android and iOS mobile devices).

- On the unit, hold the PAIR/STATUS button for 3 seconds to pair the Bluetooth.
 - Under the battery slots, the LED light for “Bluetooth” will show a green blinking light when it is trying to pair, and a solid green light when the unit is paired.
 - See Sections 3.2 and 4.5 of the User Guide for trouble shooting.
- The app should start on the Recorders screen:



- Once the device is paired, select “Status” and check that the SD card is empty and no errors are displayed.
- Navigate back to the Recorders screen and select “Configure” on the right of the screen. This is the configuration screen.
- Select “Acoustic settings”:
 - Select “Maximum recording length” and change to 5 minutes:
 - Navigate back to the configuration screen. Then select “Location & time zone”; and

- Enter the Lat/Long coordinates for KSM: 56.497 N, -130.298 W. Click “Set” to the right of the lat/long entry boxes.
- Navigate back to the configuration screen. Then scroll down to the “Schedule” section.
 - Under START, select the boxes to read “Time” “+” and enter 22:00 (i.e., 10 PM).
 - Under DUTY CYCLE, select “Cycle” (instead of “Always”).
 - Set “Duty On” to 00:05 and “Duty Off” to 00:55.
 - Under END, select the boxes to read “Time” “+” and enter 00:00 (i.e., 12 AM).
- Check that the LED status light (under the batteries) labelled “Recording” shows solid green.
- Navigate back to the Recorders screen. Unpair the current unit but leave it on (the unit will go to sleep until it is time to record).
- Turn on the next unit and repeat all steps in this section.

3. DEPLOYMENT LOCATIONS

3.1 Overview

Units will be deployed during daily pre-clearing surveys, then retrieved the following morning and re-deployed at the new day’s locations. Audio data should be listened to each day, and any sites which have owls detected should be returned to for a detailed search, described below.

- Deploy units across the daily 3 km pre-clearing survey area at 500 m intervals, placed at the center line of the ROW.
 - Therefore, the first unit will be placed at each day’s 500 m mark, and the last unit will be placed at the 2.5 km mark.
- Ensure the deployment data form is completed for each site.

3.2 Deployment and Pick-up Timing

- On the first day, deploy units and leave them out overnight.
- On all subsequent days, retrieve the units in the morning prior to beginning the next pre-clearing area.
 - For each unit, open the cover and swap out the SD card to a fresh card.
 - Open the Configurator app and pair the device (following steps in Section 2) to ensure that the new SD card is working and the programming schedule is intact.
 - Re-deploy the units at new sites during the day’s pre-clearing work and leave out overnight.

3.3 Audio Data Listening

At the end of each day’s pre-clearing field work, listen to the sound recordings from the previous day.

- Upload the recorded sound files to a laptop or hard drive where they will be safely stored.
- Open each sound file one by one and listen for the 5 minute duration. Each site should have 3 recordings for a total of 15 minutes.

- To speed up the process, use a free spectrogram viewing program such as RavenLite or Audacity (free downloads available: <https://ravensoundsoftware.com/raven-lite-downloads/> or <https://www.audacityteam.org/download/>).
 - Spectrogram viewers allow you to visualize the sound recordings; therefore, it is possible to see which recordings have sound and which are blank, without spending the entire listening time. It is also possible to select locations in the recordings with sound and listen to those portions only.
- Clear the SD cards once the files have been loaded on the computer to ensure files do not get mixed between sites.

3.4 Site Assessment at Detection Locations

Any locations where an owl is detected by ARU should be noted on the deployment data forms immediately. The location should be returned to the following day for a detailed check. This includes:

- Searching trees in the area for signs of wildlife/owls, including pellets and cavities.
- Knocking on larger diameter trees or snags which may serve as roosts.
- Utilizing playback for the detected species to elicit a reaction from owls in the area.
- Deploying an ARU unit for an additional night to determine if owl presence is consistent at the site.

APPENDIX D PRE-CLEARING WILDLIFE FEATURES SURVEY – STANDARD OPERATING PROCEDURE (SOP)





Blackwater Gold Project

Pre-clearing Amphibian Salvage and Relocation Procedures for Land Clearing, Pre-construction, and Construction

STANDARD OPERATING PROCEDURE

ENVIRO-01

December 2022

Version B.1

Scope of Work:

This SOP provides guidance for the avoidance of active amphibian breeding identified during land clearing and construction of project infrastructure from April through September. It is intended for Environment personnel conducting pre-clearing surveys prior to land clearing and construction of project infrastructure.

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1. INTRODUCTION

Federal Decision Statement Condition 8.11 requires Blackwater Gold (BW Gold) to have a qualified individual salvage and relocate western toads (*Anaxyrus boreas*) to suitable habitat prior to clearing activities if clearing is occurring at a breeding site during the sensitive breeding period (April 1 to September 30).

The mine area is known to overlap with active toad breeding sites. Surveys conducted in 2021 and 2022 identified breeding areas as well as habitats where breeding may occur. Additional incidental breeding areas may include sumps, open wells, and ditch/puddle type habitats that result from mine activities and occur throughout the mine area.

This Standard Operating Procedure (SOP) describes amphibian relocation (“salvage”) if pre-clearing surveys or incidental observations identify amphibians at any life stage in or adjacent to a site identified for clearing or construction.

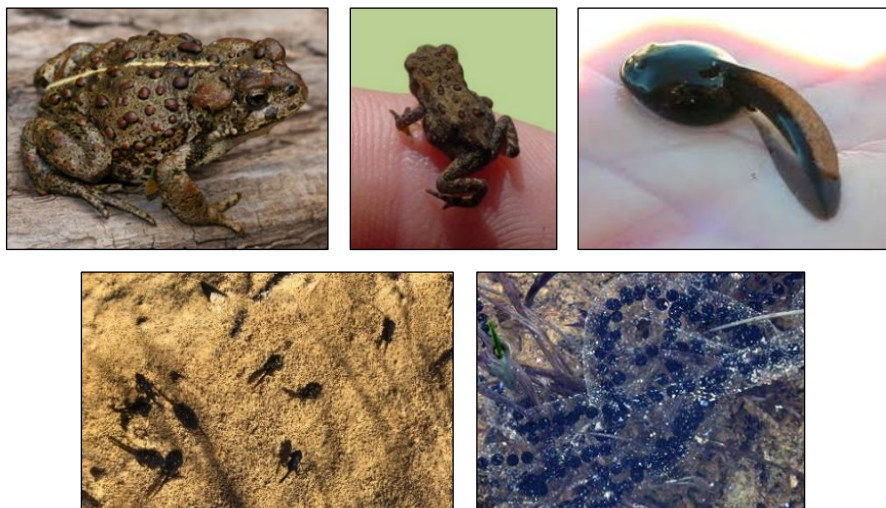


Plate 1-1: Life stages of western toad. From left to right: adult, toadlet, tadpole (larval), tadpole and metamorph, and egg.

2. APPROACH

As a condition of Federal DS Condition 8.10 and 8.11 issued for this Project, surveys for western toad are required prior to commencing clearing or site preparation if construction commences during the breeding period for this species. Consistent with the Wildlife Mitigation and Monitoring Plan (WMMP), Project-related impacts on amphibians and their habitats will be avoided, to the extent practical.

When avoidance is practical, it will be accomplished by adjusting the site of an activity, using alternative methods, adjusting the timing or schedule of an activity, or ceasing an activity altogether. As described in DS Condition 8.10, avoidance will include no-work buffers surrounding known breeding ponds and taking into account *BC Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia* (BC MOE 2014), which recommends a 30-150 m buffer zone.

The site-specific buffer zone will be determined by a Qualified Professional based on a risk assessment of the location, planned activities at the site, and mitigation (e.g., altering activities).

When disturbance of amphibian habitats cannot be avoided, amphibian salvage and relocation will be implemented by a qualified individual under the guidance of a Qualified Professional, in consultation with Environment and Climate Change Canada (ECCC) and Indigenous groups.

- Qualified individual means someone who, through education, experience and knowledge relevant to a particular matter, may be relied on by the Proponent to provide advice within his or her area of expertise. Knowledge relevant to a particular matter may include community and Indigenous traditional knowledge (DS CEAA 2012).
- Qualified Professional means a person who has training, experience and expertise in a discipline relevant to the field of practice set out in the condition, and who is registered with the appropriate professional organization in British Columbia, is acting under that organization's code of ethics and is subject to disciplinary action by that organization (DS CEAA 2012).

2.1 Reference Documents

Salvage and relocation methods will take into account:

- Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (BC MOE 2014);
- Best Management Practices for Amphibian and Reptile Salvages in British Columbia (BC MFLNRORD 2016);
- Inventory Methods for Pond-breeding Amphibians and Painted Turtle, Version 2.0 (RIC 1998a);
- Salvage and relocation activities will also adhere to prescribed methods and hygiene protocols provided by the provincial government and the Canadian Council on Animal Care (CCAC) (i.e., RIC 1998b; CCAC 2003; CCAC 2004; CCAC 2021, BC MOE 2008);
- Best Management Practices for Amphibian and Reptile Salvages in British Columbia (BC MFLNRORD 2016);
- Guidelines on the care and use of wildlife (CCAC 2003), the Canadian Council on Animal Care: Species-specific recommendations on amphibians and reptiles (CCAC 2004), the CCAC Guidelines on: Amphibians (CCAC 2021); and
- Live Animal Capture and Handling Guidelines for Wild Mammals, Birds, Amphibians & Reptiles, Version 2.0 (RIC 1998b).

3. OBJECTIVE

The objective of Amphibian Salvage and Relocation is to avoid accidental injury or mortality to amphibians that may result from Project activities (including vegetation clearing, ground disturbance, and construction).

3.1 Species Conservation Status

Amphibian species are subject to provincial wildlife regulations, and Red- and Blue-listed species may be subject to the *Species at Risk Act* (SARA; Government of Canada 2002). Broad habitat and species protection measures in the BC Forest and Range Practices Act (BC MFLNRORD 2016) and BC Wildlife Act provide direction for protection of these species.

Four amphibian species are known to occur in the Project area; these species and their conservation status within BC are listed in Table 3-1. Western toad is federally listed as Special Concern on Schedule 1 of the SARA (Government of Canada 2002).

Table 3-1: Conservation Status of Amphibian Species Expected to Occur in the Project Area

Species Name		Conservation Status		
		Provincial	Federal	
Common	Scientific	BC CDC ¹	COSEWIC ²	SARA Schedule 1 ³
Columbia Spotted Frog	<i>Rana luteiventris</i>	Yellow	Not at Risk	Not Assessed
Long-toed Salamander	<i>Ambystoma macrodactylum</i>	Yellow	Not at Risk	Not Assessed
Western Toad	<i>Anaxyrus boreas</i>	Yellow	Special Concern	Special Concern
Wood Frog	<i>Lithobates sylvatica</i>	Yellow	Not Assessed	Not Assessed

1) Species conservation status code definitions from BC Conservation Data Centre: **Red** – Includes any indigenous species or subspecies that have been designated, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. **Blue** – Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. **Yellow** – Includes species that are apparently secure and not at risk of extinction. Yellow-listed species may have red- or blue-listed subspecies.

2) COSEWIC (Committee on the Status of Endangered Wildlife In Canada) ranking system: **Endangered** – A species facing imminent extirpation or extinction. **Threatened** – A species that is likely to become endangered if limiting factors are not reversed. **Special Concern** – A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.

3) SARA (Species at Risk Act) Federal Public Registry uses the same ranking system as COSEWIC.

4. SALVAGE AND RELOCATION FIELD PROGRAM

Surveys and/or salvage and relocation activities will be carried out prior to site preparation and construction activities at incidental habitats*¹, and watercourses, wetlands, and terrestrial habitats where amphibians are known or likely to disperse (e.g., upland habitats adjacent to amphibian breeding habitats). Pre-clearing surveys to identify amphibian breeding sites and need for salvage are described in the Wildlife Mitigation and Monitoring Plan (WMMP).

¹ *Incidental habitats are alternative habitats used by amphibians during breeding and migration, and can include water filled ditches, sumps and depressions.

Several steps will be followed to carry out once an area in need of amphibian salvage has been identified:

1. Field confirmation of identified relocation sites (Section 4.2.1 Relocation Sites).
2. Isolation of salvage areas (Section 4.2.2 Isolation of Salvage Areas).
3. Capture and relocation of amphibians (Sections 4.2.3 Salvage Methods and 4.2.4 Storage, Transportation and Release).
4. Follow up surveys to confirm no remaining amphibians in salvage area – time and area constrained surveys of salvage area (as described in WMMP).
 - a. Two follow up surveys with no amphibians identified – **no further salvage required.**
 - b. Amphibians identified – **Continue from Step 3.**
5. Monitor relocated amphibians at relocation sites (Section 4.2.5 Monitoring Relocation Sites).

4.1 Hygiene Protocols

All surveys will follow the protocols outlined in The BC Interim Hygiene Protocols for Amphibian field staff and researchers to reduce risk of disease transmission among sites and among animals within a site.

These include:

- When handling amphibians, hands and gloves must be free of lotion, sunscreen, insect repellent, hand sanitizer or other substances that amphibians can absorb through their skin.
- All aquatic and amphibian related field equipment arriving at site from other locations, or equipment leaving site to use elsewhere, must be disinfected. This includes footwear (boots or waders), nets and aquatic trapping equipment.

Disinfection Procedure

- To disinfect equipment in the field, the following will be required:
 - Bucket/brush/spray bottle
 - Disinfectant (A bleach solution with 0.2 % sodium hypochlorite)
 - Protective gloves to wear while disinfecting
 - Clean water
- Before leaving site, field workers must scrub using a hand brush and rinse using the pond/stream water to remove mud, algae, plants, snails and other invertebrates from all equipment. Disinfection procedures work best on cleaned equipment, free of debris.
- A bleach solution with 0.2 % sodium hypochlorite and exposure time of 10 minutes has been shown to be effective against Bd (Johnson et al 2003). Commercial household bleach sold in North America often contains 6.15% sodium hypochlorite, but concentrations can vary. To prepare the disinfectant solution, add 32 ml of household bleach to 1 litre of water. This translates to approximately 3.5 cups (0.85 litre) of bleach to one tall bucket or tote (~ 25 litres) of water. In the absence of municipal/well water supply, water from the pond or stream can be used.
- All equipment must be soaked in the bleach solution for a minimum of 15 minutes. Small items such as dipnets, and sample containers can be immersed in the bleach solution in a bucket or plastic tote. Larger items such as chest waders, paddles, boats, canoes, meter sticks and other survey equipment should be thoroughly soaked with the bleach solution using a spray bottle.

- The bleach solution can be rinsed off after 15 minutes with clean water from a well or municipal supply. However, if clean treated water is not available, the items can be hung out to dry, preferably in sunlight, so that the bleach evaporates completely from the equipment.
- The bleach solution can damage exposed skin and clothing. Dishwashing gloves and rubber aprons should be worn to protect clothing and skin from exposure to the bleach solution.
- Any off-road vehicles, boats, and other floatation devices are subject to the same SOP as sampling equipment.

4.2 Salvage and Relocation

Salvage and relocation may involve a variety of life stages, from egg through tadpole to adult, and include monitoring of animals in their new locations.

Salvage and relocation activities occur when clearing and construction activities occur during the breeding season (May-September) and where impacts to occupied habitats cannot be avoided. A permit must be obtained to capture, hold, and relocate animals to a safe location and work must be guided by a Qualified Professional.

- General Wildlife Permit must be obtained, under the Wildlife Act, from BC MFLNRORD (BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development) from FrontCounter BC.
- Amphibian salvage and relocation will be implemented in consultation with Environment and Climate Change Canada (ECCC) and Indigenous groups.

Although salvage activities are targeted primarily toward western toad, other native amphibians (Table 3-1) encountered during salvage operations within affected wetlands and watercourses will also be captured and relocated.

4.2.1 Relocation Sites

Amphibians will be moved from where they are encountered to a place sufficiently far from disturbance while maintaining proximity to their originating location. Potential relocation sites have been identified based on 2021 and 2022 amphibian assessments (Figure 4-1) and are to be confirmed in the field prior to commencement of salvage activities. Field confirmation will be carried out by a qualified individual, to ensure that the pre-selected site is still suitable for the amphibians to be salvaged. If the conditions no longer fit the requirements, an alternative site will be selected.

Relocation sites will be selected based on the following criteria:

- Located within the same watershed to minimize the potential spread of chytrid fungus;
- Located outside of the Project workspaces by at least 300 m, with priority given to sites within 3 km of salvage sites;
- Sites of equal or better habitat suitability, relative to salvage sites, and meet the life requisites of target species. Relocation and salvage sites should be comparable by:
 - Cover and structure
 - pH within 1.0
 - Temperature within 5°C
 - Similar potential food sources
- If the salvage location is an incidental habitat, upland habitat characteristics should be similar to the salvage location.

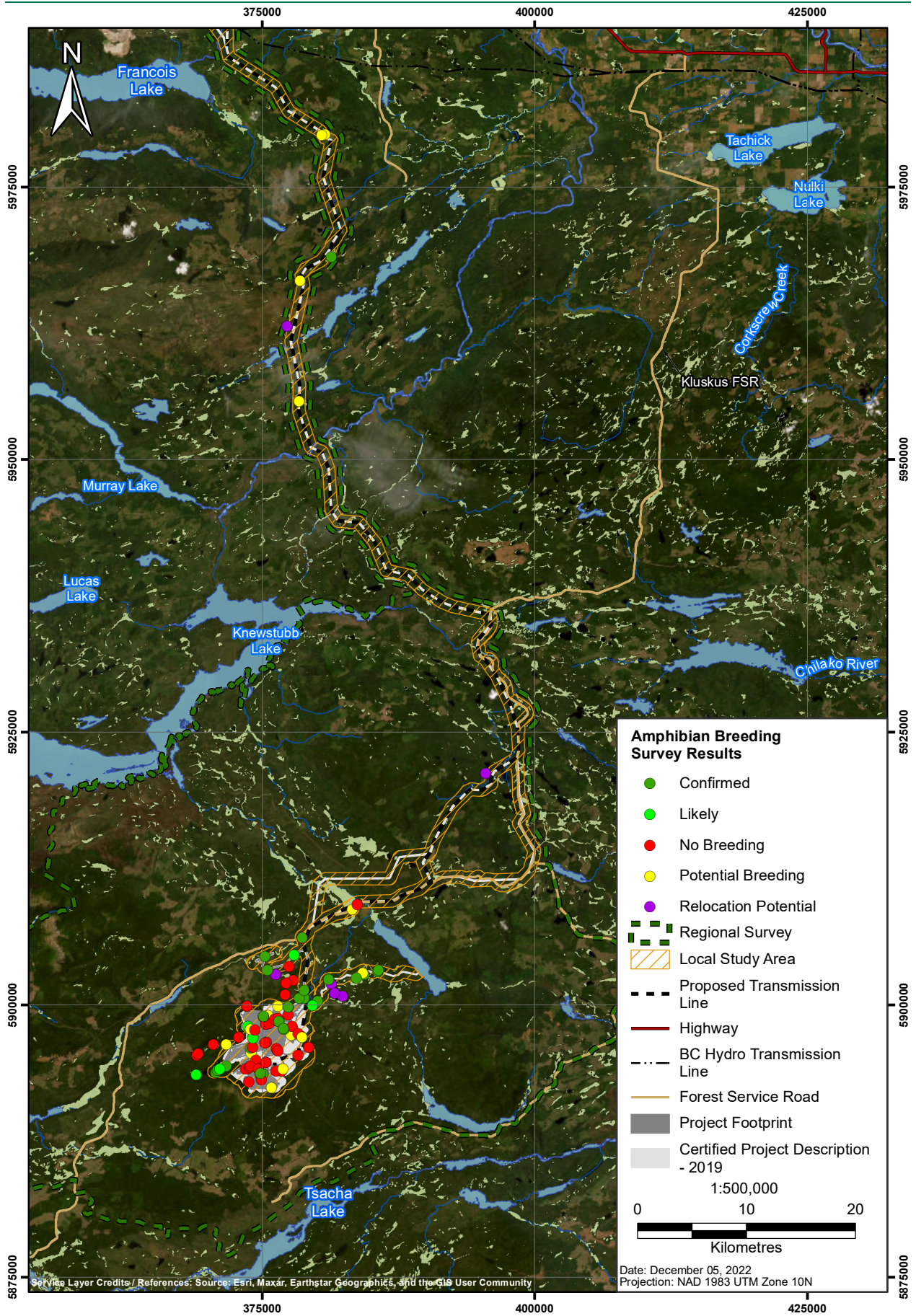


Figure 1: Blackwater Amphibian Locations

4.2.2 Isolation of Salvage Areas

Western toad breeding areas which will be de-watered or disturbed will be isolated by fencing to prevent additional access by amphibians:

- Geotextile exclusion fencing will be installed as necessary around affected wetlands and watercourses (salvage areas) to isolate amphibians from Project activities.
- Wetlands and watercourses near to the Project workspaces will be fenced on one side, along the edge of the workspaces, to direct dispersing amphibians away from active construction areas.
- The integrity of installed exclusion fencing will be monitored and adjusted/repared as necessary throughout site preparation and construction activities.
- Exclusion fencing will be removed once Project construction activities are complete.

4.2.3 Salvage Methods

Salvage and relocation activities will be undertaken by qualified individuals under the guidance of a Qualified Professional (Section 2) in accordance condition 8.11 and 8.10 of the EAC.

Following isolation of the salvage area, affected wetlands and watercourses will be systematically surveyed:

- Hand and dip netting
 - May be used to capture adults, juveniles, and egg masses of all amphibian species.
- Baited funnel or minnow traps
 - Traps must be modified with a platform to allow amphibians to position themselves above water.
 - Traps must be positioned so that the top of the trap is above the water level.
 - Traps will be baited with approximately 10 g of moist cat food.
 - Checked at regular intervals that do not exceed 12 hours (RIC 1998b).
- Dewatering
 - Habitats affected by dewatering activities will be isolated with fencing to prevent incursion.
 - Qualified biologists will remain on-site for the entire dewatering process and actively salvage amphibians that may have avoided capture during the initial salvage.
 - These individuals will be captured by hand and transported to relocation sites.
- Pit-fall traps
 - May be used during certain life stage periods, e.g., presence of metamorphosing toadlets, where necessary
 - Traps to be placed in upland areas, along the edge of exclusion fencing to improve likelihood of salvaging dispersing adult and recently metamorphosed amphibians if detected.
 - Traps will contain a layer of moist moss (or a moistened sponge if moss is not available) and perforations to prevent captured amphibians from desiccation or drowning (RIC 1998b).
 - Traps will also include a length of jute twine stapled to the side of the pit-trap to provide an effective escape route for small mammals.
 - Traps will be checked at least every 12 hours. Captured amphibians will be transported to relocation sites (RIC 1998b).

- Salvage efforts will continue until there are two consecutive zero-capture sessions that are at least six hours apart.
 - The time between salvage sessions is to allow for amphibians that may be in hiding to appear, and/or for sediment (if present) to settle.
- Sweeps
 - At watercourses, wetlands, and terrestrial habitats where amphibians have been identified, surveys will be completed prior to the start of daily construction activities (including equipment mobilization) for amphibians that may have entered the workspaces overnight.
 - If a western toad is discovered within the Project workspaces, or in association with any other Project activity or facility, the discovery will be reported to the environmental monitor who will initiate the appropriate salvage procedure.

4.2.4 Animal Storage, Transportation, and Release

Efforts will be taken to retain captured individuals for as short a period as possible. Individuals will be transported and released at relocation sites using buckets or small containers. The following guidelines will be followed for capture, handling, transportation, and release of amphibians:

- Handling of amphibians will be limited and done quietly and without sudden movements. Hand nets (made of non-abrasive material) will be used to reduce the risk injury. The field crew will wear nitrile gloves for all salvage and relocation activities.
- The field crew will not wear lotions, perfumes, insect repellent, or other potentially harmful substance on their hands.
- Where handling is necessary, amphibians will be grasped around the waist with the hind limbs uninhibited to reduce the risk of injury. Larger individuals should also be grasped around the forelegs. Tadpoles will not be handled out of water.
- Captured animals will always be kept in buckets and containers and separated by species and life stage to limit the risk of injury, predation, or the spread of disease (BC MFLNRORD 2016).
- Transport buckets and containers will be sealed, adequately ventilated, properly insulated, and include a source of moisture. Captured amphibians in the larval stage will be transported in buckets filled with water sourced from the salvage location. Transportation buckets and containers holding captured individuals will be kept out of direct sunlight.
- Amphibians will not be exposed to large changes in water pH or water temperature between sites. Individuals will be given time to acclimate to their release location:
 - Transportation containers will be temperature adjusted until water is within 50 C of the release site. Temperature acclimation can be achieved by adding water from the release site to the transportation containers.
 - Safe temperature change time is approximately 20 C every 15 minutes.
 - pH of the release site cannot be changed, and therefore must be within 1.0 pH scale point of the salvage location.
- Traps and all other salvage equipment will be disinfected when brought to Blackwater site, and if taken to other projects (Section 4.1).

- If an animal is inadvertently injured, or does not recover from stress or myopathy, such that death is imminent, the individual will be euthanized per the CCAC species-specific recommendations for amphibians (CCAC 2021):
 - Field crews will carry appropriate euthanasia kits as suggested in CCAC 2021 – Section 11.
 - **Euthanasia will only be carried out by competent personnel using the least invasive method that is suited to the particular species and life stage of the animal (CCAC 2021).**
 - Suggested kit contents:
 - Nitrile gloves
 - Minimum 3 litre size container with lid to be used as a wet bucket
 - Benzocaine Hydrochloride, Commonly sold as Orajel ([Example Product Link](#)) – **must be menthol free**
 - Application of 20% gel to the ventral abdomen in a 2cm x 1mm strip is generally an effective means of anesthesia and euthanasia.
 - Animals are to be placed in a wet, sealed container (e.g., bucket). Deep anesthesia is expected within ~7 minutes, euthanasia within 5 hours.
 - Euthanized animals will be preserved in 90% ethanol and delivered as a voucher specimen to the Royal BC Museum.

4.2.5 *Ad hoc salvage of adult toads*

Salvage of adult toads may be necessary to move the animal out of harm's way. Moving terrestrial toads must be done with gloved hands or bare hands that are free of any chemicals (bug spray, lotions, soap residue, perfumes, etc.). Hands, gloved or not, should be moist and cool to limit any stress to the toad.

- Toads should be moved to a location as close to its capture location and a distance of 500m from an active work area.
- Release sites should be riparian wetland or adjacent upland forested habitats. Toads are terrestrial animals and should not be held in water or placed in water.

Handling methods for adult toads include:

- Scoop the toad into a net or cupped hand and cover it with the other hand – grasping the toad can cause injury or undo stress.
- Walk carefully to a release point and release the toad by lowering your cupped hands to the ground and opening them up to free it.
- If the distance to the release site is further away, a lidded container lined with moist moss can be used to transport the toad.
- Use the scooping method in step one to get the toad into and out of the container. Or, gently place the container on the ground on an angle to let the toad walk out of the container.
- Toads should not be held for long periods of time, and need to be kept cool until released.
- Data collection includes the following habitat and animal information:
 - Location, type (eco type or wetland class) and size of salvage and relocation areas;
 - Location of the salvage and relocation sites (i.e., UTM NAD83 GPS coordinate);
 - Capture method, date and time;

- Species, life stage, and sex, where possible, of captured and relocated individuals; and
- Photographs (without flash and only if this can be completed without causing distress).

4.2.6 Monitoring Relocation Sites

Post-salvage monitoring is important to determine the effectiveness of salvage operations in avoiding mortality, and to determine practices that can improve the effectiveness of future salvages. The goal of post-salvage monitoring is to assess salvage has any impacts on amphibian persistence or survival (BC MFLNRORD 2016):

- Relocation sites will be revisited the day following release of animals.
 - Ideally, monitoring will occur within 24-48 hours of relocation, but at least within 5 days.
- Amphibian monitoring will follow established RIC standards for the amphibian species that were relocated.
 - Using a combination of area-based and time-constrained searches of suitable habitats to determine short-term survivorship.
 - Any mortalities will be recorded.
- The information obtained from these surveys will inform upcoming relocations.
- Each aquatic relocation site will continue to be monitored annually for a minimum of three years during the breeding periods to identify western toad use of salvage recipient breeding ponds, and to assess longer-term survival and breeding success.

4.3 Survey Prep and Data Management

The following sections describe data that will be collected at sites where disturbance will occur, sites assessed for relocation suitability, and for amphibians captured during salvage operations.

4.3.1 Pre-field

- Review Figure 4-1 for potential relocation sites applicable to the survey location.
- Review sensitive time periods for species of concern and associated protocols and SOPs for the surveys being conducted.
- Obtain current geo-referenced .pdf maps (20k scale) – map features include roads, BC Fresh Water Atlas (streams, wetlands and lakes), mine infrastructure, mine LSA and RSA boundaries, on top of orthophotos.

4.3.2 Field Gear

- GPS enable tablet loaded with maps (Avenza App) or paper field maps if a tablet is not available (or for backup), SOPs, amphibian ID keys.
- Backup battery for the tablet.
- Field notebook, pencils, sharpie.
- Hand held GPS unit, binoculars, compass.
- 30 m measuring tape.
- Flagging tape (pre-determined colour(s)).

- Dip and hand nets, traps (as required – see section 4.2.3).
- 2 x 5 gallon pails with lids, gloves.
- pH/Temp pen (calibrated).
- Hygiene equipment (Section 4.2.2.3).

4.3.3 Data Collection

The following data will be collected at salvage and relocation sites.

4.3.3.1 Habitat Data

The following habitat data is collected at salvage sites and relocations sites:

- Location, type (eco type or wetland class) and size of salvage and relocation areas;
- Location of the salvage and relocation sites (i.e., UTM NAD83 GPS coordinate);
- Time taken to complete salvages and monitoring; and
- Water quality parameters including pH, temperature, depth (if relevant).

4.3.3.2 Amphibian Data

The following data regarding amphibians will be collected at each site where amphibians are observed:

- Capture method, date, time, and distance from water/shoreline;
- Species, life stage, and sex, where possible, of captured and relocated individuals; and
- Photographs (without flash and only if this can be completed without causing distress).

4.3.3.3 Post-Relocation Monitoring Data

After relocation has been completed, the following data will be collected:

- Date and time of monitoring;
- Water quality parameters; and
- Presence of western toad at relocation sites including life stage and evidence of breeding.

4.3.4 Reporting Requirements

Data and a written report of the activities related to the Permit must be submitted within 90 days of the permit expiry as outlined in Appendix A of the permit.

5. REFERENCES

- BC Ministry of Environment (MOE). 2008. *Interim hygiene protocols for amphibian field staff and researchers*. Standard Operating Procedures: Hygiene Protocols for Amphibian Fieldwork, 2008. Ecosystems Branch, Ministry of Environment, British Columbia.
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APPENDIX E PRE-CLEARING AMPHIBIAN SALVAGE AND RELOCATION PROCEDURES FOR LAND CLEARING, PRE-CONSTRUCTION, AND CONSTRUCTION – STANDARD OPERATING PROCEDURE (SOP)





Blackwater Mine

Pre-Clearing Wildlife Features Survey

STANDARD OPERATING PROCEDURE

ENVIRO-03

November 2022

Version B.1

Scope of Work: This SOP provides guidance for the completion of pre-clearing surveys for the identification of wildlife features for bats, bears, ungulates and furbearers. It is intended for Environment personnel conducting pre-clearing surveys prior to land clearing and construction of project infrastructure.

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1. INTRODUCTION

Development of the Blackwater Gold Project (Project) including infrastructure, roads, and transmission corridors, will require the clearing of natural vegetation. The Project Wildlife Mitigation and Monitoring Plan (WMMP) includes mitigation, following the mitigation hierarchy:

- Avoid: clearing will primarily be completed outside of sensitive timing windows for habitat features such roosts, dens, and mineral licks; and
- Minimize/Manage: if clearing occurs during the sensitive periods, conduct pre-clearing surveys and establish buffers to avoid disturbance.

This SOP describes methods for conducting pre-clearing surveys for important wildlife features such as dens, roosts, and mineral licks. Pre-clearing survey methodologies for other important wildlife features such as nests and amphibian breeding ponds are described in the Pre-Clearing Surveys for Bird Nests SOP (ENVIRO-02) and in the Amphibian Salvage and Relocation SOP (ENVIRO-01).

Pre-clearing surveys for wildlife habitat features outlined in this SOP will be completed anytime vegetation clearing is scheduled to occur during sensitive periods designated for wildlife species occurring in the Project area (Table 1-1). Sensitive periods for the Project area are designated for bats, furbearers, and ungulates (BC MFLNRO 2014).

Table 1-1: Wildlife Features and Sensitive Periods Applicable to the Project Area

Species Group	Species	Habitat Feature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bat	Little Brown Myotis and Northern Myotis	Day or Maternity Roost												
		Hibernaculum												
	All	Den												



Species Group	Species	Habitat Feature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Furbearer	Fisher	Den												
	American Marten	Den												
	Wolverine	Den												
	Black and Grizzly Bear	Den												
Ungulate	Caribou	Mineral Lick												
	Moose													

2. PRE-CLEARING SURVEYS FOR WILDLIFE FEATURES

A qualified professional that is knowledgeable and experienced in identification of important wildlife features and habitat will lead surveys. Additional survey crew assisting the lead will have a base knowledge in feature identification and will be trained in, or have experience conducting pre-clearing surveys. The survey team will establish a strong communication network with project personnel on-site conducting the clearing activities to ensure the survey team can easily inform construction crews what the pre-clearing surveys include, why they are required, and the proper protocol for features identified during surveys.

2.1 Bat Surveys

Resources on bat species distributions and habitat preferences are available from the BC Community Bat Program (<https://www.bcbats.ca/index.php/bat-basics/bc-bat-species>). Pre-clearing surveys should be conducted in suitable habitat even if bat occupancy was not previously confirmed at a particular site.

The first choice for minimizing risks to bats is to avoid clearing during May - September in areas with old growth tree snags that may be used by bats as summer roosts, or during hibernation periods (October – May) around features identified as potential hibernacula (e.g., karst landscapes, caves, etc.). If clearing is planned in these areas during sensitive timing windows, then pre-clearing surveys will be conducted.

2.1.1 Features

Two types of habitat features are important for bats: summer roosts and winter hibernacula.

2.1.1.1 Roosts

Bats have day, night, and maternal roosts (where females congregate with young) and include the following features:

- Trees similar to those used by raptors and woodpeckers for nesting; and
- Structural stage 6 and 7 old growth trees, including snags with cavities or loose bark for shelter.

These areas typically occur in low elevation riparian or flood plain forest habitat.

Terrestrial ecosystem mapping and other imagery will be used to identify forested areas that may have mature trees, and the areas can be visually inspected for suitable roost trees and/or signs of bat use (Table 2-1).

Table 2-1: Tree Features Bats Use for Roosting and Indicators of Use

Features of Trees Used as Bat Roosts	Signs Indicating Possible Use by Bats
<ul style="list-style-type: none"> ■ Natural holes ■ Woodpecker holes ■ Cracks/splits in major limbs ■ Loose bark ■ Hollows/cavities ■ Dense epicormic growth (bats may roost within it) 	<ul style="list-style-type: none"> ■ Tiny scratches around entry point ■ Staining around entry point ■ Bat droppings in, and around or below entrance ■ Audible squeaking at dusk or in warm weather ■ Flies around entry point ■ Distinctive smell of bats ■ Smoothing of surfaces around cavity

Adapted from Hundt (2012)

2.1.1.2 *Hibernacula*

Habitat features with the potential to be hibernacula often include the following:

- Caves that provide a damp and relatively warm environment through the winter (any karst material can be mapped prior to heading out in the field);
- rock or cliff crevices;
- Large root balls; and
- abandoned mines.

Signs of bat presence prior to hibernating at potential sites include:

- the presence of guano;
- urine or body oil stains; and
- discarded food items.

2.1.2 *Survey Methods*

Pre-clearing surveys will be conducted for roosts in the spring/summer, and for hibernacula in the fall/winter. Methods involve a combination of auditory and visual surveys within the disturbance area and 1 km around this area for potential bat hibernacula. Survey data collection requirements are detailed in Section 4.3.

2.1.2.1 *Auditory Surveys*

Auditory surveys using automated recording devices (ARUs) can document bat activity. Automated recorders are programmed to record bat sounds between sunset and sunrise and deployed in identified or potential roost habitat or outside of possible hibernacula entrances in early or late hibernation periods to pick up activity of bats entering or exiting the hibernacula.

Weather conditions can influence bat activity and should be taken into consideration when analysing ARU data. Rain can prevent bats from foraging and dry spells following rain can influence longer foraging periods (J. Collins (ed.) 2016).

Size of the area to surveyed should also be taken into consideration when conducting these surveys. An ARU's listening range is between 30 and 100m, depending on the loudness of the bat call. For hibernaculum, one unit set up near the feature is adequate. For roosting surveys, surveys should consist of one unit per hectare (100 m x100 m).

Setting up the ARUs involves the following steps:

- Program the ARUs
 - Utilize the ultrasonic microphone for recording bat calls.
 - Set timer to record calls between sunset and sunrise.
 - Can set to record for 5 minutes every hour to limit the amount of collected data.
- Select the location
 - Deploy the ARU in the area to be cleared (1 unit/ha).
 - If the area is large, you can minimize the number of units deployed by selecting a location with roosting or feeding attributes (wetland edge, opening).
- Deploy the ARUs
 - Ensure the unit programmed and turned on.
 - Attach the unit to a tree at head height using zip strips or bungy cords.
 - If using an older SM3 model, attach the microphone to a branch so it is pointing out and slightly upwards.
 - If using the mini model, ensure the ultrasonic mic is facing outward.
 - Flag the tree, keeping the flag tails away from the mic.
 - Record the weather conditions (past, present and forecasted).
- Determine presence
 - Follow the ARU guide (Appendix A) to analyse the recorded calls.
 - If bats are detected, return to the site for additional surveys and applying the setback buffers (Table 2-2).

2.1.2.2 Visual Surveys

Suitable roosting habitat areas are also visually surveyed for current occupancy.

- Observers survey by foot along transect lines;
- Transect widths will depend in forest conditions and are spaced so potential roosting trees or hibernating structures can be identified;
- A ground level assessment is conducted along the transect to identify signs of bat activity (Table 2-2; J. Collins (ed.) 2016);
- Once identified, a detailed inspection is completed from the ground level. Trees are inspected consistently around all parts from all angles and from both close to the trunk and further away;
- Features identified as potential hibernacula are inspected for signs of bat use including the presence of guano, urine or body oil stains, and discarded food items. If no sign is identified an ARU should be deployed to determine use; and
- A flashlight and binoculars can help identify more detail. Inspections should be carried out in daylight conditions and can be conducted in conjunction with bird surveys if seasonally timed.

Table 2-2: Habitat Feature Buffer Distances for Bats

Bat Habitat Feature	Setback Distance for Low Impact Activity (m)	Setback Distance for Higher Impact Activity (m)
Day/Night Roost Sites	100 m	300 m
Maternal Roost Sites	300 m	1 km
Hibernacula	300 m	1 km

Adapted from BC MFLNRO (2014); BC MOE (2020). Species of conservation concern may require larger buffer areas

Areas with identified bat roosting activity will be buffered by a minimum of 100 m (Table 2-2). Buffer distances may be higher for certain activities (e.g., blasting) or more sensitive species. Roosting areas can be checked periodically (e.g., once per week or two weeks) to determine if bats have vacated the roost site. Work may proceed when bats are no longer occupying the area.

Hibernacula and maternal roosts require greater buffer distances because bats are particularly sensitive during these periods. Specific management plans should be created to moderate activity occurring within 1 km if occupied hibernacula or maternal roosts are identified, to ensure ongoing viability of the habitat (BC MOE 2020). These sites should not be destroyed or disturbed even when inactive, because they are re-used between years. Buffer distances should be documented, along with any monitoring of areas for ongoing activity (Section 4).

2.2 Den Surveys

Surveys are required to look for den sites for American marten, black bear and grizzly bears, fisher, and wolverine within the area of disturbance and an additional 100 m outside of the clearing boundary.

2.2.1 Den Identification

2.2.1.1 Grizzly and Black Bear

Grizzly bear ground dens are typically located in the following areas:

- On moderate to steep (40–90%) mountain slopes in alpine, subalpine, or montane environments;
- Cooler north or east-facing aspects where insulating snow accumulations are greater;
- In flat topography, ground dens may be located on high spots or small knolls, as the sides of these features provide easier digging conditions;
- Where conditions are optimal (i.e., slope, soil texture, aspect, snow cover, security), more than one Den site may be found in a relatively small area (1– 2 ha); and
- Grizzly bears may use these areas year after year as hibernation sites.

Black bear dens are found in the following areas:

- In valley-bottom environments on the forest floor;
- Under root mats and fallen logs or in hollow tree cavities; or
- Black bears will excavate ground dens in areas with suitable soil substrates.

In general, grizzly bear ground dens usually have larger entrances and larger inside chambers than the dens of black bears. Things to look for when identifying a bear den:

- Ground den entrances of a grizzly bear is usually about 75 cm in diameter;

- Grizzly bear den chambers may be 150–225 cm in diameter with a height of 125 cm and are usually lined (some may be unlined) with shrub branches, tree boughs, duff, or grass;
- Hair is often visible at the den entrance and in bedding material;
- Because the grizzly bear's long front claws and powerful shoulder muscles adapted for digging, many dens are excavated. In these cases, large piles of soil, rocks, or wood (called a "porch") are found downslope of the den entrance;
- Fresh material, with little or no vegetation growing on a debris pile, may indicate a freshly dug den;
- Black bears often den in large diameter (>1 m) trees or wooden structures derived from trees (logs, root boles and stumps);
- Unexcavated dens are often located under root wads of large trees and occasionally in sheltered, dry caves or rock cavities;
- Den sites are often most visible in spring during snowmelt when soil from the den gets tracked onto the surrounding snow; this enhances snowmelt immediately around the den (i.e., the den area becomes more visible in contrast to the adjacent snow); and
- Tracks in the snow or trails on the ground may lead to or from den site in late fall or at the end of the hibernation season in spring; however, during hibernation, bears do not leave the den so there will not be any visible tracks.

2.2.1.2 *Fisher*

Female fishers require large diameter trees with cavities to birth and raise their young.

- Fishers use cottonwood, balsam poplar, trembling aspen, Douglas-fir, and lodgepole pine as den trees in BC;
- Trees generally have extensive heart-rot forming large internal cavities while the tree is still living. Other trees, such as spruce, also get heart-rot, but don't maintain the hard exterior shell that preserves the standing tree and cavity for many years;
- The minimum tree diameter depends on the tree type, but is generally large for the particular tree species;
- They will only use cavities (~25 to 30cm d) with entrance holes that are approximately 8 to 12 cm in diameter: large enough for them to squeeze into, but small enough to keep larger predators away from their kits;
- Den trees also need to have other trees and shrubs around them to allow the female approach her den unseen; and
- Multiple cavities are usually required to accommodate the growing kits.

2.2.1.3 *Wolverine*

Wolverines are known to den in alpine, subalpine, taiga, boreal forest, and tundra habitats. A critical feature of wolverine denning habitat is the dependability of deep snow throughout the denning season (February-May).

- Snow greater than 1 m deep, distributed uniformly or accumulated in drifts, provides protection from cold temperatures;

- Long, complex snow tunnels in hardened snowdrifts characterize den sites in tundra and alpine areas, and in some cases, the tunnels lead down to entrances under boulders that provide additional protection for kits; and
- In forested areas where snow is deep and soft, dens are located under fallen trees or boulders that provide added structure to the den, preventing snow tunnels from slumping (Wolverine Foundation 2022).

There are two types of reproductive dens:

- **Natal Dens:**
 - In forested habitats, natal dens are often located under fallen trees, either under a single large tree that has fallen or a group of trees that have blown down or been sheared off by an avalanche; and
 - The trees are covered with deep snow and dens are formed in snow tunnels that incorporate subnivean spaces under the tree trunks.
- **Maternal Dens:**
 - Sites used for maternal dens are often close to the natal den and have similar structure, although the distance between the natal den and maternal den can be 3-4 km away.

2.2.1.4 *American Marten*

Forests with old growth structure provide martens with places for resting and denning. Winter resting dens tend to be at ground level under logs, root masses, brush piles, and rock jumbles.

Dens are classified as either natal dens, where parturition takes place, or maternal dens, where females move their kits after birth. Denning structures and sign include:

- Dens sites are often identified with trails radiating out from such habitat elements;
- Cavities in standing dead or live trees that are more than 35 cm diameter;
- Branches, cavities or broken tops of live trees, snags, stumps, logs;
- Woody debris piles, rock piles; and
- Red squirrel nests or middens.

2.2.2 *Survey Methods*

Den surveys are best completed when done in two stages, particularly when the survey area is large or complex. A pre-aerial survey is conducted first to identify areas to conduct ground surveys. The ground survey is then completed in the areas identified.

1. A pre-aerial survey is used to delineate habitat types and to determine where to focus efforts. This is helpful when the survey area is large and it will take considerable time to cover the entire area on the ground. The survey will consist of flying along transects approximately 40 km/h at approximately 50 m above ground level, with surveyors looking for habitat features within 100 m on either side of each transect.
2. A ground survey will be conducted in areas that were identified during the aerial reconnaissance survey as areas that contain potentially suitable denning habitat for bears and furbearers, such as mature deciduous or coniferous trees potentially containing cavities or snags with hollow cores.

Ground Survey methods include:

- The den surveys will be completed on foot, walking transect lines spaced no more than 25 m apart;
- Tree decay class from decay class 1 to 9 will be noted as outlined in Maser et al. (1979); live trees are classed as decay classes 1 and 2 while hollow snags are considered in later stages of decay (e.g., classes 6 and 7);
- Root wads, blowdown trees, and coarse woody debris will be evaluated for the potential for subnivian dens;
- Observers will conduct a visual search of potential den trees for presence of cavities and other characteristics suggestive of active den sites (e.g., scratch marks created by furbearers climbing up and down trees, scat, tracks in the snow, and hair);
- Potential cavities at higher levels in the canopy will be visually inspected with binoculars from the ground for evidence of use;
- Presence and habitat use by any potential prey species for furbearers will also be noted;
- Infrared remote and forward-looking Infrared (FLIR) cameras can be used to confirm suspected den locations:
 - It should be noted that denning locations that are covered by rock, thick layers of debris, or deep into the ground cannot be confirmed “not active” if nothing is detected with the FLIR; and
- Den activity must be determined by a qualified person knowledgeable and experienced in feature and important wildlife habitat identification.

2.2.3 Mitigation and Buffers for Dens

Active den sites will be buffered using the setback distances listed in Table 2-3. These are different for different species and based on the denning activity (hibernation vs maternal).

Table 2-3: Habitat Feature Buffer Distances for Dens

Species	Setback Distance for Low Impact Activity (m)	Setback Distance for Higher Impact Activity (m)
Black Bear	100	200
Grizzly Bear	100	200-1000
Fisher	250	500
Wolverine	250	500
American Marten	100	100

Adapted from BC MFLNRO (2014); BC MOE (2020). Species of conservation concern may require larger buffer areas

Many animals (bats, ground squirrels) undergo true “hibernation” where their body temperature drops and they cannot be woken up unless they are warmed up. Bears, however, are not true hibernators and are instead in a deep sleep and can be woken by loud noises or vibrations. Hence the need for management in the 100 m buffer surrounding the den for low impact activities.

Low-risk activities are allowed in “limited work” zones, defined as activities with reduced chance of waking a bear up or disturbing newly emerged bears due to noise and vibration.

- If a bear den is detected, a 100 m buffer will be set and maintained around the den site until it is confirmed the bears have emerged, no longer use the den and have left the area;

- Only limited work may occur inside the buffer and at least 50 m from the den site; and
- Limited work includes moving machinery through the area and conducting critical clearing to enable movement. Work within 50 m of the den site and all high and moderate risk works must be deferred until the dens are no longer occupied.

Note: Its not always evident that the den is empty. Also, if the den was occupied by a sow with cubs, the cubs could still be in the den even if the sow is out. Additionally, the bears may be emerged but still use the den until they are ready to move on. If a sow is disturbed she may temporarily leave the den site, coming back to get her cubs when she feels its safe.

2.3 Mineral Lick Surveys

Habitat features such as mineral licks are important and require specific management. Licks are used by ungulate species to compensate for mineral deficiencies and imbalances; as well as potentially decreasing the influence of toxic plant compounds. Mineral licks are relatively rare on the landscape and may be used annually by multiple species of ungulate or multiple individuals of a single species. Ungulates typically use mineral licks in the spring and early summer, and can travel more than 1 km away from security habitat to reach them (Roy et al. 2004).

Buffer zones are used to mitigate disturbance to licks and should be assigned by a wildlife biologist with local species knowledge based on the importance of the lick to the wildlife species using it, the intensity of use, and the occurrence of similar features across the landscape. Lick protection guidelines encompass lick site trail networks, hydrological features, nearby thermal and security cover, and adjacent foraging sites (Roy et al, 2004; Wiles and Weeks 1986).

2.3.1 Mineral Lick Identification

Some mineral licks are easily recognizable by their exposed crystallization, which shows as white or colourful deposits. Other mineral licks are nondescript and are easily overlooked, only appearing as bare soil areas or muddy seepages. Most mineral licks will have visible, well-used wildlife trails that typically radiate out in multiple directions from the mineral lick (Roy et al. 2004).

Mineral licks often occur naturally and provide important nutrients such as sodium, calcium, iron, phosphorus and zinc, which are required for building bone and muscle. There are two visually distinct types of licks including wet and dry:

- Wet licks are usually associated with groundwater springs and develop into muddy clearings used mainly by moose;
- Dry licks are often associated with steep, well-drained slopes, and are used by mountain ungulates. They include dry earth exposures, such as clay or lacustrine deposits, often found above river cut banks and rock face mineral licks;
- Numerous tracks in conjunction with well-defined trails converging at one spot are good indicators of a wet or dry mineral lick; and
- Bare soil areas associated with most mineral licks are usually covered in animal tracks that can help identify the wildlife species using the mineral lick.

2.3.2 Mitigation and Buffers for Mineral Licks

Upon discovery of a mineral lick, the lick, and associated trails and features will be accurately mapped to allow for appropriate disturbance setbacks. Guidelines indicate a 250 m to 1 KM buffer may be required depending on lick significance. Preferred setbacks are listed in Table 2-4.

Table 2-4: Preferred Buffer Distance for Mineral Licks

Mineral Lick Significance (as determined by QP)	Setback Distance for Mineral Lick (m)	Setback Distance for Access Trail (m)	Setback Distance for Associated Hydrological Features
Non-Significant	Min 250	TBD	TBD
Significant	Up to 1000	100	100

A Significant lick is one that is naturally occurring and is used at least annually by one or more species (BC MFLNRO 2014) as evidenced by:

- Well established or braided trail leading to the site;
- Extensive excavating or trampling; and
- Teeth marks, hair, pellets and tracks.

2.3.3 Survey Methods

Two surveys will be conducted for mineral licks:

1. **An aerial survey** will be conducted over the clearing area to look for important features such as wetlands, cliffs, trails, and mineral licks. The survey will consist of flying along transects approximately 40 km/h at approximately 50 m above ground level, with surveyors looking for habitat features within 100 m on either side of each transect.
2. **A ground survey** will be conducted in areas that were identified during the aerial reconnaissance survey as possibly supporting mineral licks. The surveys will be completed on foot walking transect lines spaced no more than 25 m apart. All trails in a suspected lick area will be followed and tracked. All wildlife sign will be recorded. If a lick is identified, the lick boundary will be mapped and fully described with photos. Upland features will also be described.

3. BUFFERS

If a feature is identified, a setback buffer will be established following a risk-based approach that considers the species sensitivity and associated risk due to the planned activity. Preferred buffer sizes are listed in each survey section and summarized in Table 3-1.

Table 3-1: Preferred Buffer Sizes

Wildlife Species	Wildlife Habitat Feature	Preferred Buffer Size (m)
Bat	General Day Roost	100-300
	Maternity Roost	300-1000
	Hibernacula	300-1000
Black/Grizzly Bear	Den	100-200
Marten	Den	100
Fisher	Den	250-500
Wolverine	Den	250-500
Ungulate (moose, caribou)	Mineral Lick	250-1000

3.1 Flagging of Buffer Areas

Flagging tape will be used to designate buffer areas where clearing will be avoided, following these steps:

- Flagging tape should be used to indicate the buffer boundaries. A predetermined colour or colour combination should be used to avoid confusion of flagging meaning.
- A waterproof label will be attached to the flagging tape and will provide the following information: distance, direction, and general height of the feature, the associated species, and the unique ID assigned to the feature when initially identified. The feature itself should not be flagged to avoid predation marking.
- The outer boundary of the buffer should clearly indicate the boundary as to not be missed. If dense vegetation makes the boundary flagging difficult to see, flagging tape should be run as a barricade strip through that area.

4. SURVEY PREP AND DATA MANAGEMENT

4.1 Pre-field

- Review survey SOPs and methodologies;
- Review sensitive time periods for species of concern and associated protocols and SOPs for the surveys being conducted; and
- Obtain current geo-referenced pdf maps (20k scale) - map features include roads, FWA (streams, wetlands and lakes), mine infrastructure, mine LSA and RSA boundaries, private and FN lands, on top of orthophotos.

4.2 Field Gear

- GPS enable tablet loaded with maps (Avenza App), SOPs, Survey123 forms, bird visual and auditory ID resources;
- Backup battery for the tablet;
- Field notebook, pencils, sharpie;
- ARU units, extra batteries and sd cards;
- Hand held GPS unit, binoculars, compass; and
- 50m measuring tape and flagging tape (pre-determined colour(s)).

4.3 Data Collection

4.4 Survey Data

The following habitat data is collected at identified features:

- Survey date and start/end time;
- Transect ID and start location;
- Weather;
- Observation type, species and location

- Photo details;
- GPS track of survey; and
- GPS waypoints.

5. DELIVERABLES

- Daily field reports detailing progress, issues related to field sampling and safety issues emailed to PM or designated receiver along with scanned Health and Safety Field Safety Meeting daily forms;
- Scanned copies of all field notes, digital copies of all field forms, photographs and all track and waypoint files will be uploaded to a predetermined sharepoint site;
- Short trip report summarizing field activities, methodologies, team, and objectives achieved, delays, issues, or concerns using the trip report template will be provided upon field program completion; and
- All surveys, features, monitoring and mitigation activities will be reported in the Wildlife Mitigation and Monitoring Program (WMMP) annual report.

6. RESOURCES

ARU data collection Info: [How Far Can Your Wildlife Acoustics Microphone... | Wildlife Acoustics](#)

ARU user guide: [User Guides: Recorders & Software | Wildlife Acoustics](#)

7. REFERENCES

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APPENDIX F AMPHIBIAN SALVAGE DATA, 2023



Appendix F: Amphibian Salvage Data, 2023

Date	Crew	Temp (°C)	Cloud Cover (%)	Precipitation	Visit Type	Species Name	Age Class	# Salvaged	Salvage Site								
									Site ID	Salvage Number	Zone 10U		pH	Water Temp (°C)	Water Clarity	Start Time	End Time
											Easting	Northing					
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpole	200	BWP-01	1	374855	5893615	7.41	23.2	Clear but can't see to bottom	15:00	16:33
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	1	BWP-01	1	374855	5893615	7.41	23.2	Clear but can't see to bottom	15:00	16:33
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Tadpole	80	BWP-01	2	374855	5893615	7.41	23.2	Clear but can't see to bottom	6:55	8:11
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Tadpole	30	BWP-01	3	374855	5893615	7.41	23.2	Clear but can't see to bottom	9:35	10:43
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	1	BWP-01	3	374855	5893615	7.41	23.2	Clear but can't see to bottom	9:35	10:43
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	4	BWP-01	4	374855	5893615	7.41	23.2	Turbid	14:15	15:17
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpoles	140	BWP-01	5	374855	5893615	7.41	23.2	Turbid	8:12	9:08
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	1	BWP-01	5	374855	5893615	7.41	23.2	Turbid	8:12	9:08
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpole	110	BWP-01	6	374855	5893615	7.41	23.2	Turbid	10:27	11:29
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	1	BWP-01	6	374855	5893615	7.41	23.2	Turbid	10:27	11:29
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpoles	19	BWP-01	7	374855	5893615	7.41	23.2	Turbid	13:19	14:16
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	1	BWP-01	7	374855	5893615	7.41	23.2	Turbid	13:19	14:16
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpoles	14	BWP-01	8	374855	5893615	7.41	23.2	Turbid	16:00	16:56
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	5	BWP-01	8	374855	5893615	7.41	23.2	Turbid	16:00	16:56
2023-06-15	SL	15	20	Mostly sunny	Return Survey	-	-	-	BWP-01	8	374855	5893615	7.41	23.2	Turbid	20:13	20:16
2023-06-16	SL	5	100	Light Rain	Return Survey	-	-	-	BWP-01	8	374855	5893615	7.41	23.2	Turbid	7:00	7:05
2023-06-13	SL, KB	5	100	Light rain	Salvage	Western Toad	Tadpoles	~12,000	BWP-04	1	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:27	9:29
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	15	BWP-04	1	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:27	9:29
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	1	BWP-04	1	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:27	9:29
2023-06-13	SL, KB	5	100	Light rain	Salvage	Western Toad	Tadpoles	~13,000	BWP-04	2	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	12:17	13:18
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	17	BWP-04	2	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	12:17	13:18
2023-06-13	SL, KB	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	2	BWP-04	2	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	12:17	13:18
2023-06-13	SL	5	100	Light rain	Salvage	Western Toad	Tadpoles	~4000	BWP-04	3	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	15:15
2023-06-13	SL	5	100	Light rain	Salvage	Western Toad	Adult	3	BWP-04	3	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	15:15
2023-06-13	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	5	BWP-04	3	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	15:15
2023-06-13	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	2	BWP-04	3	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	15:15
2023-06-14	SL	7	50	No precipitation	Salvage	Western Toad	Tadpoles	36	BWP-04	4	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	6:40	7:10
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Tadpoles	12	BWP-04	4	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	6:40	7:10
2023-06-14	SL	7	50	No precipitation	Salvage	Western Toad	Tadpoles	80	BWP-04	5	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:37	10:42

Appendix F: Amphibian Salvage Data, 2023

Date	Relocation Site								Comments
	Site ID	Zone 10U		Acclimation Start Time	pH	Water Temp (°C)	Water Clarity	Release Time	
		Easting	Northing						
2023-06-13	BWG-RP-01	370189	5896330	17:10	6.84	21.4	Clear	17:15	Shallow water with emergent veg on one side of pond, connected to larger deeper pond with no emergent veg. Reclaimed exploration sump.
2023-06-13	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	17:15	-
2023-06-14	BWG-RP-01	370189	5896330	8:50	6.84	21.4	Clear	8:55	-
2023-06-14	BWG-RP-01	370189	5896330	11:15	6.84	21.4	Clear	11:20	-
2023-06-14	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	11:20	-
2023-06-14	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	16:20	-
2023-06-15	BWG-RP-01	370189	5896330	9:48	6.84	21.4	Clear	9:55	-
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	9:55	-
2023-06-15	BWG-RP-01	370189	5896330	11:51	6.84	21.4	Clear	11:56	-
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	11:56	-
2023-06-15	BWG-RP-01	370189	5896330	15:00	6.84	21.4	Clear	15:05	-
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	15:05	-
2023-06-15	BWG-RP-01	370189	5896330	17:15	6.84	21.4	Clear	17:20	Start of dewatering
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	17:20	-
2023-06-15	-	-	-	-	-	-	-	-	Survey 1 - no amphibians observed
2023-06-16	-	-	-	-	-	-	-	-	Survey 2 - no amphibians observed. No additional surveys required.
2023-06-13	BWG-RP-01	370189	5896330	10:56	6.84	21.4	Clear	11:02	Shallow warm water with emergent vegetation.
2023-06-13	BWG-RP-01	370189	5896330	10:56	6.84	21.4	Clear	11:02	-
2023-06-13	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	11:02	-
2023-06-13	BWG-RP-01	370189	5896330	13:55	6.84	21.4	Clear	14:00	-
2023-06-13	BWG-RP-01	370189	5896330	13:55	6.84	21.4	Clear	14:00	-
2023-06-13	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	14:00	-
2023-06-13	BWG-RP-01	370189	5896330	15:55	6.84	21.4	Clear	16:01	-
2023-06-13	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	16:01	-
2023-06-13	BWG-RP-01	370189	5896330	15:55	6.84	21.4	Clear	16:01	-
2023-06-13	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	16:01	-
2023-06-14	BWG-RP-01	370189	5896330	8:50	6.84	21.4	Clear	8:55	-
2023-06-14	BWG-RP-01	370189	5896330	8:50	6.84	21.4	Clear	8:55	-
2023-06-14	BWG-RP-01	370189	5896330	11:15	6.84	21.4	Clear	11:20	-

Appendix F: Amphibian Salvage Data, 2023

Date	Crew	Temp (°C)	Cloud Cover (%)	Precipitation	Visit Type	Species Name	Age Class	# Salvaged	Salvage Site								
									Site ID	Salvage Number	Zone 10U		pH	Water Temp (°C)	Water Clarity	Start Time	End Time
											Easting	Northing					
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Tadpoles	40	BWP-04	5	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:37	10:42
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	2	BWP-04	5	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:37	10:42
2023-06-14	SL	7	50	No precipitation	Salvage	Western Toad	Tadpoles	50	BWP-04	6	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:05	14:12
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Tadpoles	30	BWP-04	6	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:05	14:12
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	4	BWP-04	6	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:05	14:12
2023-06-15	SL	15	20	Mostly sunny	Salvage	Western Toad	Tadpoles	12	BWP-04	7	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:25	10:27
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpoles	41	BWP-04	7	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:25	10:27
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	2	BWP-04	7	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:25	10:27
2023-06-15	SL	15	20	Mostly sunny	Salvage	Western Toad	Tadpoles	9	BWP-04	8	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	14:16
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Tadpoles	31	BWP-04	8	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	14:16
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	4	BWP-04	8	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	13:19	14:16
2023-06-16	SL	5	100	Light rain	Salvage	Western Toad	Tadpoles	5	BWP-04	9	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	7:18	8:18
2023-06-16	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	35	BWP-04	9	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	7:18	8:18
2023-06-16	SL	5	100	Light rain	Salvage	Western Toad	Tadpoles	6	BWP-04	10	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:32	9:35
2023-06-16	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	79	BWP-04	10	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:32	9:35
2023-06-16	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	1	BWP-04	10	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	8:32	9:35
2023-06-16	SL	5	100	Light rain	Salvage	Western Toad	Tadpoles	6	BWP-04	11	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:41	10:32
2023-06-16	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Tadpoles	14	BWP-04	11	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:41	10:32
2023-06-16	SL	5	100	Light rain	Salvage	Columbia Spotted Frog	Adult	2	BWP-04	11	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	9:41	10:32
2023-06-16	SL	5	100	Light rain	Return Survey	-	-	-	BWP-04	-	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	15:36	15:41
2023-06-17	SL	0	95	Overcast	Return Survey	-	-	-	BWP-04	-	374852	5893531	6.8	22.38	Clear but can't see bottom in some spots	6:30	6:36
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	2	BWP-02	1	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	8:20	8:35
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	2	BWP-02	2	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	15:20	16:21
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	1	BWP-02	3	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	7:06	8:04
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	1	BWP-02	4	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	11:03	11:58

Appendix F: Amphibian Salvage Data, 2023

Date	Relocation Site								Comments
	Site ID	Zone 10U		Acclimation Start Time	pH	Water Temp (°C)	Water Clarity	Release Time	
		Easting	Northing						
2023-06-14	BWG-RP-01	370189	5896330	11:15	6.84	21.4	Clear	11:20	-
2023-06-14	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	11:20	-
2023-06-14	BWG-RP-01	370189	5896330	14:38	6.84	21.4	Clear	14:43	-
2023-06-14	BWG-RP-01	370189	5896330	15:38	6.84	21.4	Clear	15:43	-
2023-06-14	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	16:43	-
2023-06-15	BWG-RP-01	370189	5896330	9:50	6.84	21.4	Clear	10:00	-
2023-06-15	BWG-RP-01	370189	5896330	9:50	6.84	21.4	Clear	10:00	-
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	10:00	-
2023-06-15	BWG-RP-01	370189	5896330	15:00	6.84	21.4	Clear	15:05	-
2023-06-15	BWG-RP-01	370189	5896330	15:00	6.84	21.4	Clear	15:05	-
2023-06-15	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	15:05	-
2023-06-16	BWG-RP-01	370189	5896330	8:58	6.84	21.4	Clear	9:03	Start of dewatering
2023-06-16	BWG-RP-01	370189	5896330	8:58	6.84	21.4	Clear	9:03	-
2023-06-16	BWG-RP-01	370189	5896330	10:03	6.84	21.4	Clear	10:08	-
2023-06-16	BWG-RP-01	370189	5896330	10:03	6.84	21.4	Clear	10:08	One Columbia Spotted Frog tadpole mortality found in pond
2023-06-16	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	10:08	-
2023-06-16	BWG-RP-01	370189	5896330	10:55	6.84	21.4	Clear	11:00	-
2023-06-16	BWG-RP-01	370189	5896330	10:55	6.84	21.4	Clear	11:00	-
2023-06-16	BWG-RP-01	370189	5896330	-	6.84	21.4	Clear	11:00	-
2023-06-16	-	-	-	-	-	-	-	-	Survey 1 - no amphibians observed
2023-06-17	-	-	-	-	-	-	-	-	Survey 2 - no amphibians observed. No additional surveys required
2023-06-14	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	9:00	Relatively shallow water with some emergent vegetation and 85% algae covered.
2023-06-14	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	17:20	No tadpoles observed
2023-06-15	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	9:55	No tadpoles observed
2023-06-15	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	13:10	No tadpoles observed

Appendix F: Amphibian Salvage Data, 2023

Date	Crew	Temp (°C)	Cloud Cover (%)	Precipitation	Visit Type	Species Name	Age Class	# Salvaged	Salvage Site								
									Site ID	Salvage Number	Zone 10U		pH	Water Temp (°C)	Water Clarity	Start Time	End Time
											Easting	Northing					
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	3	BWP-02	5	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	14:30	15:46
2023-06-15	SL	15	20	Mostly sunny	Salvage	-	-	-	BWP-02	6	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	20:16	20:20
2023-06-16	SL	5	100	Light rain	Salvage	-	-	-	BWP-02	6	374884	5893616	6.89	21.56	Clear, but algae filled. Difficult to see extent.	7:05	7:10
2023-06-14	SL	7	50	No precipitation	Salvage	Columbia Spotted Frog	Adult	17	BWP-03	1	374887	5893561	6.84	21.35	Clear, but heavily vegetated in areas	14:01	15:03
2023-06-15	SL	15	20	Mostly sunny	Salvage	-	-	-	BWP-03	2	374887	5893561	6.84	21.35	Clear, but heavily vegetated in areas	7:06	8:07
2023-06-15	SL	15	20	Mostly sunny	Salvage	Columbia Spotted Frog	Adult	3	BWP-03	3	374887	5893561	6.84	21.35	Clear, but heavily vegetated in areas	13:27	14:45
2023-06-15	SL	15	20	Mostly sunny	Return Survey	-	-	-	BWP-03	4	374887	5893561	6.84	21.35	Clear, but heavily vegetated in areas	20:20	20:23
2023-06-16	SL	15	20	Mostly sunny	Return Survey	-	-	-	BWP-03	5	374887	5893561	6.84	21.35	Clear, but heavily vegetated in areas	7:10	7:15

Appendix F: Amphibian Salvage Data, 2023

Date	Relocation Site								Comments
	Site ID	Zone 10U		Acclimation Start Time	pH	Water Temp (°C)	Water Clarity	Release Time	
		Easting	Northing						
2023-06-15	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	17:20	No tadpoles observed
2023-06-15	-	-	-	-	-	-	-	-	No tadpoles observed
2023-06-16	-	-	-	-	-	-	-	-	No tadpoles observed
2023-06-14	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	16:20	Shallow with emergent vegetation.
2023-06-15	-	-	-	-	-	-	-	-	No amphibians salvaged/observed
2023-06-15	BWG-RP-02	370192	5896307	-	6.81	16.51	Clear	16:20	Dewatering started
2023-06-15	-	-	-	-	-	-	-	-	Survey 1 - No amphibians observed
2023-06-16	-	-	-	-	-	-	-	-	Survey 2 - no amphibians observed. No additional surveys required.

APPENDIX G BLACKWATER WILDLIFE SIGHTING LOG, 2023



Appendix G: Blackwater Wildlife Sighting Log, 2023

Date	Time	Reported By	Department	Species Observed	Group	Total Detected/ Observed	Observation or Sign	Gender	Age	Health	Behaviour	Location	Comments
2023-01-13	8:00	RH	Environment	Canada Lynx	Mammal	1	Observation	Unknown	adult	healthy	stood around for 15 min	Access Road KM1	-
2023-02-25	9:40	JL	Environmental	Western Toad	Amphibian	1	Observation	Unknown	Adult	Healthy	Traveling across parking area	Fuels Station parking lot	-
2023-03-08	11:30	RS	Logging	Red Fox	Mammal	1	Observation	Unknown	Unknown	Healthy	Friendly	A trail	-
2023-03-17	9:33	LR	Environment	Red Fox	Mammal	1	Observation	Male	Adult	Healthy	Friendly, begging for food	10 375784 E 5896121 N	-
2023-05-06	16:40	KT	Environmental	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Normal	Access Road KM8	-
2023-05-10	16:32	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Feeding on road side	Access Road KM1	-
2023-05-10	16:36	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Feeding on cut line	Access Road KM3	-
2023-05-21	7:35	-	Earthworks	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	-	Access Road KM12, cleared area	-
2023-05-21	13:57	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Normal	Access Road KM13	-
2023-05-21	-	-	Earthworks	Red Fox	Mammal	1	Observation	Unknown	Adult	Healthy	-	Access Road near office trailer	-
2023-05-21	21:08	-	-	Red Fox	Mammal	1	Observation	Unknown	Adult	Healthy	-	Access Road near office trailer	-
2023-05-21	13:00	TC	Contractor	Unknown Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Calm	13 km bridge	-
2023-05-22	6:15	HV	Health and Safety	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Normal feeding	Behind Office Trailers	-
2023-05-22	6:05	RK	Warehouse	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm	Gully between camps	Called supervisor
2023-05-22	15:00	DS	Site services	Black Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Eating on site of the road	Access Road KM13.5	As the car approached he went up the bank
2023-05-26	15:15	RF	Construction	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm cool and collected	Access Road KM13.5	-
2023-05-27	11:30	JB	Earthworks	Black Bear	Mammal	1	Observation	Male	Adult	Healthy	Normal	12 km board	-
2023-05-29	16:00	KS	Earthworks	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Crossing the road in a leisurely fashion	A Trail 300 m down from Earthworks HQ	-
2023-05-29	10:30	DS	Site services	Black Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Walk off the road	Access Road KM1	Walk off the road and just chilled out in the woods. Looking at the truck before walking off
2023-05-29	17:00	RH	Environment	Red Fox	Mammal	1	Observation	Unknown	Adult	Healthy	Had a grouse in its mouth	9 km on Access road	Ran off the road to the right, going up towards site
2023-05-29	-	HV	Health and Safety	Unknown Bear	Mammal	5	Observation	Unknown	Juvenile	Healthy	Ran off the road	C Trail, Site Services Road	-
2023-06-01	8:00	AT	Environment	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	By road then went into trees	Access Road KM0.5	-
2023-06-02	15:15	AT	Environment	Black Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Hanging by roadside	Access Road KM6	-
2023-06-02	15:15	AT	Environment	Black Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Hanging by roadside	Access Road KM6	-
2023-06-06	12:09	SB	Security	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Roaming	Access Road KM13	Bear was spotted by traffic coming up
2023-06-06	14:00	GH	Survey	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walking along the road, pretty calm	Access Road KM13	-
2023-06-11	8:00	QS	Environmental	Moose	Mammal	1	Observation	Unknown	Adult	Healthy	Normal	Access Road KM14.75	-
2023-06-11	17:20	QS	Environmental	Unknown Deer	Mammal	1	Observation	Unknown	Adult	Healthy	Normal	Weather station at the plant site	-
2023-06-16	11:30	QS	Environmental	Red Fox	Mammal	1	Observation	Unknown	Adult	Skinny	Just wondering through camp	Main camp offices	-
2023-06-17	8:30	TW	Survey	Red Fox	Mammal	5	Observation	Unknown	Juvenile	Healthy	Puppies playing	Between cell tower and M road	-
2023-06-19	21:20	JW	-	Unknown Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Unknown	5 km bridge area	Called in by radio bus broke down and been worked on at 4 km area
2023-06-21	16:45	MJ	Mobile Maintenance	Red Fox	Mammal	1	Observation	Unknown	Unknown	Skinny	Walking	Turnoff to plant site, coming down the hill	-
2023-06-21	10:30	RW	Construction	Unknown Upland Bird	Upland Bird	2	Observation	Unknown	Unknown	Healthy	Hanging out at the trailer. One sitting on top. Looked like one may have flown underneath into the framework of the trailer.	Plant Site on BIRD trailer parked near Primary Crusher where Articulated trucks are parking	Smaller Black birds with distinct two points on tail
2023-06-23	8:00	MJ	Mobile Maintenance	Unknown Sparrow	Upland Bird	2	Observation	Unknown	Unknown	Healthy	Flew up and around in rafters. Chased out with noise and banging and closed door.	Maintenance Bay 1 Tent	-
2023-06-27	20:00	TZJ	Projects	Unknown Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm	Close to the Bridge on the access road at the kilometre 15 and 1/4.	The bear was feeding himself with grass.
2023-06-29	8:00	BC	Environment	Black Bear	Mammal	4	Observation	Female	Adult	Healthy	Feeding Sow and 3 cubs	Camp fuel area, temp camp kitchen area, camp road causeway	Sow with 3 cubs (cubs will be put in as separate observation) feeding on grass. Sow investigated.
2023-06-29	8:00	BC	Environment	Black Bear	Mammal	3	Observation	Unknown	Juvenile	Healthy	Following mother, eating	Camp fuel, temp camp kitchen waste area, camp road causeway	-
2023-06-29	21:00	AO	Engineering	Black Bear	Mammal	4	Observation	Female	Adult	Healthy	Normal	Earthworks HQ (A-trail)	-
2023-06-29	10:30	DP	Health and Safety	Unknown Bear	Mammal	4	Observation	Female	Adult	Healthy	Moving along	Between camping in the low ground	-

Appendix G: Blackwater Wildlife Sighting Log, 2023

Date	Time	Reported By	Department	Species Observed	Group	Total Detected/ Observed	Observation or Sign	Gender	Age	Health	Behaviour	Location	Comments
2023-06-30	5:30	GF	Health and safety	Black Bear	Mammal	3	Observation	Female	Adult	Fat	Sow protective of cubs	Access Road KM13.5	-
2023-06-30	10:35	GF	Security	Black Bear	Mammal	1	Observation	Male	Adult	Fat	Crossed access road and entered bush to walk around us.	Security gate, Access Road KM12.5	-
2023-06-30	5:30	AO	Engineering	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walking on road	Access Road KM14	-
2023-07-03	6:30	BC	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walking in ditch then ran into the forest	Access Road KM16	-
2023-07-04	7:00	KB	Earthworks	Red Fox	Mammal	1	Observation	Unknown	Unknown	Skinny	Hung around the packer for a bit then took off down the road	A trail	-
2023-07-07	11:30	TC	Supervisor	Moose	Mammal	3	Observation	Female	Adult	Healthy	Cow moose Walking with 2 calves	300 m West of the 711 hall road on M trail	-
2023-07-07	12:15	BJ	Earthworks	Moose	Mammal	2	Observation	Female	Adult	Healthy	Normal, Eating	M trail	Cow and calf
2023-07-08	7:45	MH	Site services	White-tailed Deer	Mammal	2	Observation	Male	Juvenile	Healthy	Ran into gully	Core shack	-
2023-07-09	11:30	TV	Environment	Moose	Mammal	1	Observation	Female	Adult	Healthy	Grazing	M Trail	Crew just pulled off of the 7-11 Road onto the M Trail and spotted cow and two calves grazing on side of the road.
2023-07-31	7:00	JH	Environment	Moose	Mammal	1	Observation	Female	Adult	Healthy	Crossing cutblock	Etrail	-
2023-07-31	10:41	JH	Environment	Mule Deer	Mammal	2	Observation	Female	Adult	Healthy	Crossing road. Mother and fawn	Between mine access road and mine face south of haul road.	Mother and fawn
2023-08-05	12:40	BK	Environmental	Moose	Mammal	3	Observation	Female	Adult	Too far away to tell	Cow moose and two calves near working excavator. Looks to be grazing on the side of the road.	M trail, past 2nd bridge	-
2023-08-07	12:35	SL	Environment	Moose	Mammal	3	Observation	Female	Adult	Healthy	Walking undisturbed	7-11 Haul Road	Cow and 2 calves
2023-08-09	6:00	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Unknown	-	-	A trail bridge	-
2023-08-12	7:35	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walking on access road	Access Road KM11.5	-
2023-08-12	10:10	JE	Environment	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Walking along access road	Access Road KM14.5	-
2023-08-12	3:15	TT	Crane operator	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm	South of new camp	-
2023-08-13	19:00	BE	Earthworks	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Eating grasses	Access Road KM15	-
2023-08-13	17:00	NJ	Maintenance	Unknown Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Foraging	Km 15	-
2023-08-14	15:00	NP	Earthworks	Black Bear	Mammal	2	Observation	Unknown	Juvenile	Healthy	Walking off the road	Access Road KM1 and KM3.5	-
2023-08-14	7:00	SL	Environmental	Grizzly Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Not that afraid. Feeding in the ditch.	Access Road KM16.25	-
2023-08-14	6:40	MS	Security	Unknown Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Acting normally	16 km mark	Bear was spotted by another worker at the 16 km mark
2023-08-15	6:20	J	Security	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm, continued watching as another vehicle came by, eventually wandered off.	Access Road KM16	-
2023-08-18	13:25	GF	Security	Black Bear	Mammal	1	Observation	Male	Adult	Healthy	Feeding along ditch	Access Road KM12	Walking towards camp
2023-08-18	16:46	KW	Fish salvage	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Eating beside the road, not scared by vehicle or honking just continued eating vegetation	Access Road KM14	-
2023-08-18	16:37	GF	Supervisor	Black Bear	Mammal	1	Observation	Male	Adult	Healthy	Feeding along ditch across from 2 parked Tigre cats fellar bunchers	Access Road KM13.8	Not afraid of vehicle , appears to be full grown boar
2023-08-19	7:30	GF	Security	Black Bear	Mammal	1	Observation	Male	Adult	Healthy	Feeding on grass along the access road, unafraid of vehicles or equipment	Access Road KM16	Seen earlier at 5:50 hrs at 15 km Bridge.
2023-08-20	12:37	BK	Environmental	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walked down the hill to the creek on the opposite bank, across from where crew was processing fish. There were live wells holding fish in the creek.	Davidson creek	Crew began making noise and blew air horn and truck horn until bear left area. Bear was not overly concerned by the noise.
2023-08-20	8:31	DP	Health and Safety	Grey Wolf	Mammal	1	Observation	Unknown	Unknown	Healthy	Wolf crossed the road in front of me and continued running down toward a lake.	Access Road KM9	-
2023-08-21	7:50	GF	Security	Black Bear	Mammal	1	Observation	Male	Adult	Skinny	-	Security gate, Access Road KM12.5	Walked around shack and continued walking northwest on access road.
2023-08-26	17:22	RF	Security	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm and placid	Security gate, Access Road KM12.5	-
2023-08-26	17:50	DA	Security	Unknown Bear	Mammal	1	Observation	Unknown	Juvenile	Skinny	Calm	Just before 12.5	-
2023-08-27	13:14	MC	Earthworks	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Eating	Access Road KM14.75	-
2023-08-27	13:15	RH	Ironworker FM	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Timid	Left side coming up at Access Road KM14 3/4 laydown by stop signs	-
2023-08-27	15:00	BC	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Eating veg	Access Road KM15	-
2023-08-27	13:00	GF	Security	Western Toad	Amphibian	15	Observation	Unknown	Adult	Healthy	Crossing site access road	16 km	-

Appendix G: Blackwater Wildlife Sighting Log, 2023

Date	Time	Reported By	Department	Species Observed	Group	Total Detected/ Observed	Observation or Sign	Gender	Age	Health	Behaviour	Location	Comments
2023-08-28	17:00	KB	Corporate	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm in proximity to persons and vehicle 30 ft away.	Between exploration and construction camp	-
2023-08-31	17:00	-	-	Unknown Bear	Mammal	1	Observation	Unknown	Unknown	-	-	-	Bear sighting in camp
2023-09-03	7:00	RR	Security	Black Bear	Mammal	1	Observation	Unknown	Juvenile	Skinny	-	Access Road KM13 bridge	At tree line on side of upside of road
2023-09-03	6:30	MH	Earthworks	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Good normal	Access Road KM13 bridge	-
2023-09-03	12:45	SB	Security	Black Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	Grazing on Vegetation	Security gate hill towards C trail	-
2023-09-03	14:46	SL	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Feeding	Security gate, Access Road KM12.5	-
2023-09-03	14:50	MD	Environmental	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Weary of vehicle	Security gate, Access Road KM12.5	-
2023-09-04	14:00	RR	Security	Black Bear	Mammal	1	Observation	Unknown	Unknown	Had a face full of porcupine quills	-	Access Road KM11	Face full of porcupine quills
2023-09-04	13:00	JR	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Eating grass on hillside of road	Access Road KM10	Good condition, same bear seen around camp but now has a snout full of porcupine quills. Still actively eating grass.
2023-09-04	14:00	RR	Security	Grizzly Bear	Mammal	1	Observation	Unknown	Unknown	-	-	Access Road KM2	-
2023-09-04	13:15	JR	Environment	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Seen running off into the burned timber as we were driving down the access road	Access Road KM9	-
2023-09-14	18:22	DA	Security	Grizzly Bear	Mammal	1	Observation	Unknown	Juvenile	Skinny	Eating grass	Security gate, Access Road KM12.5	-
2023-09-15	6:48	ED	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Eating clover.	Access Road KM12	-
2023-09-16	8:46	AW	Health and Safety	Unknown Bird Nest	Upland Bird	1	Observation	Unknown	Unknown	-	-	Ground at reclaim tunnel	Empty Bird nest on ground
2023-09-16	18:06	BC	Environment	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Feeding	Access Road KM15	-
2023-09-17	16:15	MH	IT	Black Bear	Mammal	1	Observation	Unknown	Adult	Healthy	On side of the access road, ran into the bush when I drove by.	Access Road KM2	-
2023-09-20	15:00	DS	Environment	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Unbothered by consistent haul truck traffic. Walked out of the bush, looked at us a few times, and continued to cross the road before following the stream east.	11.5km bridge on C trail (North of Spur 4)	-
2023-09-21	11:08	GF	Security	Grizzly Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Calmly walked down road then into Bush to walk around security shack headed up towards camp	Security gate, Access Road KM12.5	-
2023-09-21	7:15	MK	Health and Safety	Unknown Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Standing	South laydown Processing Area	-
2023-09-24	18:30	-	Environment	Grey Wolf	Mammal	3	Observation	Unknown	Adult	Healthy	Traveling across Kluskus FSR	Kluskus FSR KM130	-
2023-09-24	18:30	-	-	Grey Wolf	Mammal	3	Observation	Unknown	Adult	Healthy	Traveling across Kluskus FSR	Kluskus FSR KM130	-
2023-09-24	11:00	CL	Environmental	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Bear was in the ditch, once our truck passed it jumped up and ran away.	Access road to CC-02	-
2023-09-24	8:00	CL	Environmental	Moose	Mammal	3	Observation	Male	Adult	Healthy	Seemed to be a bachelor group of moose hanging out in a cut block.	Access road to CC-02	-
2023-09-26	5:50	MJ	Mobile Maintenance	Red Fox	Mammal	1	Observation	Unknown	Unknown	Healthy	Walking away from camp, went off the road down into the valley	Road between camp and 7-11 Road, just past (away from camp) where the haul road merges with the LV road	-
2023-10-01	13:00	MW	Environment	Bald Eagle	Raptor	1	Observation	Male	Adult	Healthy	Flying	Access Road KM14.75	-
2023-10-04	9:00	TS	Environment	Moose	Mammal	3	Observation	Female	Juvenile	Healthy	Mother moose with two calves crossing the road	505 road off A trail	-
2023-10-06	19:00	BT	Construction	Grizzly Bear	Mammal	1	Observation	Male	Adult	Healthy	Calm	Construction east of Bird triplex	Bird night shift
2023-10-11	7:00	SL	Environment	Moose	Mammal	1	Observation	Male	Adult	Healthy	Normal. Walking.	7-11 haul road	-
2023-10-12	8:07	KB	Corporate	Moose	Mammal	2	Observation	Female	Adult	Healthy	Fearful of approaching vehicles	C trail at spur 4 intersection	-
2023-10-13	7:30	BH	Supervision	Unknown Bear	Mammal	1	Sign: Bear scat	Unknown	Unknown	-	Pooping	Secondary/tertiary crushing building	On my walk verifying permits at 7:30, I noticed fresh bear scat by the man lift of the secondary/tertiary crushing building
2023-10-14	9:45	RH	Environment	Moose	Mammal	2	Observation	Male	Adult	Healthy	Aware.	South side of 3 km on the A trail	1 bull. 1 cow.
2023-10-14	10:00	QS	Environment	Moose	Mammal	2	Observation	Male	Adult	Healthy	Bull and cow walking together	A trail WMP	No signs of stress at work site.
2023-10-18	16:00	EO	Environment	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Moved 20 m away from road when trucked passed by	Access Road KM10	Likely foraging on roadside grasses
2023-10-20	14:45	TW	Survey	Grizzly Bear	Mammal	1	Observation	Unknown	Juvenile	Healthy	Calm, walking around	500m west of the maintenance laydown at km14.75	-

Appendix G: Blackwater Wildlife Sighting Log, 2023

Date	Time	Reported By	Department	Species Observed	Group	Total Detected/ Observed	Observation or Sign	Gender	Age	Health	Behaviour	Location	Comments
2023-10-21	11:50	DM	Engineering	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Fat	Looking for food	Behind a SEDGMAN sea can	-
2023-10-21	11:50	IT	Electrical	Grizzly Bear	Mammal	1	Observation	Unknown	Unknown	Healthy	The bear was walking around the office	Back side of Sedgman office	-
2023-10-21	16:50	RF	Earthworks	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Chilling, having a snack	Heap, top of ore body road	-
2023-10-27	11:50	AC	Health and Safety	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm	Stockpile	-
2023-10-27	17:00	MD	Environment	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Walking near camp for short time, then back into the bush to the East of camp	Construction camp	-
2023-10-27	18:30	AC	Health and Safety	Grizzly Bear	Mammal	1	Observation	Unknown	Adult	Healthy	Calm	Process Plant Fuel Station and Construction Offices.	The Bear was seen at the fuel station at 18:30. at 18:40 it went (construction) East around Bird and Sedgman trailers and I lost sight of it.

APPENDIX H INCIDENTAL WILDLIFE DETECTIONS DURING THE 2023 WILDLIFE FIELD SEASON



Appendix H: Incidental Wildlife Detections during the 2023 Wildlife Field Season

Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Caribou Offsetting Camera Monitoring	CM05	2021/10/31	355064	5907440	Mountain Goat	Mammal	Observation	2	-	-
Caribou Offsetting Camera Monitoring	CM07	2021/12/15	359048	5908550	Unknown	Unknown	Observation	1	-	-
Site Wide Camera Monitoring	CM18	2021/12/24	374964	5905382	Unknown Bird	Unknown Bird	Observation	3	-	Unknown sp.
Site Wide Camera Monitoring	CM18	2021/12/25	374964	5905382	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Site Wide Camera Monitoring	CM18	2022/03/22	374964	5905382	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM10	2022/03/29	358886	5908588	Small Mammal	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/05/16	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM02	2022/05/16	341000	5897964	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM16	2022/05/31	339419	5893856	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM20	2022/05/31	341254	5898945	Unknown	Unknown	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM01	2022/06/06	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM10	2022/06/06	358886	5908588	Unknown Bird	Unknown Bird	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/06/07	355064	5907440	Mountain Goat	Mammal	Observation	3	-	-
Caribou Offsetting Camera Monitoring	CM20	2022/06/08	341254	5898945	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM02	2022/06/09	341000	5897964	Unknown	Unknown	Observation	1	-	Camera obstructed
Caribou Offsetting Camera Monitoring	CM16	2022/06/10	339419	5893856	Unknown	Unknown	Observation	1	-	-
Site Wide Camera Monitoring	CM13	2022/06/12	371965	5894743	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM05	2022/06/14	355064	5907440	Mountain Goat	Mammal	Observation	6	-	-
Caribou Offsetting Camera Monitoring	CM19	2022/06/18	341983	5897811	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM05	2022/06/20	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Site Wide Camera Monitoring	CM18	2022/06/22	374964	5905382	Unknown Ungulate	Mammal	Observation	1	-	likely a moose
Caribou Offsetting Camera Monitoring	CM16	2022/06/24	339419	5893856	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM20	2022/06/26	341254	5898945	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM02	2022/07/05	341000	5897964	Unknown	Unknown	Observation	1	-	Camera obstructed, possible leaf or ear
Caribou Offsetting Camera Monitoring	CM05	2022/07/18	355064	5907440	Mountain Goat	Mammal	Observation	6	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/07/22	355064	5907440	Mountain Goat	Mammal	Observation	8	-	-
Caribou Offsetting Camera Monitoring	CM19	2022/07/23	341983	5897811	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/08/07	345512	5899706	White-tailed Deer	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/08/12	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/08/17	355064	5907440	Mountain Goat	Mammal	Observation	14	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/08/19	345512	5899706	Coyote	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/08/25	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/09/01	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/09/01	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/09/02	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/09/02	355064	5907440	Mountain Goat	Mammal	Observation	8	-	-
Caribou Offsetting Camera Monitoring	CM01	2022/09/08	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/09/12	355064	5907440	Mountain Goat	Mammal	Observation	3	-	-
Caribou Offsetting Camera Monitoring	CM10	2022/09/20	358886	5908588	Unknown Bird	Unknown Bird	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM08	2022/09/24	357444	5908620	White-tailed Deer	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2022/09/30	355064	5907440	Mountain Goat	Mammal	Observation	4	-	-
Site Wide Camera Monitoring	CM13	2022/10/04	371965	5894743	Mule Deer	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM10	2022/11/08	358886	5908588	Unknown Bird	Unknown Bird	Observation	1	-	Unknown species
Caribou Offsetting Camera Monitoring	CM01	2022/11/18	345512	5899706	Unknown Ungulate	Mammal	Observation	1	-	Likely a moose
Caribou Offsetting Camera Monitoring	CM01	2022/12/22	345512	5899706	Unknown Ungulate	Mammal	Observation	1	-	Likely a moose
Caribou Offsetting Camera Monitoring	CM01	2023/01/02	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/01/17	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-

Appendix H: Incidental Wildlife Detections during the 2023 Wildlife Field Season

Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Winter Ungulate Tracks - Ground	T3	2023/03/03	385702	5903048	Unknown Deer	Mammal	Sign	1	Tracks	Old sign. low snowpack. cutblock
Winter Ungulate Tracks - Ground	T1	2023/03/03	374338	5888550	Canada Lynx	Mammal	Sign	1	Tracks	Crossing trail and then parallels for about 1 km. 1 sign of digging for pray. conf. fresh.
Winter Ungulate Tracks - Ground	T1	2023/03/03	381386	5888968	Canada Lynx	Mammal	Sign	1	Tracks	Crosses trail. conf. fresh
Winter Ungulate Tracks - Ground	T2	2023/03/03	382134	5888388	Canada Lynx	Mammal	Sign	1	Tracks	Conf. Some snow fill in
Winter Ungulate Tracks - Ground	T3	2023/03/03	378883	5898511	Canada Lynx	Mammal	Sign	1	Tracks	Older, snowed in and wind
Winter Ungulate Tracks - Ground	T1	2023/03/03	374338	5888550	North American Porcupine	Mammal	Sign	1	Tracks	Heading into culvert. conf. fresh
Winter Ungulate Tracks - Ground	T3	2023/03/03	382905	5902760	Northern River Otter	Mammal	Sign	1	Tracks	Some snow but recent. Crosses trail going from one conifer cut block to another.
Winter Ungulate Tracks - Ground	T5	2023/03/04	371115	5908806	Canada Lynx	Mammal	Sign	1	Tracks	Fresh. intercepts the trail and wolf tracks
Winter Ungulate Tracks - Ground	T8	2023/03/04	383481	5897475	Canada Lynx	Mammal	Sign	1	Tracks	Cut block. crosses trail. light snow cover
Winter Ungulate Tracks - Ground	T8	2023/03/04	382072	5895217	Canada Lynx	Mammal	Sign	1	Tracks	Light snow cover, crosses trail. cutblock
Winter Ungulate Tracks - Ground	T8	2023/03/04	383919	5897645	Coyote	Mammal	Sign	1	Tracks	1 ind. In cut block. Fresh
Winter Ungulate Tracks - Ground	T9	2023/03/04	375557	5913557	Coyote	Mammal	Sign	1	Tracks	Crossing road. mature stand. Fresh
Winter Ungulate Tracks - Ground	T7	2023/03/04	381969	5904491	Coyote	Mammal	Sign	2	Tracks	Likely 2. Fresh
Winter Ungulate Tracks - Ground	T7	2023/03/04	381169	5905259	Coyote	Mammal	Sign	3	Tracks	Crossing trail. At least 2 or 3. Fresh
Winter Ungulate Tracks - Ground	T5	2023/03/04	374346	5905826	Grey Wolf	Mammal	Sign	1	Tracks	Low stage cut block and mid stage. Going along trail moved into young stand. Fresh
Winter Ungulate Tracks - Ground	T5	2023/03/04	372829	5906932	Grey Wolf	Mammal	Sign	3	Tracks	Walking with first set on trail till veered off into young stand. 2 individuals; 3 in total 2 veered off first 3rd up a bit. Fresh. Seen along whole trail. signs of marking their territory.
Winter Ungulate Tracks - Ground	T9	2023/03/04	373317	5895691	Northern River Otter	Mammal	Sign	1	Tracks	On river below bridge crossing. Fresh.
Winter Ungulate Tracks - Aerial	-	2023/03/05	371947	5911711	Moose	Mammal	Observation	1	-	Adult unknown sex
Winter Ungulate Tracks - Aerial	-	2023/03/05	385017	5889599	Moose	Mammal	Observation	2	-	-
Winter Ungulate Tracks - Aerial	19	2023/03/05	363778	5895464	Canada Lynx	Mammal	Sign	1	Tracks	New. Dig/pounce area where looking for food
Winter Ungulate Tracks - Aerial	17	2023/03/05	364378	5897563	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	23	2023/03/05	364570	5891576	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	16	2023/03/05	366286	5898614	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	368156	5908716	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	369086	5908783	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	9	2023/03/05	369527	5905653	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	23	2023/03/05	369550	5891884	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	25	2023/03/05	370452	5889689	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	21	2023/03/05	370684	5893635	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	4	2023/03/05	371477	5910768	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	372169	5907627	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	5	2023/03/05	372438	5909670	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	29	2023/03/05	372609	5885463	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	372762	5909689	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	372823	5908752	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	8	2023/03/05	373003	5906941	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	13	2023/03/05	373146	5901609	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	26	2023/03/05	373146	5901609	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	10	2023/03/05	373547	5904592	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	4	2023/03/05	374316	5910748	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	9	2023/03/05	374401	5905644	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	15	2023/03/05	374892	5899851	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	374920	5909653	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	25	2023/03/05	375008	5889455	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	4	2023/03/05	375331	5910727	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	20	2023/03/05	375533	5894536	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	2	2023/03/05	375824	5912613	Canada Lynx	Mammal	Sign	1	Tracks	New. On river
Winter Ungulate Tracks - Aerial	7	2023/03/05	376710	5907410	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	4	2023/03/05	377053	5910774	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	16	2023/03/05	377229	5898615	Canada Lynx	Mammal	Sign	1	Tracks	New

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Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Winter Ungulate Tracks - Aerial	6	2023/03/05	377391	5908630	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	20	2023/03/05	377586	5894546	Canada Lynx	Mammal	Sign	1	Tracks	New. by the work area
Winter Ungulate Tracks - Aerial	16	2023/03/05	377820	5898670	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	3	2023/03/05	377953	5911646	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	378051	5908656	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	13	2023/03/05	378803	5901792	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	26	2023/03/05	378803	5901792	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	29	2023/03/05	378835	5884522	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	17	2023/03/05	379204	5897661	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	379359	5909538	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	24	2023/03/05	380394	5890574	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	29	2023/03/05	381084	5885214	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	21	2023/03/05	381426	5893701	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	24	2023/03/05	381476	5890535	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	14	2023/03/05	381522	5900608	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	13	2023/03/05	381743	5901767	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	19	2023/03/05	381819	5895599	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	20	2023/03/05	382021	5894713	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	17	2023/03/05	382052	5897629	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	15	2023/03/05	382476	5899700	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	16	2023/03/05	382666	5898718	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	16	2023/03/05	383258	5898762	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	21	2023/03/05	383560	5893747	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	385209	5908544	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	24	2023/03/05	385282	5890485	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	385475	5903579	Canada Lynx	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	14	2023/03/05	386396	5900587	Canada Lynx	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	372398	5908751	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	372643	5903890	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	375991	5907456	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	13	2023/03/05	380097	5901759	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	4	2023/03/05	380287	5910682	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	381122	5909518	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	1	2023/03/05	381142	5913676	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	381699	5908672	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	386652	5907606	Coyote	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	10	2023/03/05	376721	5904467	Coyote	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	2	2023/03/05	375824	5912613	Coyote	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	13	2023/03/05	365932	5901324	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	4	2023/03/05	371477	5910768	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	8	2023/03/05	375379	5906932	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	14	2023/03/05	377292	5900518	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	1	2023/03/05	381616	5913691	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	13	2023/03/05	382502	5901801	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	14	2023/03/05	386396	5900587	Grey Wolf	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	375289	5907505	Grey Wolf	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	12	2023/03/05	376142	5902626	Grey Wolf	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	14	2023/03/05	376362	5900510	Grey Wolf	Mammal	Sign	2	Tracks	New. tracks and bed together
Winter Ungulate Tracks - Aerial	14	2023/03/05	376362	5900510	Grey Wolf	Mammal	Sign	2	Bed	New. tracks and bed together
Winter Ungulate Tracks - Aerial	14	2023/03/05	379196	5900555	Grey Wolf	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	3	2023/03/05	380413	5911490	Grey Wolf	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	15	2023/03/05	380444	5899633	Grey Wolf	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	370859	5909618	Grey Wolf	Mammal	Sign	3	Tracks	New

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Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Winter Ungulate Tracks - Aerial	6	2023/03/05	371013	5908712	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	8	2023/03/05	372290	5906917	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	372568	5907599	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	9	2023/03/05	375195	5905551	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	6	2023/03/05	382945	5908734	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	9	2023/03/05	385689	5905576	Grey Wolf	Mammal	Sign	3	Tracks	New
Winter Ungulate Tracks - Aerial	15	2023/03/05	365247	5899484	Grey Wolf	Mammal	Sign	4	Tracks	New
Winter Ungulate Tracks - Aerial	20	2023/03/05	381508	5894702	Grey Wolf	Mammal	Sign	4	Tracks	New. possibly more
Winter Ungulate Tracks - Aerial	4	2023/03/05	381544	5910687	Grey Wolf	Mammal	Sign	4	Tracks	New
Winter Ungulate Tracks - Aerial	21	2023/03/05	364470	5893263	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	15	2023/03/05	364889	5898774	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	25	2023/03/05	365696	5889753	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	21	2023/03/05	368501	5893589	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	369471	5903664	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	19	2023/03/05	371251	5895932	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	372183	5903877	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	372643	5903890	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	12	2023/03/05	372644	5902452	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	10	2023/03/05	374996	5904572	Northern River Otter	Mammal	Sign	1	Tracks	New. hole to access water on the pond
Winter Ungulate Tracks - Aerial	5	2023/03/05	375441	5909650	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	10	2023/03/05	376721	5904467	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	8	2023/03/05	377520	5906822	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	377660	5907414	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	16	2023/03/05	377820	5898670	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	378965	5907412	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	4	2023/03/05	379052	5910676	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	14	2023/03/05	379196	5900555	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	10	2023/03/05	379474	5904409	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	8	2023/03/05	379584	5906704	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	380372	5907412	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	9	2023/03/05	380573	5905433	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	4	2023/03/05	380694	5910688	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	9	2023/03/05	383276	5905483	Northern River Otter	Mammal	Sign	1	Tracks	New
Winter Ungulate Tracks - Aerial	5	2023/03/05	383313	5909499	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	6	2023/03/05	385533	5908540	Northern River Otter	Mammal	Sign	1	Tracks	Old
Winter Ungulate Tracks - Aerial	7	2023/03/05	378254	5907423	Northern River Otter	Mammal	Sign	2	Tracks	Mix of New and Old
Winter Ungulate Tracks - Aerial	18	2023/03/05	379162	5896775	Northern River Otter	Mammal	Sign	2	Tracks	New
Winter Ungulate Tracks - Aerial	7	2023/03/05	381291	5907470	Northern River Otter	Mammal	Sign	2	Tracks	Mix of New and Old
Winter Ungulate Tracks - Aerial	5	2023/03/05	381433	5909535	Northern River Otter	Mammal	Sign	2	Tracks	Old
Winter Ungulate Tracks - Aerial	6	2023/03/05	385533	5908540	Bald Eagle	Raptor	Observation	1	-	-
Winter Ungulate Tracks - Aerial	11	2023/03/05	369471	5903663	Mountain Goat	Mammal	Sign	4	Tracks	New
Winter Ungulate Tracks - Aerial	11	2023/03/05	369471	5903663	Mountain Goat	Mammal	Observation	4	-	Seen on cliff by where the tracks were. 1 kid
Winter Ungulate Tracks - Aerial	12	2023/03/05	368765	5902580	Mountain Goat	Mammal	Sign	4	Tracks	New
Winter Ungulate Tracks - Aerial	30	2023/03/05	375005	5884740	Mountain Goat	Mammal	Sign	2	Tracks	New. Could not find any individuals in the area
Caribou Offsetting Camera Monitoring	CM07	2023/03/15	359048	5908550	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/03/28	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM06	2023/03/28	357794	5909891	Wolverine	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM06	2023/03/29	357794	5909891	Wolverine	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM06	2023/03/29	357794	5909891	Wolverine	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM06	2023/03/29	357794	5909891	Wolverine	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM06	2023/03/30	357794	5909891	Wolverine	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/04/08	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/04/13	345512	5899706	Unknown Bird	Unknown Bird	Observation	1	-	spruce grouse

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Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Caribou Offsetting Camera Monitoring	CM01	2023/04/20	345512	5899706	Unknown Bird	Unknown Bird	Observation	1	-	spruce grouse?
Caribou Offsetting Camera Monitoring	CM01	2023/04/20	345512	5899706	Unknown Bird	Unknown Bird	Observation	1	-	Spruce grouse
Caribou Offsetting Camera Monitoring	CM09	2023/04/25	342317	5900435	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/04/25	345512	5899706	Coyote	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/04/26	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM07	2023/05/02	359048	5908550	American Marten	Mammal	Observation	1	-	American Martin
Caribou Offsetting Camera Monitoring	CM16	2023/05/12	339419	5893856	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/05/17	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/17	374181	5904521	Moose	Mammal	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/17	397846	5929320	Black Bear	Mammal	Observation	2	-	-
Waterbird-Spring Pair	-	2023/05/17	384916	5908332	Canada Goose	Waterbird	Observation	2	-	-
Waterbird-Spring Pair	-	2023/05/18	379094	5911174	Moose	Mammal	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/18	383464	5970869	Black Bear	Mammal	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/18	386397	5897063	Beaver	Mammal	Sign	1	Beaver Dam	-
Waterbird-Spring Pair	-	2023/05/18	379827	5972834	Northern Harrier	Raptor	Observation	2	-	-
Waterbird-Spring Pair	-	2023/05/18	378742	5957757	Rough-legged Hawk	Raptor	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/19	360938	5886725	Moose	Mammal	Observation	2	-	-
Waterbird-Spring Pair	-	2023/05/19	376148	5914817	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/19	375617	5883619	Mountain Goat	Mammal	Observation	1	-	-
Waterbird-Spring Pair	-	2023/05/20	-	-	Western Toad	Amphibian	Observation	2	-	From trip report. Caribou hab offsetting, wetland beside Capoose Camera 11
Caribou Offsetting Camera Monitoring	CM16	2023/05/25	339419	5893856	Unknown	Unknown	Observation	1	-	-
Breeding Bird	UB07-S3	2023/06/11	367659	5895750	Unknown Bird	Unknown Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB07-S5	2023/06/11	367948	5895848	American Robin	Upland Bird	Observation	1	-	-
Breeding Bird	UB07-S5	2023/06/11	367948	5895848	Chipping Sparrow	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB08-S1	2023/06/11	369890	5896082	Clark's Nutcracker	Upland Bird	Observation	1	-	After survey incidental
Breeding Bird	UB08-S3	2023/06/11	370256	5895976	Clark's Nutcracker	Upland Bird	Observation	1	-	-
Breeding Bird	UB08-S4	2023/06/11	370287	5896180	Dark-eyed Junco	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB07-S1	2023/06/11	367484	5895893	Olive-sided Flycatcher	Upland Bird	Observation	1	-	-
Breeding Bird	UB07-S3	2023/06/11	367659	5895750	Pine Siskin	Upland Bird	Observation	1	-	-
Breeding Bird	UB07-S3	2023/06/11	367659	5895750	Red-breasted Nuthatch	Upland Bird	Observation	1	-	-
Breeding Bird	UB08-S2	2023/06/11	370087	5896071	Unknown Flycatcher	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB07-S4	2023/06/11	367870	5895677	Varied Thrush	Upland Bird	Observation	1	-	Flew from 0-50m to 50-100m in SE quadrant
Breeding Bird	UB08-S2	2023/06/11	370087	5896071	Varied Thrush	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB08-S1	2023/06/11	369890	5896082	Belted Kingfisher	Waterbird	Observation	1	-	-
Breeding Bird	UB08-S2	2023/06/11	370087	5896071	Common Loon	Waterbird	Observation	1	-	-
Breeding Bird	UB08-S1	2023/06/11	369890	5896082	Unknown Duck	Waterbird	Observation	1	-	Before survey incidental
Breeding Bird	UB08-S3	2023/06/11	370256	5895976	Wilson's Snipe	Waterbird	Observation	1	-	Before survey incidental
Ungulate Pellet	-	2023/06/11	-	-	Moose	Mammal	Observation	1	-	From trip report - at bridge to camp at 06:00
Ungulate Pellet	-	2023/06/11	-	-	Red Fox	Mammal	Observation	1	-	From trip report - at bridge to camp at 19:00
Ungulate Pellet	-	2023/06/13	-	-	Unknown Deer	Mammal	Observation	1	-	From trip report - seen from heli
Breeding Bird	UB05-S1	2023/06/14	369390	5891207	American Robin	Upland Bird	Observation	1	-	-
Breeding Bird	UB10-S1	2023/06/14	371477	5896290	Canada Jay	Upland Bird	Observation	1	-	-
Breeding Bird	UB10-S5	2023/06/14	371040	5896530	Canada Jay	Upland Bird	Observation	1	-	-
Breeding Bird	UB05-S4	2023/06/14	369100	5890800	Clark's Nutcracker	Upland Bird	Observation	1	-	Flew from 55 m NW to 100 m NE
Breeding Bird	UB05-S5	2023/06/14	369309	5890806	Clark's Nutcracker	Upland Bird	Observation	1	-	-
Breeding Bird	UB10-S4	2023/06/14	371008	5896326	Pine Grosbeak	Upland Bird	Observation	1	-	Before survey incidental, unknown loud midrange call
Breeding Bird	UB05-S4	2023/06/14	369100	5890800	Ruby-crowned Kinglet	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB10-S2	2023/06/14	371338	5896131	Varied Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB10-S2	2023/06/14	371338	5896131	Varied Thrush	Upland Bird	Observation	1	-	Flew from 30 m NW to 40 m NE
Breeding Bird	UB10-S3	2023/06/14	371151	5896152	Varied Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB10-S4	2023/06/14	371008	5896326	Varied Thrush	Upland Bird	Observation	1	-	Small brown birds
Ungulate Pellet	-	2023/06/14	-	-	Moose	Mammal	Observation	1	-	From trip report - seen from heli
Ungulate Pellet	-	2023/06/14	-	-	Black Bear	Mammal	Observation	1	-	From trip report - seen from heli

Appendix H: Incidental Wildlife Detections during the 2023 Wildlife Field Season

Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Ungulate Pellet	MP20	2023/06/14	377330	5890909	Sandhill Crane	Waterbird	Observation	20	-	Flying
Breeding Bird	UB04-S5	2023/06/15	378437	5888077	Common Raven	Raptor	Observation	1	-	Before survey incidental
Breeding Bird	UB04-S1	2023/06/15	378593	5887727	Unknown Bird	Unknown Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB09-S1	2023/06/15	372586	5896010	Black-backed Woodpecker	Upland Bird	Observation	1	-	-
Breeding Bird	UB04-S2	2023/06/15	378381	5887644	Boreal Chickadee	Upland Bird	Observation	1	-	After survey incidental
Breeding Bird	UB06-S4	2023/06/15	373126	5889930	Chipping Sparrow	Upland Bird	Observation	1	-	-
Breeding Bird	UB04-S1	2023/06/15	378593	5887727	Dark-eyed Junco	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB06-S3	2023/06/15	373293	5889961	Dark-eyed Junco	Upland Bird	Observation	1	-	-
Breeding Bird	UB09-S3	2023/06/15	372393	5896196	Dark-eyed Junco	Upland Bird	Observation	1	-	-
Breeding Bird	UB09-S5	2023/06/15	372245	5896111	Dark-eyed Junco	Upland Bird	Observation	1	-	-
Breeding Bird	UB06-S4	2023/06/15	373126	5889930	Lincoln's Sparrow	Upland Bird	Observation	1	-	Before incidental
Breeding Bird	UB09-S1	2023/06/15	372586	5896010	Swainson's Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB09-S2	2023/06/15	372599	5896190	Swainson's Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB09-S3	2023/06/15	372393	5896196	Swainson's Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB09-S5	2023/06/15	372245	5896111	Swainson's Thrush	Upland Bird	Observation	1	-	Flushed a small bird off of a nest, 4 blue eggs found within nest
Breeding Bird	UB09-S1	2023/06/15	372586	5896010	Varied Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB06-S5	2023/06/15	373174	5890103	Willow Ptarmigan	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB09-S2	2023/06/15	372599	5896190	Yellow-rumped Warbler	Upland Bird	Observation	1	-	-
Breeding Bird	UB02-S2	2023/06/16	374480	5894332	Unknown Bird	Unknown Bird	Observation	1	-	-
Breeding Bird	UB02-S4_2023	2023/06/16	374059	5894317	Unknown Bird	Unknown Bird	Observation	1	-	After survey incidental
Breeding Bird	UB02-S5_2023	2023/06/16	374064	5894115	Wilson's Warbler	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB15-S2	2023/06/17	378331	5897325	Red-breasted Nuthatch	Upland Bird	Observation	1	-	-
Breeding Bird	UB15-S2	2023/06/17	378331	5897325	Ruby-crowned Kinglet	Upland Bird	Observation	1	-	-
Breeding Bird	UB14-S1	2023/06/17	378270	5897769	Yellow-rumped Warbler	Upland Bird	Observation	1	-	-
Breeding Bird	UB14-S3	2023/06/17	378436	5898039	Yellow-rumped Warbler	Upland Bird	Observation	1	-	-
Site Wide Camera Monitoring	CM13	2023/06/17	371965	5894743	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Breeding Bird	UB12-S5	2023/06/18	376664	5899152	Common Raven	Raptor	Observation	1	-	-
Breeding Bird	UB12-S3	2023/06/18	376850	5899325	Unknown Owl	Raptor	Observation	1	-	-
Breeding Bird	UB12-S3	2023/06/18	376850	5899325	Unknown Bird	Unknown Bird	Observation	1	-	-
Breeding Bird	UB12-S3	2023/06/18	376850	5899325	Dark-eyed Junco	Upland Bird	Observation	1	-	-
Breeding Bird	UB12-S3	2023/06/18	376850	5899325	Pine Siskin	Upland Bird	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM08	2023/06/27	357444	5908620	Unknown	Unknown	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM16	2023/06/28	339419	5893856	Unknown	Unknown	Observation	1	-	-
Breeding Bird	UB01_2023-S4	2023/07/07	376583	5893599	Common Raven	Raptor	Observation	1	-	After survey incidental
Breeding Bird	UB01_2023-S1	2023/07/07	376442	5893256	Unknown Bird	Unknown Bird	Observation	1	-	-
Breeding Bird	UB01_2023-S2	2023/07/07	376608	5893164	Unknown Bird	Unknown Bird	Observation	1	-	After survey incidental
Breeding Bird	UB01_2023-S2	2023/07/07	376608	5893164	Unknown Bird	Unknown Bird	Observation	1	-	-
Breeding Bird	UB01_2023-S3	2023/07/07	376627	5893383	Unknown Bird	Unknown Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB01_2023-S5	2023/07/07	376410	5893718	Unknown Bird	Unknown Bird	Observation	1	-	Before/after survey incidental
Breeding Bird	UB11-S1	2023/07/07	377845	5893161	Unknown Bird	Unknown Bird	Observation	2	-	-
Breeding Bird	UB11-S5	2023/07/07	377422	5893329	Unknown Bird	Unknown Bird	Observation	2	-	After survey incidental
Breeding Bird	UB01_2023-S3	2023/07/07	376627	5893383	Unknown Bird	Unknown Bird	Observation	5	-	Before survey incidental
Breeding Bird	UB11-S1	2023/07/07	377845	5893161	American Redstart	Upland Bird	Observation	1	-	-
Breeding Bird	UB01_2023-S1	2023/07/07	376442	5893256	American Robin	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB01_2023-S5	2023/07/07	376410	5893718	Canada Jay	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB01_2023-S5	2023/07/07	376410	5893718	Chipping Sparrow	Upland Bird	Observation	1	-	After survey incidental
Breeding Bird	UB01_2023-S2	2023/07/07	376608	5893164	Clark's Nutcracker	Upland Bird	Observation	1	-	-
Breeding Bird	UB01_2023-S5	2023/07/07	376410	5893718	Clark's Nutcracker	Upland Bird	Observation	1	-	Before survey incidental
Breeding Bird	UB01_2023-S1	2023/07/07	376442	5893256	Varied Thrush	Upland Bird	Observation	1	-	-
Breeding Bird	UB01_2023-S2	2023/07/07	376608	5893164	Yellow-rumped Warbler	Upland Bird	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM20	2023/07/17	341254	5898945	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM20	2023/07/19	341254	5898945	Unknown Bird	Unknown Bird	Observation	1	-	Unknown sp.
Caribou Offsetting Camera Monitoring	CM01	2023/07/23	345512	5899706	Canada Lynx	Mammal	Observation	1	-	-

Appendix H: Incidental Wildlife Detections during the 2023 Wildlife Field Season

Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Caribou Offsetting Camera Monitoring	CM05	2023/08/08	355064	5907440	Mountain Goat	Mammal	Observation	3	-	-
Site Wide Camera Monitoring	CM17	2023/08/12	373443	5895986	Unknown Bird	Unknown Bird	Observation	1	-	Common Raven?
Caribou Offsetting Camera Monitoring	CM05	2023/08/15	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/15	355064	5907440	Mountain Goat	Mammal	Observation	3	-	-
Ungulate Pellet	-	2023/08/18	-	-	Black Bear	Mammal	Observation	2	-	South of Project
Caribou Offsetting Camera Monitoring	CM05	2023/08/23	355064	5907440	Mountain Goat	Mammal	Observation	2	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/24	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/24	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/26	355064	5907440	Mountain Goat	Mammal	Observation	4	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/27	355064	5907440	Mountain Goat	Mammal	Observation	3	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/08/28	355064	5907440	Mountain Goat	Mammal	Observation	2	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/09/04	355064	5907440	Mountain Goat	Mammal	Observation	4	-	-
Caribou Offsetting Camera Monitoring	CM01	2023/09/07	345512	5899706	Unknown Bird	Unknown Bird	Observation	2	-	Grouse
Caribou Offsetting Camera Monitoring	CM05	2023/09/08	355064	5907440	Mountain Goat	Mammal	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	375750	5915955	Moose	Mammal	Observation	2	-	-
Waterbird-Fall Staging	-	2023/09/09	378593	5900497	Moose	Mammal	Observation	2	-	Cow and calf
Waterbird-Fall Staging	-	2023/09/09	368640	5884623	Moose	Mammal	Observation	3	-	-
Waterbird-Fall Staging	-	2023/09/09	352364	5889032	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	354144	5889431	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	367644	5901428	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	377333	5914532	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	371251	5896412	Golden Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/09	369111	5902258	Red-tailed Hawk	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	386952	5897752	Moose	Mammal	Observation	1	-	3 adult bears in river together
Waterbird-Fall Staging	-	2023/09/10	388044	5905795	Moose	Mammal	Observation	1	-	Cow and calf
Waterbird-Fall Staging	-	2023/09/10	389321	5909832	Moose	Mammal	Observation	2	-	Cow and calf
Waterbird-Fall Staging	-	2023/09/10	390566	5913382	Beaver	Mammal	Observation	1	-	in cutblock
Waterbird-Fall Staging	-	2023/09/10	378562	5911803	Grizzly Bear	Mammal	Observation	3	-	3 adult bears in river
Waterbird-Fall Staging	-	2023/09/10	372528	5990607	Bald Eagle	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	378723	5911813	Bald Eagle	Raptor	Observation	1	-	Large male
Waterbird-Fall Staging	-	2023/09/10	387903	5905996	Bald Eagle	Raptor	Observation	1	-	Cow and 2 calves
Waterbird-Fall Staging	-	2023/09/10	374906	5888205	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	382083	5969653	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	387265	5904777	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	390566	5913382	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	390979	5910399	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	380271	5951477	Osprey	Raptor	Observation	2	-	-
Waterbird-Fall Staging	-	2023/09/10	380326	5907123	Red-tailed Hawk	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/10	389178	5902981	Sharp-shinned Hawk	Raptor	Observation	1	-	Bull and cow
Waterbird-Fall Staging	-	2023/09/10	380175	5883418	Unknown Raptor	Raptor	Observation	1	-	SSHA or male in burnt area between waterbodies/wetlands
Waterbird-Fall Staging	-	2023/09/11	388601	5912568	Moose	Mammal	Observation	1	-	Cow and calf
Waterbird-Fall Staging	-	2023/09/11	389888	5915063	Moose	Mammal	Observation	1	-	Large male
Waterbird-Fall Staging	-	2023/09/11	383258	5943735	Moose	Mammal	Observation	2	-	-
Waterbird-Fall Staging	-	2023/09/11	397210	5925597	Beaver	Mammal	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/11	377471	5914308	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/11	380223	5970892	Osprey	Raptor	Observation	1	-	Forest
Waterbird-Fall Staging	-	2023/09/11	388757	5913204	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/11	394515	5930634	Osprey	Raptor	Observation	1	-	-
Waterbird-Fall Staging	-	2023/09/11	396536	5929287	Mule Deer	Mammal	Observation	1	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/09/13	355064	5907440	Mountain Goat	Mammal	Observation	2	-	-
Caribou Offsetting Camera Monitoring	CM05	2023/09/15	355064	5907440	Mountain Goat	Mammal	Observation	6	-	-
Caribou Offsetting Camera Monitoring	CM03	2023/09/16	361594	5906082	Unknown	Unknown	Observation	1	-	-
Country Foods Trip 2	-	2023/09/20	-	-	Red Fox	Mammal	Observation	1	-	Helipad

Appendix H: Incidental Wildlife Detections during the 2023 Wildlife Field Season

Survey Type	Site ID	Date	Easting	Northing	Species Common Name	Group	Observation or Sign	Total Detected/ Observed	Signs Observed	Comment
Country Foods Trip 2	SM24	2023/09/20	375719	5907374	Sandhill Crane	Waterbird	Observation	300	-	-
Country Foods Trip 2	SM24	2023/09/21	375719	5907374	Moose	Mammal	Observation	1	-	dead moose in lake ~300m from site 24
Country Foods Trip 2	-	2023/09/21	-	-	Black Bear	Mammal	Observation	2	-	north shore of Tatelkuz Lake
Country Foods Trip 2	SM24	2023/09/21	375719	5907374	Grey Wolf	Mammal	Observation	1	-	heard bear and wolf fighting over moose carcass near site 24
Country Foods Trip 2	SM24	2023/09/21	375719	5907374	Unknown Bear	Mammal	Observation	1	-	heard bear and wolf fighting over moose carcass near site 24
Site Wide Camera Monitoring	CM17	2023/09/21	373443	5895986	White-tailed Deer	Mammal	Observation	1	-	-
Country Foods Trip 2	CF34	2023/09/22	396594	5896340	Black Bear	Mammal	Observation	1	-	Black bear seen on top of mountain where Country Foods site 34 was located from heli.
Country Foods Trip 2	CF37	2023/09/23	383002	5908138	Grizzly Bear	Mammal	Sign	1	-	Saw grizzly bear sign and heard snorting at Country Foods site 37.
Country Foods Trip 2	-	2023/09/24	-	-	Northern Goshawk	Raptor	Observation	2	-	Saw two goshawks (adult male and juvenile) on C-trail around KM 8.
Country Foods Trip 2	-	2023/09/25	-	-	Western Toad	Amphibian	Observation	1	-	WETO toadlet at CF34
Country Foods Trip 2	CF34	2023/09/25	396594	5896340	Black Bear	Mammal	Observation	1	-	Black bear at fire tower heli pad (drop off location for Country Foods site 34).
Country Foods Trip 2	REL_AMP01/02	2023/09/25	370189	5896331	Black Bear	Mammal	Observation	1	-	Black bear at amphibian relocation sites REL_AMP01/02
Country Foods Trip 2	-	2023/09/26	-	-	Moose	Mammal	Observation	1	-	Cow moose around KM8 on the C-trail
Country Foods Trip 2	-	2023/09/27	-	-	Red Fox	Mammal	Observation	1	-	Fox at Environment Trailer around 07:00
Breeding Bird	-	-	-	-	Black Bear	Mammal	Observation	1	-	From trip report
Breeding Bird	-	-	-	-	Grizzly Bear	Mammal	Observation	1	-	From trip report
Breeding Bird	-	-	-	-	Bald Eagle	Raptor	Observation	1	-	From trip report
Country Foods Trip 1	-	-	-	-	Moose	Mammal	Observation	1	-	-
Country Foods Trip 1	-	-	-	-	Black Bear	Mammal	Observation	1	-	-
Country Foods Trip 1	-	-	-	-	Grizzly Bear	Mammal	Observation	1	-	-
Country Foods Trip 1	-	-	-	-	Bald Eagle	Raptor	Observation	1	-	-
Country Foods Trip 1	-	-	-	-	Osprey	Raptor	Observation	1	-	-
Country Foods Trip 1	-	-	-	-	Red-tailed Hawk	Raptor	Observation	1	-	-
Country Foods Trip 2	-	-	-	-	Columbia Spotted Frog	Amphibian	Observation	1	-	-
Swift and Swallow	SW12	-	378593	5893479	Chipping Sparrow	Upland bird	Observation	1	-	-
Swift and Swallow	SW12	-	378593	5893479	Dark-eyed Junco	Upland bird	Observation	1	-	-
Swift and Swallow	SW12	-	378593	5893479	Golden-crowned kinglet	Upland bird	Observation	1	-	-
Swift and Swallow	SW12	-	378593	5893479	White-winged Crossbill	Upland bird	Observation	4	-	-
Swift and Swallow	SW12	-	378593	5893479	Yellow-rumped warbler	Upland bird	Observation	1	-	-
Ungulate Pellet	-	-	-	-	Black Bear	Mammal	Observation	1	-	From trip report

APPENDIX I BLACKWATER WILDLIFE INTERACTIONS AND INCIDENTS, 2023



Appendix I: Blackwater Wildlife Interactions, 2023

Date	Time	Location	Description	Actions Taken
2023-10-19	12:00	Plant Site Sediment Control Pond	Fox gained access to the plant site sediment control pond due to lack of traction on the smooth black pond liner, could not escape and required rescuing.	Traction aid was rolled down to the pond liner to where the fox was and the animal was removed from the pond.
2023-05-28	10:18	Intersection of Andrew's Hill Road and Access Road KM15.5	Equipment operator tossed lunch leftovers on the ground. A fox approached and ate the leftovers in front of him.	Reiterated that we have policies against littering and feeding wildlife. Immediately had a verbal conversation with operator's supervisor. Supervisor talked to operator and gave verbal warning and reminded of company policies.
2023-04-01	7:00	First Aid Station	Observer noticed the nurse feeding the fox. I approached her and reminded her that feeding wildlife on site is unacceptable.	Reminded nurse that feeding wildlife isn't acceptable on site.
2023-02-21	17:00	Exploration Camp Parking Lot	Bag of food waste found in bed of pickup truck and being scavenged by ravens.	Collected garbage around parking lot and from bed of truck and disposed of in appropriate bin.
2023-10-21	15:20	Construction Camp Waste Bins	Ravens picking at waste through mesh top of food waste dumpsters.	Kitchen staff redistribution food waste garbage bags and packed them down so bags were not accessible through mesh lid.
2023-06-14	19:00	Access Road KM6	Woodchuck noted to be dead on side of road.	-

APPENDIX J SITE WILDLIFE CAMERA SITE DATA, 2023



Appendix J: Site Wildlife Camera Site Data, 2023

Camera ID	Zone 10U		Deployment Date	Retrieval Date	Servicing Event 1	Servicing Event 2	Camera and Data Status	Habitat Description	Wildlife Features	Camera Location Description	2021 Camera Deployment Comments
	Easting	Northing									
CM13	371965	5894743	2021-10-15	2023-09-27	2023-06-19	2023-09-27	Destroyed by the July Wildfire, camera never redeployed due to area burnt from fire.	Pine forest	Bear den and trails	-	Site near bear den from previous year. Site M112.
CM14	362122	5893527	2021-10-15	-	2023-05-20	2023-09-26	Still deployed as of 2023-09-26.	Bog/wet meadow	Trails, rut rub, and bull moose smell	In clearing off Kluskus, recommend heli access. Heli landing in clearing within 10 - 20 m NE of camera. Camera facing clearing.	Near M003 Access road near Kluskus FSR.
CM15	375387	5894611	2021-10-15	-	2023-06-19	2023-09-27	Still deployed as of 2023-09-27.	Wet meadow	Trails along edge of wetland	-	On side road from T043 on large wet meadow.
CM17	373443	5895986	2021-10-15	-	2023-06-19	2023-09-27	Still deployed as of 2023-09-27.	Access trail in forest	Moose, bear, and wolf tracks	-	Off main mine access, near M001 on spur access trail.
CM18	374964	5905382	2021-10-15	2023-05-20	2023-05-20	-	Fell on 2022-10-27 at 02:52:04. Retrieved 2023-05-20 and not redeployed.	Wet meadow	Moose and wolf tracks, bear scat	In wetland ~ 80 m W of Chedakuz road near Kluskus. Wetland was too wet, heli landed on road.	Near road, edge of LSA map near T026.

APPENDIX K SITE WILDLIFE CAMERA DETECTIONS, 2023



Appendix K: Site Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM13	2022-07-20	8:55	Moose	1	-	-	1	Feeding
	2022-08-06	7:24	Moose	1	-	-	1	Feeding
	2022-08-11	22:04	Moose	1	-	-	1	Feeding
	2022-08-29	9:09	Moose	1	-	-	1	Feeding
	2022-09-01	8:52	Moose	1	-	-	1	Feeding
	2022-09-06	17:36	Black Bear	1	-	-	1	Travelling
	2022-10-19	10:44	Moose	1	-	-	1	Travelling
	2023-06-15	11:26	Moose	1	-	-	1	Feeding
CM14	2022-01-31	14:40	Moose	1	-	-	1	Travelling
	2022-04-17	22:26	Black Bear	1	-	-	1	Travelling
	2022-06-21	12:10	Moose	1	-	-	1	Travelling
	2022-09-09	20:31	Moose	1	-	-	1	Alarmed
	2022-09-11	16:48	Moose	1	-	-	1	Feeding
	2022-09-11	22:22	Moose	1	-	-	1	Feeding
	2022-09-12	3:21	Moose	1	-	-	1	Travelling
	2023-03-27	10:22	Coyote	1	-	-	1	Travelling
	2023-03-27	10:48	Coyote	2	-	-	2	Travelling
	2023-04-03	15:21	Coyote	1	-	-	1	Travelling
	2023-04-03	18:42	Coyote	1	-	-	1	Travelling
	2023-04-10	16:36	Coyote	1	-	-	1	Travelling
	2023-06-22	21:38	Moose	1	-	-	1	Travelling
	2023-07-16	8:52	Moose	1	-	-	1	Travelling
	2023-07-30	9:05	Moose	1	-	-	1	Travelling
	2023-08-04	10:24	Moose	1	-	-	1	Feeding
	2023-08-20	11:55	Moose	1	1	-	2	Feeding
	2023-08-20	21:10	Moose	1	1	-	2	Alarmed
	2023-08-28	0:45	Moose	1	-	-	1	Feeding
	2023-08-29	21:32	Moose	1	1	-	2	Feeding
2023-09-21	3:19	Moose	1	-	-	1	Travelling	
CM15	2021-11-20	12:58	Moose	2	1	-	3	Alarmed
	2022-06-23	13:09	Moose	1	-	-	1	Travelling
	2022-07-16	6:47	Moose	1	-	-	1	Travelling
	2022-08-04	14:33	Moose	1	-	-	1	Travelling
	2022-08-20	19:45	Moose	1	-	-	1	Feeding
	2023-07-23	8:56	Moose	1	2	-	3	Travelling
CM17	2021-11-05	12:15	Moose	1	-	-	1	Travelling
	2021-12-23	18:12	Moose	1	-	-	1	Travelling
	2021-12-26	6:41	Moose	1	-	-	1	Travelling
	2021-12-27	10:58	Moose	1	-	-	1	Travelling
	2022-03-27	0:30	Lynx	1	-	-	1	Travelling
	2022-05-20	16:17	Black Bear	1	-	-	1	Travelling
	2022-05-22	12:39	Lynx	1	-	-	1	Travelling
	2022-06-20	22:19	Moose	1	-	-	1	Travelling
	2022-06-29	15:56	Black Bear	1	-	-	1	Travelling
	2022-07-21	7:15	Moose	1	-	-	1	Travelling
	2022-07-27	23:19	Moose	1	-	-	1	Travelling

Appendix K: Site Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM17 (cont'd)	2022-08-09	7:37	Moose	1	-	-	1	Travelling
	2022-08-09	10:58	Moose	1	-	-	1	Inspecting Sign
	2022-08-17	12:30	Black Bear	1	-	-	1	Travelling
	2022-08-28	15:18	Lynx	1	-	-	1	Travelling
	2022-08-28	15:34	Black Bear	1	-	-	1	Travelling
	2022-09-03	12:49	Black Bear	1	-	-	1	Travelling
	2022-09-05	22:08	Black Bear	1	-	-	1	Travelling
	2022-09-09	21:52	Black Bear	1	-	-	1	Travelling
	2022-09-10	7:46	Black Bear	1	-	-	1	Travelling
	2022-09-10	16:19	Moose	1	-	-	1	Scratching back with sign
	2022-09-14	9:05	Moose	2	-	-	2	Inspecting Sign
	2022-09-22	15:13	Black Bear	1	-	-	1	Travelling
	2023-05-18	20:31	Black Bear	1	-	-	1	Travelling
	2023-05-19	8:51	Black Bear	1	-	-	1	Travelling
	2023-05-27	21:38	Moose	1	-	-	1	Resting
	2023-06-02	20:54	Moose	1	-	-	1	Travelling
	2023-06-04	8:50	Moose	1	-	-	1	Travelling
	2023-06-06	12:10	Black Bear	1	-	-	1	Travelling
	2023-06-06	21:07	Black Bear	1	-	-	1	Travelling
	2023-06-06	21:49	Black Bear	1	-	-	1	Travelling
	2023-07-03	10:53	Moose	1	-	-	1	Travelling
	2023-07-14	12:40	Black Bear	1	-	-	1	Travelling
	2023-08-06	2:14	Fox	-	-	1	1	Travelling
2023-08-20	14:19	Black Bear	1	-	-	1	Travelling	
CM18	2021-10-18	12:15	Moose	1	-	-	1	Feeding
	2022-02-25	11:33	Coyote	1	-	-	1	Travelling
	2022-06-19	17:33	Moose	1	1	-	2	Travelling
	2022-06-21	21:50	Moose	-	1	-	1	Travelling
	2022-06-22	18:06	Moose	1	-	-	1	Feeding
	2022-06-22	23:46	Moose	-	1	-	1	Travelling
	2022-06-23	0:35	Moose	1	1	-	2	Feeding
	2022-06-27	10:05	Moose	1	1	-	2	Feeding
	2022-07-18	10:51	Moose	1	1	-	2	Travelling
	2022-07-25	23:42	Moose	1	-	-	1	Travelling
2022-10-16	20:22	Fox	1	-	-	1	Travelling	

APPENDIX L UNGULATE PELLET SURVEYS – STANDARD OPERATING PROCEDURE (SOP)





Blackwater Gold Project

Ungulate Pellet Survey

STANDARD OPERATING PROCEDURE

June 2023

Version A.1

Scope of Work: This SOP provides guidance for the completion of ungulate pellet surveys.

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1. INTRODUCTION

Proposed development of the Blackwater Gold Project (the Project) falls within the British Columbia (BC) Ungulate Winter Range number U-7-012 (BC MOE 2008) and is on the eastern edge of the Tweedsmuir local population unit of southern mountain caribou (*Rangifer tarandus caribou*). Blackwater Gold (BW Gold) met with the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRORD), Environment and Climate Change Canada (ECCC), Ulkatcho First Nation, and Lhoosk'uz Dené Nation on January 26, 2022, to discuss the monitoring of ungulate populations within the Project area. At that time, FLNRORD indicated that the province is already doing aerial surveys for moose population and composition estimates and caribou population estimates, caribou herd composition, and caribou calf survival estimates in the Tweedsmuir area and would prefer that BW Gold: conduct pellet counts and/or snow track surveys to measure relative distribution of caribou and moose in lieu of aerial surveys.

As such, based on this feedback and direction, BW Gold will conduct yearly pellet count surveys to assess any indications of avoidance of the mine by ungulates. This Standard Operating Procedure (SOP) is intended to provide suggested methodology for ungulate pellet surveys to be completed.

Two methodologies for ungulate pellet count surveys are suggested to be completed in year one to assist in determining the best methodology for estimating ungulate population at the Project.

2. PELLET IDENTIFICATION

Ungulate pellets in close proximity sourced from one defecation event are referred to as a pellet group. Ungulate pellets can vary greatly in composition, shape, and size due to factors such as species, diet, and season. Pellets that are soil and well defined are often deposited during the winter or dry seasons. Whereas cake like deposits or wet and clumped depositions are often deposited during the summer or high nutrient season. Caribou, mule deer, and moose are the likely ungulate species to be present within the pellet survey's study area. The general description of each species pellets by season is presented in Table 1. Additional field guides on ungulate pellet identification may be necessary to best distinguish similar depositions.



Table 1: Distinctions Between Pellets of Ungulate Species Potentially Present at the Blackwater Mine

Ungulate	Season	Pellet Description	Size ¹ (in)	Examples of Variation ²
Caribou	Summer	<ul style="list-style-type: none"> Pellets are coalesced in a clump or soft patty with some to no pellet shape often in a log like mass. Resembles summer mule deer pellets but generally has a less defined pellet shape. 	1 to 3.25	
	Winter	<ul style="list-style-type: none"> Irregularly shaped pellets that often have concave or pointed edges. Resembles winter mule deer pellets but is generally short and stout in comparison. 	~0.5	
Mule Deer	Summer	<ul style="list-style-type: none"> Pellets often are fused together generally retaining some pellet shape. 	~3	
	Winter	<ul style="list-style-type: none"> Long ovular pellets that are often smooth, but some are irregular with points and concaves. Pellet groups typically contain 68 to 128 pellets. 	0.5 to 0.9	
Moose	Summer	<ul style="list-style-type: none"> Typically, no distinction between pellets. Resembles a large cow patty. Usually are much larger and less defined than caribou and mule deer pellets. 	1.25 to 8	
	Winter	<ul style="list-style-type: none"> Smooth round or oval pellets that look like compressed sawdust. Pellet groups typically contain 78 to 192 pellets, with an average of 128 pellets. Spring and fall pellets are often indicated by an angular or irregular shape or conjoined pellets. Pellets are noticeable larger with more woody debris than caribou and mule deer pellets. 	1 to 1.75	

¹ Approximate size but may vary based on individual and region.

² Examples sourced from: Murie, O.J. 1975. *A field guide to animal tracks*. Peterson Field Guide Series No. 9. Houghlin Mifflin Co. Boston, Mass.

Knowing if pellet groups were deposited within a year of surveying is important for monitoring and correctly estimating ungulate populations. The following are signs that may suggest the pellet group was deposited over a year ago:

- Light brown colouration;
- Sides resting on ground are noticeably darker than exposed sides;
- Leaves or other material covering the pellet group;

- Moss growing on pellets; and
- Fragile or easily falling apart.

Surveyors should be knowledgeable in identification of species and approximate season deposited. For the first survey year, detailed descriptions of the pellets condition should be recorded to assist in determining approximately how long ago the pellet group was deposited. For all additional survey years, only the general season deposited is required as all pellet groups recorded in previous years will be removed from the survey plots. Surveyors will wear gloves any time they must touch or move pellets or summer depositions.

3. SURVEY LOCATIONS

The study area for pellet count surveys will include the mine site and the 10 km surrounding area. The pellet count program is designed as a Before-After, Control-Impact (BACI) study. The study area will be separated into five zones with different levels of Project impact:

- < 500 m from the mine site;
- Between 500 m and 1 km from the mine site;
- Between 1 and 3 km from the mine site;
- Between 3 and 5 km from the mine site; and
- One Control Zone between 5 and 10 km from the mine site.

Development of the mine will occur during the construction phase, generally starting from the centre and building outwards towards the eventual final footprint. During the early years of construction, mining activities will be in the centre of the future footprint (1-3 km from the future edge of the final footprint) and will represent the 0 km mark in this study. Establishing zones based on the future footprint of the Project will provide a understanding on how the construction and expansion of the mine impacts ungulate populations surrounding the Project. Therefore, all samples in any zones greater than 5 km from the edge of the existing mine footprint will be considered "Before" impact.

Ten sampling transects will be established in each study zone using recent site maps prior to field work commencing. Survey transects should be stratified by suitable ungulate habitat type to proportionally represent habitat types within each study zone. Study zones closest to the mine site may only have one habitat type, and therefore may not allow for stratification. Drainage patterns should be considered and transect should be established to run diagonally along them. Designated survey transects will be used for each subsequent sampling year.

4. METHODS FOR UNGULATE PELLET SURVEYS

Ungulate pellet surveys will be completed at the Project to determine whether the mine site has an impact on the relative abundance of ungulates in the area. Surveys should be completed in the early spring as pellets are most visible before vegetation grows their full summer foliage. Surveys will count pellet groups containing at least 10 pellets or summer depositions.

Ideally, one survey methodology could be used estimate relative abundance for all ungulates at the Project; however, field observations indicate that some ungulate pellets are more commonly observed than others. Particularly, caribou pellets have been reported to be much less common than moose pellets at the Project. Observations of both moose and caribou pellets were made in the summer of 2021 during habitat suitability fieldwork and incidentally during other surveys in the area surrounding the mine site.

Moose pellets were abundant and observed daily, while caribou pellets were rare compared to moose pellets, with approximately 10-15 total observations.

To determine the best methodology to properly estimate the relative abundance of all ungulate species within the study area, two different methodologies will be used during the first year of surveying: transect and distance pellet counts. Level of field effort and detection accuracy will determine which survey methodology will be adopted for surveys conducted in subsequent years. The survey locations used during the first year of sampling for the adopted methodology will be re-sampled for each subsequent sampling year.

4.1 Quadrat Methodology

Survey methods for quadrat surveys will follow methodology from RIC 1998, *Ground-based Inventory Methods for Selected Ungulates: Moose, Elk and Deer*. Ten quadrat survey locations will be established in 15 m intervals along each survey transect. A circle with a 1.7 m radius stemming from each quadrat survey location will be established. The center of each circular survey plot will be marked with a staked and ferromagnetic marker. A description of the site including information on habitat type, vegetation community, and notable characteristics or features will be recorded for each survey plot.

Starting at the center of the plot, the survey team should initially walk clockwise from the center to the outer boundary of the circle looking for pellet groups and then repeat by walking counter-clockwise. For each pellet group or summer deposition identified, the number of pellets, potential season deposited, and the species will be recorded. If the species cannot be confidently identified, detailed notes on pellet size and shape will be recorded and a picture will be taken. Once the survey plot has been scanned twice, all recorded pellets or summer depositions will be removed and reallocated to an area outside of the survey plot. If a deposition cannot be fully removed, a temporary marker should be placed or a detailed note on the location should be taken.

4.2 Distance Methodology

Survey methods for quadrat surveys will follow methodology from Batcheler 1975, *Development of a Distance Method for Deer Census from Pellet Groups* and Goulet 1984, *Ungulate pellet group surveys on the Liard and Stikine Rivers using the plotless Batcheler's technique*. Ten distance survey starting locations will be established in 18m intervals along each survey transect. A description of the habitat type, vegetation community, and notable characteristics or features surrounding the distance survey starting location will be recorded.

Starting at each designated starting location, the survey team should walk (clockwise or counter-clockwise) from the center to locate the nearest pellet grouping or summer deposit. A maximum of 10 m from the starting location will be searched. The distance from the starting point to the center of the nearest pellet group (group A) will be recorded. The center of the group A will act as the next "starting location" to identify the next nearest pellet group (group B) residing within the 10 m boundary. If a group B is found, it will then act as the next "starting location" to identify the next nearest pellet group (group C) residing within the 10 m boundary. Surveys should be continued until no additional pellet groups are found or the 10m boundary is reached. The distance from the centroid of the "starting location" pellet group to the nearest pellet group will be recorded for each group identified. In addition to the distance from the starting point or pellet group, the number of pellets, potential season deposited, and the species will be recorded for each pellet group or summer deposition. If the species cannot be confidently identified, detailed notes on pellet size and shape will be recorded and a picture will be taken. All recorded pellet groups or summer depositions will be removed and reallocated to an area well outside of the survey area. If a deposition cannot be fully removed, a temporary marker should be placed or a detailed note on the location should be taken.

4.3 Analysis

Pellet count data will be assessed using a BACI analysis to test the interaction between study zone type (control vs impact) and time period (before vs. after). The analysis will include a random effect due to repeated measurements at transects and include covariates to control for habitat type. In addition, pairwise comparisons will be conducted to compare each impact zone to the control zone to explore more precisely the distances at which a potential effect is detected.

5. REFERENCES

- BC MOE (Ministry of Environment). 2008. Order – Ungulate Winter Range #U-7-012.
- Batcheler, C.L. 1975. Development of a distance method for deer census from pellet groups. *J. Wildl. Manage.* 39: 641-652
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- Murie, O.J. 1975. *A field guide to animal tracks*. Peterson Field Guide Series No. 9. Houghlin Mifflin Co. Boston, Mass.
- RIC. 1998. *Ground-based Inventory Methods for Selected Ungulates: Moose, Elk, and Deer*. Standards for Components of British Columbia's Biodiversity No. 33. Prepared by Ministry of Environment, Lands and Parks, Resources Inventory Branch for Terrestrial Ecosystem Task Force, Resources Inventory Committee (RIC): Victoria, BC.

APPENDIX M UNGULATE PELLET COUNT SITE DATA, 2023



Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Eastings	Northings															
MP10	1	2023-06-11	375610	5898696	NB, DH	15	0	0	0	0	0	0	100	0	BAFAun	LPP, Vaccinium, crowberry	Medium	1	Lpp forest and deactivated road w young lpp
MP10	6	2023-06-11	375660	5898767	NB, DH	18	0	0	0	0	0	0	100	0	BAFAun	Lpp, vaccinium, crowberry, bunchgrass, spirea	Medium	1	decommissioned road through lpp forest
MP19	1	2023-06-11	375599	5894164	NB, DH	-	-	0	0	0	0	0	100	0	ESSFmv1	White flower rhodo, lodgepole pine, subalpine fir	Old	10	Mature forest
MP19	2	2023-06-11	375588	5894168	NB, DH	20	0	0	0	0	0	0	100	0	ESSFmv1	White flower rhodo, subalpine fir, LPP	Old	20	Mature fir pine forest
MP19	3	2023-06-11	375569	5894166	NB, DH	20	0	0	0	0	0	0	100	0	ESSFmv1	White flower rhodo, subalpine fir, lodgepole pine	Old	20	Mature fir pine forest
MP19	4	2023-06-11	375551	5894166	NB, DH	22	0	0	0	0	0	0	0	0	ESSFmv1	White flower rhodo	Young	0	Cleared forest
MP19	5	2023-06-11	375535	5894161	NB, DH	22	0	0	0	0	0	0	0	0	ESSFmv1	Sub alpine fir saplings	Young	0	Cleared forest
MP19	6	2023-06-11	375519	5894153	NB, DH	-	-	0	0	0	0	0	0	0	ESSFmv1	-	Young	0	-
MP19	7	2023-06-11	375505	5894130	NB, DH	21	0	0	0	0	0	0	100	0	ESSFmv1	Lpp, subalpine fir, white flowered rhododendron	Old	10	Lpp forest, cutblock, and log pile
MP19	8	2023-06-11	375500	5894123	NB, DH	21	0	0	0	0	0	0	100	0	ESSFmv1	Lpp, subalpine fir, white flowered rhod	Old	15	Lpp forest
MP19	9	2023-06-11	375499	5894104	NB, DH	21	0	0	0	0	0	0	100	0	ESSFmv1	Lpp, subalpine fir, vaccinium, wf rhod	Old	40	Lpp forest, mossy floor
MP19	10	2023-06-11	375507	5894093	NB, DH	20	0	0	0	0	0	0	100	0	ESSFmv1	Wf rhod, lpp, subalpine fir, vaccinium	Old	10	Lpp forest
MP09	1	2023-06-12	374000	5896658	NB, DH	25	-	0	0	0	0	0	100	0	ESSFmv1	Moss, white flower Rhod	Unknown	0	Cleared forest
MP09	2	2023-06-12	373994	5896674	NB, DH	25	0	0	0	0	0	0	100	0	ESSFmv1	Moss, white flower rhodo, labrador tea	Unknown	0	Cleared forest
MP09	3	2023-06-12	373992	5896688	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss, white flower rhodo	Unknown	0	Cleared forest
MP09	4	2023-06-12	374001	5896702	NB, DH	25	5	0	0	0	0	0	0	0	ESSFmv1	Moss, white flower rhodo, false hellebore	Unknown	0	Cleared forest
MP09	5	2023-06-12	374005	5896712	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss	Unknown	0	Cleared forest
MP09	6	2023-06-12	374009	5896728	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss	Unknown	0	Cleared forest
MP09	7	2023-06-12	374022	5882610	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss	Unknown	0	Cleared forest
MP09	8	2023-06-12	374034	5896759	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss, hellebore	Unknown	0	Cleared forest
MP09	9	2023-06-12	374047	5896774	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss, false hellebore	Unknown	0	Cleared forest
MP09	10	2023-06-12	374060	5896781	NB, DH	25	5	0	0	0	0	0	100	0	ESSFmv1	Moss, false hellebore	Unknown	0	Cleared forest
MP10	2	2023-06-12	375619	5898708	NB, DH	16	0	0	0	0	0	0	0	0	BAFAun	Lpp, bunch grass, fireweed, rosa, vaccinium, Arctostaphylos uva ursa, spirea, arnica, salix	Medium	5	Lpp forest and decommissioned road
MP10	3	2023-06-12	375628	5898726	NB, DH	16	0	0	0	0	0	0	100	0	BAFAun	Lpp, subalpine fir, strawberry, vaccinium, cornus	Medium	5	Lpp forest and decommissioned road
MP10	4	2023-06-12	375639	5898740	NB, DH	16	0	0	0	0	0	0	100	0	BAFAun	Bhpp, bunch grass, vaccinium, crowberry	Medium	5	Lpp forest and decommissioned road
MP10	5	2023-06-12	365651	5898753	NB, DH	16	0	0	0	0	0	0	100	0	BAFAun	Lpp, vaccinium, bunchgrass, Arctostaphylos	Medium	1	Lpp forest and decommissioned road
MP10	7	2023-06-12	375672	5898781	NB, DH	20	0	0	0	0	0	0	100	0	BAFAun	LPP, Crowberry, vaccinium, moss	Medium	2	LPP forest, decommissioned road
MP10	8	2023-06-12	375677	5898762	NB, DH	25	2	0	0	0	0	0	100	0	ESSFmv1	Lpp, crowberry, spirea, vaccinium, grasses	Medium	1	Lpp forest w decommissioned road
MP10	9	2023-06-12	375690	5898806	NB, DH	23	0	0	0	0	0	0	100	0	ESSFmv1	Lpp, crowberry, vaccinium	Medium	35	Lpp forest
MP10	10	2023-06-12	375704	5898818	NB, DH	23	0	0	0	0	0	0	100	0	ESSFmv1	Lpp, vaccinium, moss, crowberry	Medium	25	Lpp forest
MP08	1	2023-06-13	373779	5882653	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Engelmann spruce, lpp, equisetum, ribes	Medium	5	Engelmann spruce forest w cleared equisetum linear feature along transect
MP08	2	2023-06-13	373761	5882646	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	ES, LPP, viburum, sheperdia, equistetum, rosa, lonicera	Medium	4	ES, LPP forest
MP08	3	2023-06-13	373749	5882632	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Salix, rhododendron groenlandium, ES, LPP	Unknown	1	ES, LPP forest w salix patch in middle
MP08	4	2023-06-13	373735	5882624	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	salix, lpp, es, ribes, lab tea, betula	Medium	1	Lpp and es forest w salix area in middle
MP08	5	2023-06-13	373725	5882618	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Salix,	Medium	1	Lightly burned Lpp and es forest w salix in middle
MP08	6	2023-06-13	373704	5882615	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Salix, lab tea, equisetum, lpp, es	Young	0	Salix clearing, a few burnt lpp and small es
MP08	7	2023-06-13	373696	5882608	NB, DH	10	100	0	0	0	0	0	100	0	ESSFmv1	Salux, equisetum! Betula, lpp, es	Medium	1	Salix clearing, a few burnt lpp snags, and a few mature es trees, 2% slope
MP08	8	2023-06-13	373681	5882613	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	coltsfoot, equisetum, salix, lpp, es	Medium	1	equisetum clearing, burnt lpp snags and a few lpp trees
MP08	9	2023-06-13	373677	5882610	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Salux, equisetum, grass, lab tea, lpp, es	Medium	1	Salix clearing w burnt lpp snags, es and lpp trees
MP08	10	2023-06-13	373662	5882587	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	-	Medium	0	Open linear wet area through burnt lpp forest
MP13	1	2023-06-13	377160	5893507	NB, DH	16	10	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, vaccinium	Old	75	Fir forest, low shrubby understory
MP13	2	2023-06-13	377155	5893527	NB, DH	16	5	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, vaccinium, arnica	Old	50	Fir forest with low shrubby understory
MP13	3	2023-06-13	377156	5893543	NB, DH	16	15	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, vaccinium	Old	35	Fir forest with low shrubby understory
MP13	4	2023-06-13	377148	5893558	NB, DH	-	-	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, vaccinium	Old	65	Fir forest with low shrub understory
MP13	5	2023-06-13	377146	5893580	NB, DH	16	70	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, vaccinium, moss	Old	5	Fir forest with low shrub understory
MP13	6	2023-06-13	377142	5893600	NB, DH	16	65	0	0	0	0	0	100	0	ESSFmv1	Fir, white flower rhodo, moss, rubus pedantus	Old	30	Fir forest, shrubby understory, sloping
MP16	1	2023-06-13	378630	5893608	NB, DH	12	65	0	0	0	0	0	100	0	ESSFmv1	White flwr rhodo, fir, lodge pole pine, vaccinium	Old	15	Old forest, semi open
MP16	2	2023-06-13	378639	5893597	NB, DH	12	90	0	0	0	0	0	100	0	ESSFmv1	White flwr rhodo, vaccinium, subalpine fir, es	Old	65	Semi open forest

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Eastings	Northing															
MP16	3	2023-06-13	378643	5893578	NB, DH	12	95	0	0	0	0	0	100	0	ESSFmv1	Wht flwr rhodo, subalp fir, es, vaccinium	Old	50	Semi open forest
MP16	4	2023-06-13	378656	5893567	NB, DH	12	98	0	0	0	0	0	100	0	ESSFmv1	Wf rhodo, es, subalp fir, vaccinium	Old	35	Semi open forest, sloped
MP16	5	2023-06-13	378671	5893555	NB, DH	13	40	0	0	0	0	0	100	0	ESSFmv1	Es, subalp fir, vaccinium, wf rhodo	Old	25	Semi open w mossy floor
MP16	6	2023-06-13	378671	5893545	NB, DH	12	40	0	0	0	0	0	108	0	ESSFmv1	ES, sub fir, wf rhodo, crowberry, vaccinium, hellabore	Old	25	Semi open
MP16	7	2023-06-13	378686	5893525	NB, DH	12	100	0	0	0	0	0	100	0	ESSFmv1	Crowberry, vaccinium, bunchberry, sub fir, es	Old	75	Semi open forest
MP16	8	2023-06-13	378698	5893508	NB, DH	12	80	0	0	0	0	0	100	0	ESSFmv1	Wf rhodo, lpp, es, sub fir, crowberry,	Old	60	Semi open, dense underbrush
MP16	9	2023-06-13	378726	5893485	NB, DH	12	55	0	0	0	0	0	100	0	ESSFmv1	Wf rhodo, lpp, sub fir, es, vaccinium	Old	5	Semi open, old and young trees
MP16	10	2023-06-13	378709	5893495	NB, DH	12	80	0	0	0	0	0	0	0	ESSFmv1	Wf rhodo, sub fir, es, lpp, vaccinium	Old	10	Semi open, old and young trees
MP22	1	2023-06-13	376810	5888176	NB, DH	10	100	0	100	0	0	0	0	0	BAFAun	Spruce, fir, birch, salix, labrador tea	Old	0	Bog
MP22	2	2023-06-13	376796	5888189	NB, DH	0	100	0	95	0	0	0	5	0	BAFAun	Spruce, birch, lpp, sphagnum, moss	Old	1	Bog
MP22	3	2023-06-13	376780	5888195	NB, DH	10	100	0	40	0	0	0	60	0	BAFAun	Pine, fir, spruce, equisetum, moss, crowberry, birch, sphagnum	Old	5	Bog inyo conifer forest
MP22	4	2023-06-13	376778	5888210	NB, DH	10	100	0	30	0	0	0	70	0	BAFAun	Spruce, birch, polytrichum moss	Old	60	old forest, mossy understory
MP22	5	2023-06-13	376779	5888223	NB, DH	10	100	0	15	0	0	0	85	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, crowberry	Old	15	Old forest with mossy understory
MP22	6	2023-06-13	376776	5888242	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, crowberry	Old	5	Old conifer forest with mossy understory
MP22	7	2023-06-13	376787	5888256	NB, DH	10	-	0	0	0	0	0	100	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, vaccinium, crowberry	Old	10	Old forest w mossy understory
MP22	8	2023-06-13	376801	5888264	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, crowberry	Old	15	Old forest with mossy understorey
MP22	9	2023-06-13	376816	5888270	NB, DH	10	95	0	15	0	0	0	85	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, sphagnum, vaccinium	Old	5	Open mossy area with sphagnum
MP22	10	2023-06-13	376824	5888280	NB, DH	10	100	0	0	0	0	0	100	0	BAFAun	Spruce, fir, lpp, birch, poltrichum moss, sphagnum	Old	15	Conifer forest with mossy understory
MP01	1	2023-06-14	374843	5894795	NB, DH	4	2	0	0	0	0	0	100	0	ESSFmv1	Fir, lpp, birch shrubs, crowberry	Old	55	fir forest with shrubby birch understory
MP01	2	2023-06-14	374860	5894781	NB, DH	4	0	0	0	0	0	0	100	0	ESSFmv1	Fir, birch, salix, arnica, moss	Old	35	Fir forest, edge of plot cleared
MP01	3	2023-06-14	374878	5894772	NB, DH	5	2	0	0	0	0	0	100	0	ESSFmv1	Moss	Unknown	0	Cleared forest
MP01	4	2023-06-14	374888	5894765	NB, DH	4	0	0	0	0	0	0	100	0	ESSFmv1	Fir saplings, moss, clubmoss	Unknown	0	Cleared forest
MP01	5	2023-06-14	374908	5894759	NB, DH	4	0	0	0	0	0	0	100	0	ESSFmv1	Fir saplings, moss	Unknown	0	Cleared forest
MP01	6	2023-06-14	374928	5894748	NB, DH	4	0	0	0	0	0	0	100	0	ESSFmv1	Fir saplings, moss	Unknown	0	Cleared forest
MP01	7	2023-06-14	374939	5894746	NB, DH	4	0	0	0	0	0	0	100	0	ESSFmv1	Fir, moss, rubus pedantus	Young	0	Cleared forest with larger saplings
MP01	8	2023-06-14	374952	5894737	NB, DH	18	65	0	0	0	0	0	100	0	ESSFmv1	Moss, fir saplings, white flwr rhodo	Young	0	Cleared forest, young saplings
MP01	9	2023-06-14	374970	5894728	NB, DH	18	65	0	0	0	0	0	100	0	ESSFmv1	Salix, white flower rhodo, aspen, fir, lpp	Young	0	Cleared forest, many young saplings
MP01	10	2023-06-14	374988	5894741	NB, DH	18	70	0	0	0	0	0	100	0	ESSFmv1	Moss	Unknown	0	Cleared forest
MP11	1	2023-06-14	375174	5903968	NB, DH	22	0	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp	Medium	30	Dry site in small trench, semi open forest
MP11	2	2023-06-14	375182	5903981	NB, DH	22	0	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp	Medium	60	Dry semi open forest in small trench
MP11	3	2023-06-14	375193	5903998	NB, DH	22	0	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp	Medium	10	Dry site in small trench, semi open
MP11	4	2023-06-14	375191	5903998	NB, DH	20	30	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp, rosa	Medium	10	Dry semiopen forest in small trench
MP11	5	2023-06-14	375223	5904014	NB, DH	22	5	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina and cladonia spp	Medium	50	Dry semi open forest w needles and moss on floor
MP11	6	2023-06-14	375239	5904019	NB, DH	22	5	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp, juniper	Medium	40	Semi open dry forest on other side of trench, slight north facing slope
MP11	7	2023-06-14	375252	5904029	NB, DH	22	4	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, cladina spp	Medium	10	Dry semi open forest in small trench
MP11	8	2023-06-14	375257	5904047	NB, DH	22	4	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, juniper, cladina spp	Medium	5	Dry semi open forest
MP11	9	2023-06-14	375266	5904062	NB, DH	24	10	0	0	0	0	0	100	0	BAFAun	Lpp, fireweed, twinflower, bunchberry, kinnikinnick, sheperdia, juniper, cladina spp	Medium	10	Semi open dry forest
MP11	10	2023-06-14	375258	5904076	NB, DH	22	10	0	0	0	0	0	100	0	BAFAun	Lpp, twinflower, kinnikinnick, sheperdia, cladina spp, juniper	Medium	5	Dry semi open forest on top of trench

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Eastings	Northing															
MP13	7	2023-06-14	377141	5893618	NB, DH	18	80	0	0	0	0	0	100	0	ESSFmv1	Subalp fir, es, wf rhodo, vaccinium	Old	70	Sloped forest w lots of deadfall and mossy floor
MP13	8	2023-06-14	377140	5893629	NB, DH	18	60	0	0	0	0	0	100	0	ESSFmv1	Subalp fir, es, wf rhodo, vaccinium	Old	80	Sloped forest w mossy floor and deadfall
MP13	9	2023-06-14	377137	5893655	NB, DH	18	80	0	0	0	0	0	100	0	ESSFmv1	Subalp fir, es, wf rhodo, vaccinium, rubeus	Old	40	Sloped forest w dead fall and moss floor
MP13	10	2023-06-14	377128	5893660	NB, DH	18	80	0	0	0	0	0	100	0	ESSFmv1	Subalp fir, es, wf rhodo, vaccinium	Old	40	Sloped forest w mossy floor and lots of deadfall
MP20	1	2023-06-14	377330	5890909	NB, DH	15	50	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Open bog surrounded by spruce forest
MP20	2	2023-06-14	377339	5890926	NB, DH	16	40	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Open bog surrounded by spruce forest
MP20	3	2023-06-14	377348	5890942	NB, DH	16	50	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Bog surrounded by spruce, fir, pine
MP20	4	2023-06-14	377355	5890960	NB, DH	16	40	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Open bog surrounded by spruce and fir
MP20	5	2023-06-14	377372	5890968	NB, DH	17	40	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Open bog surrounded by spruce and fir
MP20	6	2023-06-14	377388	5890974	NB, DH	17	35	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch	Unknown	0	Open bog surrounded by spruce, fir
MP20	7	2023-06-14	377401	5890980	NB, DH	18	15	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch, stunted spruce	Unknown	0	Open bog surrounded by spruce, fir
MP20	8	2023-06-14	377418	5890990	NB, DH	18	15	0	100	0	0	0	0	0	BAFAun	Salix, sedge, sphagnum, birch, lpp	Unknown	0	Bog surrounded by spruce, fir
MP20	9	2023-06-14	377428	5891006	NB, DH	17	15	0	85	0	0	0	15	0	BAFAun	Salix, sedge, sphagnum, birch, spruce, lodgepole pine	Unknown	0	-
MP20	10	2023-06-14	377442	5891015	NB, DH	17	15	0	65	0	0	0	35	0	BAFAun	Salix, sedge, sphagnum, birch, spruce, lodgepole pine	Old	2	Open bog, dry, partially covered in pine and spruce
MP21	1	2023-06-14	377305	5890751	NB, DH	13	10	0	100	0	0	0	0	0	BAFAun	Grass, sedge, sphagnum,	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	2	2023-06-14	377289	5890749	NB, DH	13	10	0	100	0	0	0	0	0	BAFAun	Grass, sedge, betula, lab tea	Unknown	0	open bog surrounded by mature lpp and fir/spruce, one snag
MP21	3	2023-06-14	377273	5890759	NB, DH	13	10	0	100	0	0	0	0	0	BAFAun	Grass, sedge, lab tea, betula	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	4	2023-06-14	377254	5890756	NB, DH	13	15	0	0	100	0	0	0	0	BAFAun	Grass, sedge, betula, subalp fir saplings, sphagnum, rubeus	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	5	2023-06-14	377241	5890745	NB, DH	15	20	0	100	0	0	0	0	0	BAFAun	Sedge, grass, sphagnum, betula, crowsberry, es	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	6	2023-06-14	377230	5890732	NB, DH	15	15	0	100	0	0	0	0	0	BAFAun	Grass, sedge, betula, sphagnum	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	7	2023-06-14	377225	5890716	NB, DH	15	20	0	100	0	0	0	0	0	BAFAun	Grass, sedge, betula, sphag, es	Unknown	1	open bog surrounded by mature lpp and fir/spruce
MP21	8	2023-06-14	377212	5890700	NB, DH	15	20	0	100	0	0	0	0	0	BAFAun	Sedge, grass, sphag, salix, betula	Unknown	1	open bog surrounded by mature lpp and fir/spruce
MP21	9	2023-06-14	377209	5890682	NB, DH	15	20	0	100	0	0	0	0	0	BAFAun	Salix, sphag, grass, sedge, betula	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP21	10	2023-06-14	377210	5890664	NB, DH	15	20	0	100	0	0	0	0	0	BAFAun	Sedge, grass, sphag, betula, salix	Unknown	0	open bog surrounded by mature lpp and fir/spruce
MP02	1	2023-06-15	363107	5894365	NB, DH	100	14	0	0	0	0	0	100	0	BAFAun	Spruce, peavine, maianthum, fireweed, lpp, sheperdia, fragaria	Old	5	Spruce forest, many forbs, shrubs, deadfall
MP02	2	2023-06-15	363092	5894369	NB, DH	-	16	0	0	0	0	0	100	0	BAFAun	Spruce, sheperdia, rosa, unknown aster forb	Old	25	-
MP02	3	2023-06-15	363074	5894355	NB, DH	5	16	0	0	0	20	0	80	0	BAFAun	Spruce, labrador tea, birch, equisetum, vaccinium	Old	15	Small depression or pond in spruce forest
MP02	4	2023-06-15	363055	5894348	NB, DH	-	16	0	0	0	0	0	100	0	BAFAun	Spruce, Twinberry honeyduckle, sheperdia, Labrador tea	Old	5	Open area in spruce forest
MP02	5	2023-06-15	363037	5894348	NB, DH	10	17	0	0	0	0	0	100	0	BAFAun	Spruce, sheperdia, lonicera involucrata, fireweed, labrador tea	Old	1	-
MP02	6	2023-06-15	363031	5894361	NB, DH	25	16	0	30	0	0	0	70	0	BAFAun	Spruce, birch, labrador tea, equisetum, grass	Old	10	Spruce forest with wet seep
MP02	7	2023-06-15	363031	5894379	NB, DH	-	-	0	0	0	0	0	100	0	BAFAun	Spruce, salix, labrador tea, equisetum, birch, rosa	Old	15	Open area, forest surrounding aspen, lpp, fir, spruce
MP02	9	2023-06-15	362998	5894385	NB, DH	50	18	0	0	0	0	0	100	0	BAFAun	Spruce, salix, birch, equisetum	Old	5	Spruce forest
MP02	8	2023-06-15	363014	5894384	NB, DH	-	16	0	0	0	0	0	85	0	BAFAun	Spruce, large aspen, salix, equisetum, birch	Old	15	Open conifer forest with some aspen
MP02	10	2023-06-15	362990	5894372	NB, DH	50	16	0	0	0	0	0	100	0	BAFAun	Spruce, salix, equisetum	Old	30	Willow patch in spruce forest
MP03	1	2023-06-15	371284	5896229	NB, DH	95	15	0	0	0	0	0	100	0	ESSFmv1	Crowsberry, sf, lpp, es	Old	1	Forest w low shrubby understory and crowsberry/lichen substrate
MP03	2	2023-06-15	371264	5896221	NB, DH	95	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, lab tea, crowsberry, betula	Old	1	Forest w low shrubby understory and crowsberry/lichen substrate
MP03	3	2023-06-15	371252	5896221	NB, DH	95	15	0	28	0	0	0	80	0	ESSFmv1	Es, sf, lpp, lab tea, salix, bunch berry	Old	20	Forest w low shrubby understory and crowsberry/lichen/moss. wet pools throughout
MP03	4	2023-06-15	371236	5896204	NB, DH	100	15	0	10	0	0	0	90	0	ESSFmv1	Sf,es,lpp, rubeus, crowsberry	Old	20	Forest w low shrubby understory and crowsberry/moss substrate
MP03	5	2023-06-15	371216	5896206	NB, DH	100	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowsberry, vaccinium	Old	5	Forest w low shrubby understory and crowsberry/lichen substrate
MP03	6	2023-06-15	371196	5896207	NB, DH	100	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowsberry, vaccinium, peltigera	Old	5	Forest w low shrubby understory and crowsberry/lichen/moss substrate

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Eastings	Northing															
MP03	7	2023-06-15	371177	5896209	NB, DH	100	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowberry, vaccinium	Old	5	Forest w low shrubby understory and crowberry/lichen/moss substrate
MP03	8	2023-06-15	371159	5896206	NB, DH	100	14	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowberry, linnea	Old	50	Forest w low shrubby understory and moss/crowberry floor
MP03	9	2023-06-15	371139	5896213	NB, DH	100	14	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowberry, bunchberry	Old	30	Forest w low shrubby understory and crowberry/moss substrate
MP03	10	2023-06-15	371125	5896216	NB, DH	100	14	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowberry, bunchberry	Old	1	Forest w low shrubby understory and crowberry/moss/lichen substrate
MP05	1	2023-06-15	366206	5894904	NB, DH	85	15	0	0	0	0	0	100	0	BAFAun	Lpp, es, fireweed, strawberry, rose, coltsfoot, betula	Old	10	Half mature forest half clear cut w betula
MP05	2	2023-06-15	366205	5894886	NB, DH	75	15	0	0	0	0	0	100	0	BAFAun	Lpp, es, fireweed, salix, crowberry, linnea	Old	10	Mature forest w mossy floor
MP05	3	2023-06-15	366209	5894867	NB, DH	65	15	0	0	0	0	0	100	0	BAFAun	Es, lpp, kinnikinnick, linnea, fireweed, crowberry	Old	25	Mature forest opening up to the south
MP05	4	2023-06-15	366211	5894848	NB, DH	90	15	0	0	30	0	0	70	0	BAFAun	Es, lpp, betula, sedge, sphagnum	Old	0	Dry bog surrounded by mature forest
MP05	5	2023-06-15	366209	5894837	NB, DH	90	16	0	0	70	0	0	30	0	BAFAun	-	Old	0	Dry bog surrounded by mature forest
MP05	6	2023-06-15	366197	5894822	NB, DH	75	16	0	0	70	0	0	30	0	BAFAun	Salix, betula, lpp, es, arctic rasp, sedge,	Old	1	Dry bog surrounded by mature forest
MP05	7	2023-06-15	366191	5894807	NB, DH	65	16	0	0	70	0	0	30	0	BAFAun	Salix, betula, lpp, es, sedge	Old	5	Sedgy bog surrounded by mature forest
MP05	8	2023-06-15	366186	5894790	NB, DH	65	16	0	0	50	0	0	50	0	BAFAun	Es, betula, salix, sedges, coltsfoot	Old	15	Wet open forest
MP05	9	2023-06-15	366172	5894775	NB, DH	40	16	0	0	50	0	0	50	0	BAFAun	Salix, betula, sedge, es	Old	3	Sedgy wet forest
MP05	10	2023-06-15	399170	5894759	NB, DH	30	16	0	0	30	0	0	70	0	BAFAun	Es, sedge, salix, betula	Old	10	Open sedgy mature forest
MP06	1	2023-06-15	367259	5896227	NB, DH	50	21	0	0	0	0	0	100	0	BAFAun	Lpp, salix	Young	0	Cleared forest, reveg with saplings
MP06	2	2023-06-15	367240	5896220	NB, DH	40	21	0	0	0	0	0	100	0	BAFAun	Lpp, Labrador tea, salix, crowberry	Young	0	Cleared forest, saplings
MP06	3	2023-06-15	367231	5896218	NB, DH	60	21	0	0	0	0	0	100	0	BAFAun	Lpp, birch, labrador tea, crowberry	Young	0	Regrowing clearcut
MP06	4	2023-06-15	367219	5896222	NB, DH	65	21	0	0	0	0	0	75	0	BAFAun	Lpp, trembling aspen, birch, salix, fireweed	Young	0	Regrowing clearcut
MP06	5	2023-06-15	367212	5896217	NB, DH	75	21	0	0	0	0	0	100	0	BAFAun	Lpp, salix, birch, labrador tea, crowberry	Young	0	Regrowing clearcut, many small saplings
MP06	6	2023-06-15	367209	5896222	NB, DH	80	21	0	0	0	0	0	100	0	BAFAun	Lpp, birch, salix, fireweed	Young	0	Regrowing clearcut, many small saplings
MP06	7	2023-06-15	367198	5896219	NB, DH	80	21	0	0	0	0	0	100	0	BAFAun	Lpp, salix, birch, fireweed, crowberry	Young	0	Regrowing clearcut, many small saplings
MP06	8	2023-06-15	367186	5896215	NB, DH	80	21	0	0	0	0	0	100	0	BAFAun	Birch, crowberry, salix, lpp	Young	0	Regrowing clearcut, many small saplings
MP06	9	2023-06-15	367182	5896211	NB, DH	80	21	0	0	0	0	0	100	0	BAFAun	Lpp, salix, birch, crowberry	Young	0	Regrowing clearcut, many small saplings
MP06	10	2023-06-15	367170	5896208	NB, DH	80	21	0	0	0	0	0	100	0	BAFAun	Birch, lpp, spruce, salix, fireweed	Young	0	Regrowing clearcut, many small saplings
MP04	1	2023-06-16	370274	5896332	NB, DH	12	60	0	20	0	0	0	80	0	ESSFmv1	Spruce, sphagnum, birch, lpp, salix, crowberry	Old	20	Bog into conifer forest
MP04	2	2023-06-16	370260	5896316	NB, DH	10	80	0	100	0	0	0	0	0	ESSFmv1	Spruce, salix, sphagnum, birch, labrador tea	Old	0	Bog
MP04	3	2023-06-16	370256	5896306	NB, DH	10	80	0	100	0	0	0	0	0	ESSFmv1	Spruce, salix, sphagnum, birch	Old	5	Bog, stunted spruce
MP04	4	2023-06-16	370250	5896299	NB, DH	10	25	0	100	0	0	0	0	0	ESSFmv1	Salix, spruce, sphagnum, birch	Old	0	Bog with salix
MP04	5	2023-06-16	370247	5896296	NB, DH	9	20	0	60	0	0	0	40	0	ESSFmv1	Spruce, lpp, salix, sedge, sphagnum	Old	5	Spruce forest transition to bog
MP04	6	2023-06-16	370228	5896291	NB, DH	9	50	0	20	0	0	0	80	0	ESSFmv1	Spruce, lpp, birch, crowberry, moss	Old	15	Spruce forest, bog on edge of plot
MP04	7	2023-06-16	370207	5896285	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Spruce, birch, salix, moss, crowberry, lonicera	Old	10	spruce fir forest, moss substrate
MP04	8	2023-06-16	370204	5896269	NB, DH	7	100	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, lpp, birch, moss, crowberry	Old	25	spruce fir forest, moss substrate
MP04	9	2023-06-16	370189	5896258	NB, DH	7	100	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, birch, crowberry, moss	Old	15	spruce fir forest, moss lichen substrate
MP04	10	2023-06-16	370171	5896249	NB, DH	7	-	0	0	0	0	0	100	0	ESSFmv1	Spruce, bunchberry, birch, moss crowberry	Old	25	Spruce forest, birch shrub understory
MP12	1	2023-06-16	375662	5895172	NB, DH	15	35	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, salix, white flower rhodo, bunchflower	Young	0	Cleared forest, young saplings
MP12	2	2023-06-16	375667	5895195	NB, DH	15	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, salix, white flower rhodo, crowberry	Medium	2	Partially cleared forest, saplings
MP12	3	2023-06-16	375663	5895218	NB, DH	16	10	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, white flower rhodo, moss	Medium	5	Open fir and pine forest with lots of deadfall
MP12	4	2023-06-16	375668	5895231	NB, DH	15	-	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, whiteflower rhodo, moss	Medium	5	Open fir and pine forest with lots of deadfall
MP12	5	2023-06-16	375655	5895235	NB, DH	15	25	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, whiteflower rhodo, bunchflower	Medium	15	Open fir and pine forest with lots of deadfall
MP12	6	2023-06-16	375650	5895258	NB, DH	15	15	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, lpp, white flower rhodo, arnica, bbunchflower, moss	Old	20	Open fir, spruce, and pine forest with lots of deadfall
MP12	7	2023-06-16	375647	5895265	NB, DH	15	15	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, white flower rhodo, ribes, arnica, bunchflower	Old	65	Open fir, spruce forest with lots of deadfall
MP12	8	2023-06-16	375645	5895285	NB, DH	17	15	0	0	0	0	0	100	0	ESSFmv1	Spruce, pine, white flower rhodo, lonicera, lonicera	Old	15	spruce, pine forest
MP12	9	2023-06-16	375638	5895303	NB, DH	15	15	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, bunchflower, arnica, whiteflower rhodo, moss	Old	75	Spruce and fir forest, dense, mossy understory
MP12	10	2023-06-16	375649	5895325	NB, DH	15	15	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, white flower rhodo, arnica, bunchberry	Old	80	Dense spruce, fir forest, large squirrel midden

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Easting	Northing															
MP17	1	2023-06-16	377212	5896990	NB, DH	14	60	0	0	0	0	0	100	0	ESSFmv1	Lpp, willow, es, aspen, sheperdia, bunchberry	Old	1	decommissioned road thru forest
MP17	2	2023-06-16	377229	589687	NB, DH	14	40	0	0	0	0	0	90	0	ESSFmv1	Lpp, willow, es, aspen, sheperdia, bunchberry, cottonwood saplings	Old	1	decommissioned road thru forest
MP17	3	2023-06-16	377245	5896989	NB, DH	14	35	0	0	0	0	0	90	0	ESSFmv1	Lpp, willow, es, aspen, sheperdia, bunchberry, cottonwood saplings, vaccinium, wf rhodo	Old	1	decommissioned road thru forest
MP17	4	2023-06-16	377263	5896987	NB, DH	14	25	0	0	0	0	0	100	0	ESSFmv1	Lpp, willow, es, aspen, bunchberry, cottonwood saplings, vaccinium, wf rhodo	Old	5	decommissioned road thru forest
MP17	5	2023-06-16	377282	5896989	NB, DH	14	20	0	0	0	0	0	85	0	ESSFmv1	Lpp, willow, es, aspen saplings, bunchberry, cottonwood, vaccinium, wf rhodo	Old	0	decommissioned road thru forest
MP17	6	2023-06-16	377300	5896990	NB, DH	15	20	0	0	0	0	0	85	0	ESSFmv1	Lpp, willow, es, aspen saplings, bunchberry, cottonwood, vaccinium, wf rhodo	Old	0	decommissioned road thru forest
MP17	7	2023-06-16	377313	5896989	NB, DH	14	20	0	0	0	0	0	90	0	ESSFmv1	Lpp, willow, es, aspen saplings, bunchberry, cottonwood, vaccinium, wf rhodo, equisetum	Old	0	decommissioned road thru forest
MP17	8	2023-06-16	377335	5896986	NB, DH	16	15	0	0	0	0	0	100	0	ESSFmv1	Lpp, willow, es, aspen saplings, bunchberry, cottonwood, vaccinium, wf rhodo, equisetu,	Old	10	decommissioned road thru forest
MP17	9	2023-06-16	377352	5896984	NB, DH	16	15	0	0	0	0	0	85	0	ESSFmv1	Lpp, willow, es, aspen saplings, bunchberry, cottonwood, vaccinium, wf rhodo, equisetum, lab tea	Old	0	decommissioned road thru forest
MP17	10	2023-06-16	377373	5896986	NB, DH	16	15	0	0	0	0	0	90	0	ESSFmv1	Lpp, willow, es, aspen saplings, lab tea, vaccinium, wf rhodo, lonicera	Old	1	decommissioned road thru forest
MP18	1	2023-06-17	377540	5896509	NB, DH	4	90	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	1	decommissioned road thru dense forest
MP18	2	2023-06-17	377557	5896508	NB, DH	5	85	0	0	0	0	0	90	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	1	decommissioned road thru dense forest
MP18	3	2023-06-17	377576	5896507	NB, DH	4	80	0	0	0	0	0	90	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	1	decommissioned road thru dense forest
MP18	4	2023-06-17	377594	5896507	NB, DH	4	-	0	0	0	0	0	10	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road thru dense forest
MP18	5	2023-06-17	377613	5896504	NB, DH	4	90	0	0	0	0	0	50	0	ESSFmv1	Lpp, es, salix, fireweed, vaccinium, alders, aspen saplings	Old	0	decommissioned road thru dense forest
MP18	6	2023-06-17	377633	5896506	NB, DH	4	90	0	0	0	0	0	50	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road w lpp saplings and salix thru dense forest
MP18	7	2023-06-17	377651	5896509	NB, DH	5	90	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road w lpp saplings and salix thru dense forest
MP18	8	2023-06-17	377666	5896504	NB, DH	5	90	0	0	0	0	0	70	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road w lpp saplings and salix thru dense forest
MP18	9	2023-06-17	377686	5896509	NB, DH	5	85	0	0	0	0	0	70	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road w lpp saplings and salix thru dense forest
MP18	10	2023-06-17	377704	5896508	NB, DH	4	85	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, salix, cottonwood and aspen saplings, alders	Old	0	decommissioned road w lpp saplings and salix thru dense forest
MP23	5	2023-06-17	378890	5901714	NB, DH	7	100	0	35	0	0	0	0	0	SBSmc3	Aspen, spruce, labrador tea, rosa, sedge	Young	0	Edge of bog, and clearcut with spruce, aspen saplings, some large aspen in retention patch
MP23	1	2023-06-17	378842	5901672	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Rosa, spirea, lpp	Young	0	Small lpp saplings in clearcut
MP23	2	2023-06-17	378852	5901682	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp saplings, rosa, fireweed, grass	Young	0	Small lpp saplings in clearcut
MP23	3	2023-06-17	378863	5901701	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Spruce, lpp, fireweed, rosa, labrador tea, grass, salix	Young	0	Spruce and lpp saplings in clearcut
MP23	4	2023-06-17	378874	5901714	NB, DH	7	100	0	100	0	0	0	0	0	SBSmc3	Sedge, labrador tea, sphagnum, salix	Unknown	0	Bog with sedge
MP23	6	2023-06-17	378909	5901714	NB, DH	7	100	0	0	0	0	0	0	0	SBSmc3	Aspen, spruce, rosa, lpp	Young	0	Aspen saplings in clearcut
MP23	7	2023-06-17	378928	5901708	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, spruce, rosa, fireweed, spirea	Young	0	Lpp and spruce saplings in clearcut
MP23	8	2023-06-17	378944	5901710	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, spruce, rosa, vaccinium	Young	0	Lpp saplings in clearcut
MP23	9	2023-06-17	378959	5901706	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, spruce, spirea, grass, vaccinium	Young	0	Lpp saplings in clearcut
MP23	10	2023-06-17	378973	5901712	NB, DH	7	100	0	0	0	0	0	0	0	SBSmc3	Lpp, spruce, sheperdia	Young	0	Lpp saplings in clearcut, reindeer lichen
MP24	1	2023-06-17	377220	5900496	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, salix, grass, strawberry	Old	2	Grassy road thru lpp forest
MP24	2	2023-06-17	377232	5900484	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, es, grass, equisetum, linnea	Old	1	Grassy road thru lpp forest
MP24	3	2023-06-17	377244	5900472	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, es, grass, equisetum, linnea	Old	2	Grassy road thru dense lpp forest
MP24	4	2023-06-17	377257	5900460	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, es, grass, equisetum, strawberry	Old	1	Grassy road thru dense lpp forest
MP24	5	2023-06-17	377271	5900447	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, es, grass, equisetum, strawberry	Old	2	Grassy road thru dense lpp forest

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Eastings	Northing															
MP24	6	2023-06-17	377283	5900436	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, strawberry, linnea	Old	1	Grassy road thru dense lpp forest
MP24	7	2023-06-17	377296	5900425	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, es, salix, strawberry, linnea	Old	2	Grassy road thru dense lpp forest
MP24	9	2023-06-17	377324	5900404	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, strawberry, kinnikinnick, salix	Old	1	Grassy road thru dense lpp forest
MP24	8	2023-06-17	377311	5900414	NB, DH	5	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, es, salix, strawberry, equisetum	Old	1	Grassy road thru dense lpp forest
MP24	10	2023-06-17	377339	5900394	NB, DH	4	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, salix, strawberry, fabacace	Old	1	Grassy road thru dense lpp forest
MP25	1	2023-06-17	376519	5891490	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, rushes	Old	5	Decommissioned road thru dense spruce and fir forest
MP25	2	2023-06-17	376531	5891473	NB, DH	-	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, rushes, whiteflower rhodo	Old	2	Decommissioned road thru dense spruce and fir forest
MP25	5	2023-06-17	376567	5891436	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, vaccinium, moss	Old	2	Decommissioned road thru dense spruce and fir forest
MP25	3	2023-06-17	376541	5891462	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, rushes, valerian	Old	5	Decommissioned road thru dense spruce and fir forest
MP25	4	2023-06-17	376553	5891449	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, valerian, 5 leaved bramble, vaccinium	Old	5	Decommissioned road thru dense spruce and fir forest
MP25	6	2023-06-17	376580	5891424	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, vaccinium	Old	1	Decommissioned road thru dense spruce and fir forest
MP25	7	2023-06-17	376592	5891414	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, lupin, crowberry, vaccinium	Old	2	Decommissioned road thru dense spruce and fir forest
MP25	8	2023-06-17	376608	5891403	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, lonicera, rushes, vaccinium, crowberry	Old	10	Decommissioned road thru dense spruce and fir forest
MP25	9	2023-06-17	376623	5891390	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, crowberry, whiteflower rhodo	Old	3	Decommissioned road thru dense spruce and fir forest
MP25	10	2023-06-17	376635	5891385	NB, DH	8	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, fireweed, lupin, vaccinium, fireweed, 5 leaved bramble, white flower rhodo	Old	3	Decommissioned road thru dense spruce and fir forest
MP07	1	2023-06-18	379170	5887923	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Lpp, fireweed, arnica, vaccinium, crowberry	Young	0	Lpp saplings in clearcut
MP07	2	2023-06-18	379187	5887922	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce, fireweed, crowberry	Young	0	Lpp and spruce saplings in clearcut
MP07	3	2023-06-18	379197	5887918	NB, DH	4	95	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce, fir, crowberry, fireweed	Young	0	Conifer saplings in clearcut
MP07	4	2023-06-18	379206	5887913	NB, DH	5	95	0	0	0	0	0	100	0	ESSFmv1	Spruce, white flower rhodo, lpp, fireweed, vaccinium, crowberry	Old	5	Mature spruce forest and partial clearcut
MP07	5	2023-06-18	379222	5887908	NB, DH	6	100	0	0	0	0	0	100	0	ESSFmv1	Fir, spruce, lpp, crowberry, linneae	Old	5	Mature spruce and fir forest, clearcut with saplings
MP07	6	2023-06-18	379235	5887901	NB, DH	6	95	0	0	0	0	0	100	0	ESSFmv1	Lpp, fir, spruce, vaccinium, bunchberry	Young	0	Clearcut with conifer saplings
MP07	7	2023-06-18	379241	5887898	NB, DH	6	75	0	0	0	0	0	100	0	ESSFmv1	Spruce, lpp, fir, bunchflower, fireweed, whiteflower rhodo, sheperdia	Young	0	Clearcut with saplings
MP07	8	2023-06-18	379250	5887893	NB, DH	6	70	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce, fir, crowberry	Young	0	Clearcut with saplings
MP07	9	2023-06-18	379256	5887889	NB, DH	6	80	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce, fir, fireweed, whiteflower rhodo, crowberry	Young	0	Clearcut with lpp, spruce, fir saplings
MP07	10	2023-06-18	379268	5887893	NB, DH	-	90	0	0	0	0	0	100	0	ESSFmv1	Spruce, fir, lpp, labrador tea, crowberry	Old	3	Half clearcut, half mature forest
MP14	8	2023-06-18	380383	5890163	NB, DH	10	100	0	0	0	0	0	100	0	ESSFmv1	Lpp, es, sf, crowberry, fireweed, vaccinium	Old	0	Deadfall blowdown area
MP14	1	2023-06-18	380291	5890091	NB, DH	9	90	0	0	0	0	0	100	0	ESSFmv1	Salix, lpp, es, sf, grass, fireweed, equisetum, vaccinium	Old	2	Grassy area in denser forest
MP14	2	2023-06-18	380302	5890105	NB, DH	9	90	0	0	0	0	0	100	0	ESSFmv1	Salix, lpp, es, sf, grass, fireweed, vaccinium, betula, hellabore	Old	4	Semi open forest w
MP14	3	2023-06-18	380314	5890119	NB, DH	10	85	0	0	0	0	0	100	0	ESSFmv1	Salix, lpp, es, sf, grass, fireweed, vaccinium, betula, hellabore	Old	3	Semi open forest
MP14	4	2023-06-18	380323	5890128	NB, DH	10	75	0	0	0	0	0	100	0	ESSFmv1	Salix, lpp, es, sf, grass, fireweed, vaccinium, betula, hellabore, lupin	Old	15	Semi open forest
MP14	5	2023-06-18	380334	5890137	NB, DH	9	100	0	0	0	0	0	100	0	ESSFmv1	lpp, es, sf, grass, fireweed, vaccinium, betula, hellabore, rosa,	Old	20	Semi open forest, lots of deadfall
MP14	7	2023-06-18	380369	5890159	NB, DH	9	95	0	0	0	0	0	100	0	ESSFmv1	lpp, es, sf, vaccinium, fireweed	Old	25	Deadfall/blowdown area w lots of pleurozium and fireweed
MP14	6	2023-06-18	380352	5890144	NB, DH	9	95	0	0	0	0	0	100	0	ESSFmv1	lpp, es, sf, grass, fireweed, vaccinium, hellabore, rubus	Medium	25	Mixed age forest w very few shrubs
MP14	9	2023-06-18	380400	5890163	NB, DH	10	100	0	0	0	0	0	100	0	ESSFmv1	lpp, es, sf, fireweed, vaccinium, clubmoss	Old	5	Mossy area in blowdown forest
MP14	10	2023-06-18	380419	5890164	NB, DH	9	100	0	0	0	0	0	100	0	ESSFmv1	lpp, es, sf, grass, fireweed, vaccinium, lupin	Medium	0	Grassy mossy area in blowdown forest
MP15	1	2023-06-18	378965	5891528	NB, DH	6	100	0	0	0	0	0	100	0	ESSFmv1	Birch, lpp, spruce	Old	5	Shrubby birch clearing through spruce forest
MP15	2	2023-06-18	378978	5891543	NB, DH	5	100	0	0	0	0	0	100	0	ESSFmv1	Birch, salix, moss, spruce	Old	5	Birch opening in spruce forest

Appendix M: Ungulate Pellet Count Site Data, 2023

Transect ID	Site ID	Date	Zone 10U		Observers	Temp (°C)	% Cloud Cover	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer	% Deciduous	BEC Subzone	Dominant Plants	Stand Age Class	% Crown Closure	Habitat Description
			Easting	Northing															
MP15	3	2023-06-18	378990	5891562	NB, DH	5	100	0	0	0	0	0	100	0	ESSFmv1	Birch, lpp, spruce, linneae	Old	8	Birch opening in spruce forest
MP15	5	2023-06-18	379005	5891571	NB, DH	5	100	0	0	0	0	0	100	0	ESSFmv1	Birch, spruce, false hellebore	Old	8	Birch opening in spruce forest
MP15	5	2023-06-18	379006	5891589	NB, DH	6	400	0	0	0	0	0	0	0	ESSFmv1	Birch, spruce, salix, paintbrush	Old	2	Birch opening in spruce forest
MP15	6	2023-06-18	379023	5891602	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Birch, spruce, salix, hellebore	Old	3	Birch opening in spruce forest
MP15	7	2023-06-18	375033	5891615	NB, DH	5	100	0	0	0	0	0	100	0	ESSFmv1	Spruce, birch, salix, false hellebore,	Old	5	Birch and salix opening in spruce forest
MP15	8	2023-06-18	379054	5891619	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Salix, Ionicera, spruce, false hellebore, grass	Old	5	Willow opening in spruce forest
MP15	9	2023-06-18	375070	5891623	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce thalictrum, fireweed, arnica, sheperdia	Old	50	Pine and spruce forest with shrubs and forbs underneath
MP15	9	2023-06-18	375070	5891623	NB, DH	4	100	0	0	0	0	0	100	0	ESSFmv1	Lpp, spruce thalictrum, fireweed, arnica, sheperdia	Old	50	Pine and spruce forest with shrubs and forbs underneath
MP15	10	2023-06-18	379092	5891626	NB, DH	6	100	0	0	0	0	0	100	0	ESSFmv1	Spruce, lpp, false hellebore, moss	Young	3	willow opening in spruce forest
MP26	1	2023-06-19	379860	5898829	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, fireweed, arnica, vaccinium	Medium	1	grassy decommissioned road thru lpp plantation
MP26	2	2023-06-19	379870	5898814	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, vaccinium, arnica, strawberry	Medium	1	grassy decommissioned road thru lpp plantation
MP26	3	2023-06-19	379876	5898799	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, fireweed, strawberry	Medium	1	grassy decommissioned road thru lpp plantation
MP26	4	2023-06-19	379882	5898782	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, salix, arnica, grass, hawkweed, fireweed	Medium	0	grassy decommissioned road thru lpp plantation
MP26	5	2023-06-19	379888	5898765	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, salix, arnica, grass, hawkweed, fireweed, strawberry	Medium	0	grassy decommissioned road thru lpp plantation
MP26	6	2023-06-19	379890	5898746	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, hawkweed, strawberry, fireweed	Medium	0	grassy decommissioned road thru lpp plantation
MP26	7	2023-06-19	379891	5898729	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp,, salux, grass, strawberry, hawkweed, fireweed	Medium	1	grassy decommissioned road thru lpp plantation
MP26	8	2023-06-19	379893	5898712	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, strawberry, linnea, vaccinium	Medium	0	grassy decommissioned road thru lpp plantation
MP26	9	2023-06-19	379897	5898695	NB, DH	6	100	0	0	0	0	0	100	0	SBSmc3	Lpp, salix, grass, hawkweeds, vaccinium, strawberry	Medium	0	grassy decommissioned road thru lpp plantation
MP26	10	2023-06-19	379897	5898676	NB, DH	7	100	0	0	0	0	0	100	0	SBSmc3	Lpp, grass, hawkweed, pussytoes, linnea, vaccinium, strawberry, alder	Medium	2	grassy decommissioned road thru lpp plantation

APPENDIX N UNGULATE PELLET COUNT DATA, 2023



Appendix N: Ungulate Pellet Count Data, 2023

Transect ID	Site ID	Pellets Observed	Pellet Group	Species	Approximate Pellet Age (Years)	Pellet Season	# Pellets	Distance (m)	Comments
MP01	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP02	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	Yes	1	Moose	1	Summer	105	9.8	-
	4	Yes	1	Moose	0	Winter	64	1.3	-
	4	Yes	2	Moose	0	Spring	110	4.3	-
	5	Yes	1	Unknown Deer	0	Winter	105	5.4	-
	6	Yes	1	Unknown Deer	0	Fall	91	2.1	-
	7	Yes	1	Moose	0	Winter	126	1.9	-
	7	Yes	2	Moose	0	Winter	194	1.9	-
	7	Yes	3	Moose	0	Winter	147	3.6	-
	8	Yes	1	Moose	0	Winter	109	4.9	-
	9	Yes	1	Moose	0	Winter	109	6.4	-
	9	Yes	2	Moose	0	Winter	179	3.7	-
10	Yes	1	Moose	1	Summer	120	5	-	
MP03	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	Yes	1	Unknown Deer	1	Winter	50	4.4	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	Yes	1	Unknown Deer	1	Fall	107	9.5	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP04	1	No	-	-	-	-	-	-	-
	2	Yes	2	Moose	0	Winter	62	4.7	-
	2	Yes	3	Moose	1	Summer	150	2	-
	2	Yes	1	Moose	1	Summer	56	2.1	-
	3	Yes	1	Moose	0	Winter	191	4.2	-
	4	Yes	1	Moose	0	Summer	200	7.3	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	Yes	1	Moose	0	Winter	77	1	-
	8	Yes	1	Moose	0	Winter	145	8.4	-
9	Yes	1	Moose	0	Winter	114	9	-	
10	No	-	-	-	-	-	-	-	
MP05	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	Spring deer pellets just outside
	8	No	-	-	-	-	-	-	Spring deer pellets just outside
	9	Yes	1	Unknown Deer	0	Spring	317	9.8	-
	10	Yes	1	Unknown Deer	0	Spring	73	5.3	-
10	Yes	2	Unknown Deer	0	Spring	301	0.3	-	
10	Yes	3	Unknown Deer	0	Spring	136	0.3	-	
MP06	1	No	-	-	-	-	-	-	-
	2	Yes	1	Moose	2	Winter	144	5.6	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-

Appendix N: Ungulate Pellet Count Data, 2023

Transect ID	Site ID	Pellets Observed	Pellet Group	Species	Approximate Pellet Age (Years)	Pellet Season	# Pellets	Distance (m)	Comments
MP07	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP08	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	Yes	1	Moose	0	Spring	53	9.5	-
	10	No	-	-	-	-	-	-	-
MP09	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP10	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	Yes	1	Moose	2	Winter	110	8.7	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
MP11	1	No	-	-	-	-	-	-	-
	2	Yes	1	Unknown Deer	0	Winter	112	6.5	-
	3	No	-	-	-	-	-	-	Moose pellets found 3 m outside of plot
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	Yes	1	Moose	0	Winter	190	5.4	-
	6	Yes	2	Moose	1	Winter	119	3	-
	6	Yes	3	Moose	2	Summer	42	2.4	-
	7	Yes	1	Moose	1	Spring	73	7	Another group just outside of 10 m
	8	No	-	-	-	-	-	-	-
9	Yes	1	Moose	1	Winter	63	9.8	-	
10	Yes	1	Moose	1	Winter	66	5.5	-	
MP12	1	No	-	-	-	-	-	-	-
	2	Yes	1	Moose	1	Winter	37	6.4	-
	3	Yes	1	Moose	0	Winter	54	7.4	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	5 winter moose pellets
MP13	1	Yes	1	Moose	1	Winter	171	3.3	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	Yes	1	Unknown Deer	0	Spring	231	1.2	-
	5	No	-	-	-	-	-	-	-
	6	Yes	1	Unknown Deer	0	Spring	164	9.7	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	Moose pellets just outside

Appendix N: Ungulate Pellet Count Data, 2023

Transect ID	Site ID	Pellets Observed	Pellet Group	Species	Approximate Pellet Age (Years)	Pellet Season	# Pellets	Distance (m)	Comments
MP14	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP15	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	Yes	1	Moose	0	Winter	58	5.1	-
	3	Yes	2	Moose	0	Winter	185	0.9	-
	5	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	Yes	1	Moose	1	Winter	176	1	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
9	No	-	-	-	-	-	-	-	
10	No	-	-	-	-	-	-	-	
MP16	1	No	-	-	-	-	-	-	-
	2	Yes	1	Unknown Deer	1	Winter	185	7	-
	3	Yes	1	Unknown Deer	1	Winter	174	6.2	-
	4	Yes	1	Unknown Deer	1	Winter	133	1.2	-
	4	Yes	2	Unknown Deer	1	Winter	250	5	-
	5	No	-	-	-	-	-	-	-
	6	Yes	1	Unknown Deer	1	Winter	168	6.2	-
	7	Yes	1	Unknown Deer	1	Spring	191	6.4	-
	8	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
10	Yes	1	Unknown Deer	1	Spring	85	8.4	-	
MP17	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP18	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	Yes	1	Moose	0	Winter	135	4.6	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP19	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	Yes	94	Unknown Deer	1	Summer	94	6.5	Midsized dark, summer,
	10	No	-	-	-	-	-	-	-
MP20	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-

Appendix N: Ungulate Pellet Count Data, 2023

Transect ID	Site ID	Pellets Observed	Pellet Group	Species	Approximate Pellet Age (Years)	Pellet Season	# Pellets	Distance (m)	Comments
MP21	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP22	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	Moose tracks
	3	Yes	1	Moose	0	Winter	204	8.2	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	Moose poop just outside of survey plot
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP23	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	Yes	1	Unknown Deer	2	Fall	163	0.7	-
	4	Yes	1	Moose	2	Winter	80	9.2	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	Yes	1	Moose	3	Winter	74	8	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-
MP24	1	Yes	1	Moose	2	Winter	47	5.4	-
	2	No	-	-	-	-	-	-	-
	3	Yes	1	Moose	2	Winter	127	1.5	-
	3	Yes	2	Moose	2	Winter	80	4.6	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
10	No	-	-	-	-	-	-	-	
MP25	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	deer pellets just outside 10 m
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	-
	6	No	-	-	-	-	-	-	deer pellets 12.8 m away
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	Yes	1	Moose	2	Winter	98	0.8	-
	10	No	-	-	-	-	-	-	-
MP26	1	No	-	-	-	-	-	-	-
	2	No	-	-	-	-	-	-	-
	3	No	-	-	-	-	-	-	-
	4	No	-	-	-	-	-	-	-
	5	No	-	-	-	-	-	-	Winter 1 y.o. moose pellets
	6	No	-	-	-	-	-	-	-
	7	No	-	-	-	-	-	-	-
	8	No	-	-	-	-	-	-	-
	9	No	-	-	-	-	-	-	-
	10	No	-	-	-	-	-	-	-

APPENDIX O UNGULATE GROUND SNOW TRACK SURVEY TRANSECT DATA, 2023

Appendix O: Ungulate Ground Winter Track Survey Transect Data, 2023

Transect ID	Date	Start Time	End Time	Observers	Temp (°C)	% Cloud Cover	Wind Speed (km/h)	Wind Direction	Lighting	Comment
1	2023-03-03	8:39	9:45	DR, MS, O	0	50	1	W	Bright	Some clear cut blocks and some mature conf forest. Snow generally good. Some scattered snowfall during the survey.
2	2023-03-03	10:17	11:15	DR, MS, O	0	75	1	W	Flat	Between wpt 5 and 8 heavy moose use and many tracks and divergent. # of individuals not for sure, at least 2-6. Snow generally good, some area of deep powder that was hard to traverse, there areas generally had limited to no larger mammal track.
3	2023-03-03	12:44	14:12	DR, MS, O	-4	100	2	W	Flat	Lots of old tracks that were just shadows of moose trails. Continued on to the 8 km boundary. Snow generally good, some med deep powder, generally fresh. Pockets of heavy moose use. Weather good, no snow.
4	2023-03-03	15:25	15:34	DR, MS, O	-4	100	1	W	Flat	Snowing. Mature conf forest. Deep powder.
4	2023-03-03	15:42	16:08	DR, MS, O	-5	100	1	W	Flat	Snowing. Deep powder. Had to stop short as it was too deep for us to continue.
5	2023-03-04	8:26	9:07	DR, MS, O	-10	0	0	N	Bright	Sunny and cold but great conditions. Some older track signs but also some very fresh signs. Lots of open areas and cut block. 3 wolfs walked along the transect, our wpts are where they veered off into a cut block, they followed the whole trail otherwise.
6	2023-03-04	9:45	10:11	DR, MS, O	-5	0	0	N	Bright	Good conditions and snow. Mostly cut blocks.
7	2023-03-04	10:26	11:05	DR, MS, O	-5	10	0	N	Bright	Along cut block with patches of mature. Good snow and weather. Older signs of tracks present. Patches with heavy moose use and browsing along transect.
8	2023-03-04	11:08	11:52	DR, MS, O	-5	10	0	N	Bright	Good weather and snow. Generally cut block with patches of mature.
9	2023-03-04	13:18	13:46	DR, MS, O	-1	50	0	N	Variable	Truck transect along access road. Good weather. Mix of cut block, open, and mature.

APPENDIX P UNGULATE GROUND SNOW TRACK SURVEY OBSERVATIONS, 2023



Appendix P: Ungulate Ground Winter Track Survey Observations, 2023

Transect ID	Date	Waypoint	Zone 10U		Species	Primary Sign	Secondary Sign	Direction of Tracks	% Veg Cover	Comments
			Eastings	Northing						
1	2023-03-03	2	374338	15888550	Moose	Tracks	-	NE	75	Very old and windblown. conf
2	2023-03-03	5	382134	15888388	Moose	Tracks	Scat	SW	85	Great brow, heavy cover. Edge of regen and mature. Fresh. 2 individuals: cow and calf. Cross and parallels track for over 1 km. There are many divergent and joins. At least 2 individuals possibly more. Very heavy and resent signs on deciduous on road edge.
	2023-03-03	6	382567	15888274	Moose	Tracks	-	E	60	Same area as wpt 5. Comes out of regen and joins tracks of initial. Older tracks some snow in. At least 1 individual. Fresh.
	2023-03-03	7	382672	15888254	Moose	Tracks	-	-	-	At edge of cut block a bit more mature. Good thermal. Bit older tracks. Tracks from wpt 5 go into trees. Older tracks parallel trail.
3	2023-03-03	9	379173	15897537	Moose	Tracks	-	-	90	Older track crossing trail. Windblown and snowed in. Signs of brows. Not much to eat though. Cut block.
	2023-03-03	10	378869	15898116	Moose	Tracks	-	-	90	Old windblown and snowed. Signs of brows. Cut block not much deciduous.
	2023-03-03	12	378883	15898511	Moose	Tracks	-	-	80	Old windblown and snowed. More mature in between cut blocks.
	2023-03-03	13	380528	15900801	Moose	Tracks	-	-	75	Old windblown and snowed in. Cut block
	2023-03-03	15	382905	15902760	Moose	Tracks	-	-	50	Old with snow and wind. Moose browse. Mature stand. Paralleled road for a bit.
	2023-03-03	16	383157	15902629	Moose	Tracks	-	N	75	Fresh tracks. Cut block. Lots of old signs too.
	2023-03-03	17	384385	15903150	Unspecified Deer	Tracks	-	-	-	Old sign, low snow pack, cut block.
2023-03-03	18	385702	15903048	Moose	Tracks	-	W	60	Some snow in so a bit older but pretty new. Near cut block and burn.	
5	2023-03-04	22	371115	15908806	Moose	Tracks	-	-	-	Old and wind/snow. Wolves checked about. Cut block. 2 moose.
7	2023-03-04	23	380615	15905510	Moose	Tracks	-	S	85	Cut block. Fresh. 1 individual. Crosses trail.
	2023-03-04	25	381169	15905259	Moose	Tracks	-	-	85	Old, windblown and snowed. Cut block.
	2023-03-04	27	382015	15904390	Moose	Tracks	-	S	-	Old, windblown and snowed. 1 individual. Mature forest.
	2023-03-04	28	381883	15904041	Moose	Tracks	-	S	-	Fresh. Mature and cut block.
	2023-03-04	29	381894	15903896	Moose	Tracks	-	NW	-	Fresh, follows trail. Cut block. 2 individual at least.
2023-03-04	30	382114	15903783	Moose	Tracks	-	-	80	At least 2 or more individual. Very active area. Cut block. 1-2 just following trail and the 1-2 zig zagging to tree line to browse. Mature on one side.	
8	2023-03-04	31	386366	15898479	Moose	Tracks	-	-	85	Old, windblown and snowed. Cut block.
	2023-03-04	35	382072	15895217	Moose	Tracks	-	N	80	Cut block and mature mix. One follows trail a bit. 2 moose, one just crosses trail. Fresh.
	2023-03-04	36	381911	15894945	Moose	Tracks	-	-	80	Moose from wpt35 still going along trail. At least 1-2 others crossing across many times to browse.

APPENDIX Q UNGULATE AERIAL SNOW TRACK SURVEY TRANSECT DATA, 2023



Appendix Q: Ungulate Aerial Winter Track Survey Transect Data, 2023

Transect ID	Date	Transect Start (Zone 10U)		Transect End (Zone 10U)		Observers	% Cloud Cover	Lighting	Wind Speed (km/h)
		Easting	Northing	Easting	Northing				
1	2023-03-05	375557	15913557	381616	15913691	DR, MS	0	Bright	0
2	2023-03-05	383314	15912622	373517	15912473	DR, MS	0	Bright	0
3	2023-03-05	371947	15911711	384568	15911560	DR, MS	0	Bright	0
4	2023-03-05	385441	15910602	370054	15910711	DR, MS	0	Bright	0
5	2023-03-05	368478	15909643	386283	15909301	DR, MS	0	Bright	0
6	2023-03-05	386303	15908553	369086	15908783	DR, MS	0	Bright	0
7	2023-03-05	367241	15907726	386652	15907606	DR, MS	0	Bright	0
8	2023-03-05	386553	15906291	366902	15906540	DR, MS	0	Bright	0
9	2023-03-05	366717	15905725	386813	15905157	DR, MS	0	Bright	0
10	2023-03-05	366467	15904497	387447	15904476	DR, MS	0	Bright	0
11	2023-03-05	387526	15903742	369471	15903664	DR, MS	0	Bright	0
12	2023-03-05	365989	15902129	387142	15902428	DR, MS	0	Bright	0
13	2023-03-05	387412	15901797	365932	15901324	DR, MS	0	Bright	0
14	2023-03-05	365737	15900724	387096	15900579	DR, MS	0	Bright	0
15	2023-03-05	387301	15899654	365247	15899484	DR, MS	0	Bright	0
16	2023-03-05	364889	15898774	386735	15898845	DR, MS	0	Bright	0
17	2023-03-05	386941	15897670	364378	15897563	DR, MS	0	Bright	0
18	2023-03-05	364121	15896580	386775	15896728	DR, MS	0	Bright	0
19	2023-03-05	386961	15895668	363778	15895464	DR, MS	0	Bright	0
20	2023-03-05	363607	15894610	386560	15894724	DR, MS	0	Bright	0
21	2023-03-05	386956	15893634	364470	15893263	DR, MS	0	Bright	0
22	2023-03-05	364576	15892509	386039	15892606	DR, MS	0	Bright	0
23	2023-03-05	385938	15891614	364570	15891576	DR, MS	0	Bright	0
24	2023-03-05	364734	15890579	385282	15890485	DR, MS	0	Bright	0
25	2023-03-05	385017	15889599	365696	15889753	DR, MS	0	Bright	0
26	2023-03-05	383428	15888544	367001	15888613	DR, MS	10	Bright	0
27	2023-03-05	366941	15887594	383010	15887556	DR, MS	10	Bright	0
28	2023-03-05	382324	15886624	369004	15886626	DR, MS	10	Bright	0
29	2023-03-05	369048	15885740	381084	15885214	DR, MS	10	Bright	0
30	2023-03-05	378835	15884522	372079	15884885	DR, MS	10	Bright	0

APPENDIX R UNGULATE AERIAL SNOW TRACK SURVEY OBSERVATIONS, 2023



Appendix R: Ungulate Aerial Winter Track Survey Observations, 2023

Transect ID	Waypoint	Zone 10U		Species	Observation or Sign	Sign Type	Total	Sign Age	Comments
		Easting	Northing						
2	44	382487	5912618	Moose	Sign	Tracks	6	New	zig zagging
	45	379651	5912616	Moose	Sign	Tracks	1	New	-
	45	379651	5912616	Moose	Sign	Tracks	1	Old	-
	46	375824	5912613	Moose	Sign	Tracks	3	Old	-
	47	374571	5912656	Moose	Sign	Tracks	1	Old	-
3	51	372485	5911726	Moose	Sign	Tracks	1	Old	-
	52	373715	5911677	Moose	Sign	Tracks	1	New	-
	53	377953	5911646	Moose	Sign	Tracks	6	mix of new and old	a bunch of tracks in this area
	53	377953	5911646	Moose	Observation	-	2	-	adults unknown sex
	55	380413	5911489	Moose	Sign	Tracks	2	Old	-
	56	383226	5911513	Moose	Observation	-	1	-	Cow
	57	384381	5911550	Moose	Sign	Tracks	1	Old	-
4	59	385441	5910602	Moose	Sign	Tracks	1	New	-
	60	385188	5910607	Moose	Sign	Tracks	1	Old	-
	61	384597	5910604	Moose	Sign	Tracks	4	Old	-
	62	384119	5910604	Moose	Sign	Tracks	1	Old	-
	63	383791	5910611	Moose	Sign	Tracks	4	mix of new and old	-
	64	383158	5910604	Moose	Sign	Tracks	2	New	-
	66	381544	5910687	Moose	Sign	Tracks	1	New	-
	69	380287	5910682	Moose	Sign	Tracks	4	New	-
	70	379667	5910688	Moose	Sign	Tracks	6	New	-
	78	375331	5910727	Moose	Sign	Tracks	2	Old	-
	73	378401	5910682	Moose	Sign	Tracks	3	Old	-
	75	377053	5910774	Moose	Sign	Tracks	2	Old	many old
	76	376258	5910771	Moose	Sign	Tracks	1	Old	-
	77	376086	5910777	Moose	Sign	Tracks	2	Old	-
	79	374316	5910747	Moose	Sign	Tracks	2	Old	-
	80	373781	5910768	Moose	Sign	Tracks	1	Old	-
	81	373521	5910794	Moose	Sign	Tracks	3	Old	-
	81	373521	5910794	Moose	Sign	Tracks	1	New	-
	82	372921	5910746	Moose	Sign	Tracks	1	New	-
	83	372571	5910739	Moose	Sign	Tracks	4	Old	-
85	371477	5910768	Moose	Sign	Tracks	4	mix of new and old	-	
86	370682	5910756	Moose	Sign	Tracks	3	Old	-	
5	88	368478	5909643	Moose	Sign	Tracks	1	Old	-
	89	369734	5909673	Moose	Sign	Tracks	1	Old	-
	92	372438	5909669	Moose	Sign	Tracks	2	Old	-
	93	372762	5909688	Moose	Sign	Tracks	1	Old	-
	95	374920	5909652	Moose	Sign	Tracks	5	Old	-
	96	375441	5909650	Moose	Sign	Tracks	6	Old	lots of old ones
	97	375911	5909665	Moose	Sign	Tracks	2	New	-
	97	375911	5909665	Moose	Sign	Tracks	1	Old	-
	98	376785	5909700	Moose	Sign	Tracks	2	New	-
	99	377329	5909688	Moose	Sign	Tracks	1	Old	-
	101	379359	5909537	Moose	Sign	Tracks	1	New	-
	102	379683	5909512	Moose	Sign	Tracks	1	New	-
	103	379985	5909507	Moose	Sign	Tracks	1	Old	-
	106	383313	5909499	Moose	Sign	Tracks	5	Old	-
107	383799	5909519	Moose	Sign	Tracks	1	New	along river	
108	384502	5909525	Moose	Sign	Tracks	1	Old	-	
6	114	381699	5908671	Moose	Sign	Tracks	3	Old	-
	117	377391	5908630	Moose	Sign	Tracks	2	Old	-
	118	376761	5908691	Moose	Sign	Tracks	1	Old	-
	119	376283	5908760	Moose	Sign	Tracks	2	New	-
	120	376050	5908759	Moose	Sign	Tracks	5	Old	-
	121	375064	5908808	Moose	Sign	Tracks	1	New	-
	122	374851	5908817	Moose	Sign	Tracks	1	Old	-
	123	374024	5908785	Moose	Sign	Tracks	2	Old	-
	124	373672	5908801	Moose	Sign	Tracks	1	Old	-
	126	372398	5908751	Moose	Sign	Tracks	1	Old	-
	127	371600	5908707	Moose	Sign	Tracks	3	Old	-
	127	371600	5908707	Moose	Sign	Tracks	1	New	-
	128	371013	5908711	Moose	Sign	Tracks	1	Old	-
	130	369086	5908783	Moose	Sign	Tracks	1	New	-
7	136	375289	5907505	Moose	Sign	Tracks	3	Old	-
	137	375991	5907456	Moose	Sign	Tracks	3	Old	-
	141	378254	5907422	Moose	Sign	Tracks	1	Old	-
	143	380372	5907412	Moose	Sign	Tracks	2	Old	-
	144	380801	5907436	Moose	Sign	Tracks	5	Old	-
	145	381291	5907469	Moose	Sign	Tracks	4	New	same clearing as the 2 moose seen
	145	381291	5907469	Moose	Observation	-	2	-	adults unknown sex
146	385135	5906717	Moose	Sign	Tracks	2	Old	-	

Appendix R: Ungulate Aerial Winter Track Survey Observations, 2023

Transect ID	Waypoint	Zone 10U		Species	Observation or Sign	Sign Type	Total	Sign Age	Comments
		Easting	Northing						
8	150	384694	5906459	Moose	Sign	Tracks	1	Old	-
	151	384074	5906494	Moose	Sign	Tracks	2	Old	-
	152	383080	5906504	Moose	Sign	Tracks	1	Old	-
	153	382759	5906513	Moose	Sign	Tracks	1	Old	-
	154	382294	5906509	Moose	Sign	Tracks	1	Old	-
	155	381352	5906569	Moose	Sign	Tracks	1	Old	-
	156	380848	5906631	Moose	Sign	Tracks	1	New	-
	158	379584	5906704	Moose	Sign	Tracks	3	New	-
	159	379071	5906728	Moose	Sign	Tracks	2	New	cross roads
	159	379071	5906728	Moose	Observation	-	2	-	bedding just past road and trails
	161	377520	5906821	Moose	Sign	Tracks	2	New	-
	162	376250	5906835	Moose	Sign	Tracks	3	Old	-
	163	375841	5906877	Moose	Sign	Tracks	1	New	tracks and bed together
	163	375841	5906877	Moose	Sign	Bed	1	New	tracks and bed together
	164	375725	5906908	Moose	Sign	Tracks	4	Old	-
	165	375379	5906932	Moose	Sign	Tracks	1	New	-
	166	375052	5906947	Moose	Sign	Tracks	1	Old	-
	167	374394	5906972	Moose	Sign	Tracks	1	Old	-
	168	373003	5906941	Moose	Sign	Tracks	1	New	-
169	372290	5906916	Moose	Sign	Tracks	7	Old	-	
9	175	375195	5905551	Moose	Sign	Tracks	3	Old	tracks and bed together
	175	375195	5905551	Moose	Sign	Bed	1	Old	tracks and bed together
	176	375491	5905535	Moose	Sign	Tracks	2	Old	-
	177	377046	5905513	Moose	Sign	Tracks	1	Old	-
	178	377953	5905522	Moose	Sign	Tracks	1	Old	-
	180	380573	5905433	Moose	Sign	Tracks	2	New	-
	180	380573	5905433	Moose	Sign	Tracks	1	Old	-
	181	381874	5905451	Moose	Sign	Tracks	1	Old	-
	182	382832	5905442	Moose	Sign	Tracks	1	Old	-
	183	383276	5905482	Moose	Sign	Tracks	1	Old	-
	184	384289	5905499	Moose	Sign	Tracks	4	Old	-
186	385689	5905576	Moose	Sign	Tracks	3	Old	-	
10	193	379474	5904409	Moose	Sign	Tracks	1	Old	-
	194	380646	5904381	Moose	Sign	Tracks	1	Old	-
	195	382128	5904407	Moose	Sign	Tracks	1	Old	-
	196	382503	5904430	Moose	Sign	Tracks	1	Old	-
	197	382785	5904444	Moose	Sign	Tracks	1	Old	-
	198	384244	5904439	Moose	Sign	Tracks	3	New	-
	199	384712	5904445	Moose	Sign	Tracks	3	New	-
	200	385478	5904441	Moose	Sign	Tracks	2	Old	-
	201	386223	5904431	Moose	Sign	Tracks	2	Old	-
	202	386637	5904436	Moose	Sign	Tracks	2	Old	-
11	205	386898	5903607	Moose	Sign	Tracks	1	Old	-
	206	386574	5903616	Moose	Sign	Tracks	2	Old	-
	207	386196	5903606	Moose	Sign	Tracks	3	Old	-
	208	385475	5903579	Moose	Sign	Tracks	1	New	-
	209	384493	5903564	Moose	Sign	Tracks	2	Old	-
	210	384084	5903577	Moose	Sign	Tracks	1	Old	-
	211	382896	5903577	Moose	Sign	Tracks	2	New	-
	212	382383	5903520	Moose	Sign	Tracks	2	New	-
	213	381614	5903543	Moose	Sign	Tracks	1	Old	-
	214	381309	5903557	Moose	Sign	Tracks	1	New	-
215	380106	5903626	Moose	Sign	Tracks	1	Old	-	
12	224	376142	5902626	Moose	Sign	Tracks	1	Old	-
	225	377141	5902716	Moose	Sign	Tracks	1	Old	-
	226	379398	5902676	Moose	Sign	Tracks	2	Old	-
	227	380147	5902700	Moose	Sign	Tracks	2	New	-
	228	381417	5902654	Moose	Sign	Tracks	1	New	-
	229	382925	5902540	Moose	Sign	Tracks	3	Old	-
	229	382925	5902540	Moose	Sign	Tracks	1	New	-
	230	383813	5902556	Moose	Sign	Tracks	3	Old	-
	231	384513	5902525	Moose	Sign	Tracks	2	Old	-
	232	384820	5902477	Moose	Sign	Tracks	2	Old	-
	232	384820	5902477	Moose	Sign	Tracks	2	New	-
	233	385429	5902362	Moose	Sign	Tracks	2	New	-
	234	385845	5902330	Moose	Sign	Tracks	4	New	-
235	386047	5902325	Moose	Sign	Tracks	4	New	-	
236	386184	5902320	Moose	Sign	Tracks	4	New	-	
236	386184	5902320	Moose	Sign	Bed	1	New	-	
13	239	387162	5901676	Moose	Sign	Tracks	3	Old	-
	240	386784	5901648	Moose	Sign	Tracks	4	New	-
	241	385810	5901663	Moose	Sign	Tracks	2	Old	-

Appendix R: Ungulate Aerial Winter Track Survey Observations, 2023

Transect ID	Waypoint	Zone 10U		Species	Observation or Sign	Sign Type	Total	Sign Age	Comments
		Easting	Northing						
13 (cont'd)	242	384912	5901724	Moose	Sign	Tracks	1	New	-
	243	383779	5901762	Moose	Sign	Tracks	1	New	-
	250	365932	5901323	Moose	Sign	Tracks	1	New	-
14	252	366139	5900674	Moose	Sign	Tracks	6	New	tracks and bed together
	252	366139	5900674	Moose	Sign	Bed	6	New	tracks and bed together
	255	377292	5900517	Moose	Sign	Tracks	1	New	-
	257	379196	5900554	Moose	Sign	Tracks	4	Old	-
	257	379196	5900554	Moose	Sign	Bed	1	Old	-
	258	379771	5900567	Moose	Sign	Tracks	2	Old	-
	259	380660	5900605	Moose	Sign	Tracks	1	Old	-
	261	386396	5900587	Moose	Sign	Tracks	2	Old	-
	15	264	387194	5899628	Moose	Observation	-	1	-
265		385999	5899619	Moose	Sign	Tracks	4	Old	-
266		385469	5899634	Moose	Sign	Tracks	1	Old	-
269		380444	5899633	Moose	Sign	Tracks	4	Old	-
270		379449	5899587	Moose	Sign	Tracks	1	New	-
271		377937	5899591	Moose	Sign	Tracks	1	Old	-
272		377303	5899642	Moose	Sign	Tracks	2	New	-
273		376744	5899715	Moose	Sign	Tracks	1	New	-
274		374892	5899851	Moose	Sign	Tracks	1	Old	-
275		373338	5899888	Moose	Sign	Tracks	1	Old	-
16	279	366286	5898614	Moose	Sign	Tracks	1	New	-
	282	377820	5898670	Moose	Sign	Tracks	2	New	-
	285	383258	5898761	Moose	Sign	Tracks	1	New	-
	286	384444	5898840	Moose	Sign	Tracks	2	New	-
	287	385819	5898794	Moose	Sign	Tracks	1	New	-
17	291	382052	5897628	Moose	Sign	Tracks	1	New	-
	296	364121	5896579	Moose	Sign	Tracks	2	Old	-
18	298	379162	5896774	Moose	Sign	Tracks	2	Old	-
	299	385248	5896829	Moose	Sign	Tracks	2	Old	-
	300	386261	5896741	Moose	Sign	Tracks	1	New	tracks and bed together
	300	386261	5896741	Moose	Sign	Bed	1	New	tracks and bed together
19	304	381819	5895599	Moose	Sign	Tracks	2	New	-
	305	380041	5895741	Moose	Sign	Tracks	2	Old	-
	306	377735	5895771	Moose	Sign	Tracks	2	Old	-
20	314	382021	5894712	Moose	Sign	Tracks	4	New	-
22	324	381101	5892552	Moose	Sign	Tracks	1	Old	-
	325	383763	5892668	Moose	Sign	Tracks	2	Old	-
23	328	382759	5891739	Moose	Sign	Tracks	3	New	-
26	245	382502	5901800	Moose	Sign	Tracks	4	New	-
	246	381743	5901766	Moose	Observation	-	1	-	-
27	351	367792	5887568	Moose	Sign	Tracks	1	Old	-
	352	371003	5887490	Moose	Sign	Tracks	2	Old	-
	353	379540	5887580	Moose	Sign	Tracks	1	Old	-
	354	381769	5887582	Moose	Sign	Tracks	2	New	-
	355	382562	5887573	Moose	Sign	Tracks	2	Old	-
	355	382562	5887573	Moose	Sign	Bed	2	Old	-
28	358	380599	5886613	Moose	Sign	Tracks	1	Old	-
	359	378773	5886711	Moose	Sign	Tracks	2	Old	-
29	361	369048	5885740	Moose	Sign	Tracks	3	New	some old potentially around
	363	372609	5885462	Moose	Sign	Tracks	1	Old	-
	364	379682	5885240	Moose	Sign	Tracks	1	New	-
	365	380345	5885173	Moose	Sign	Tracks	2	Old	-
30	368	378012	5884589	Moose	Sign	Tracks	2	Old	-
	369	376982	5884618	Moose	Sign	Tracks	1	Old	-
	369	376982	5884618	Moose	Sign	Tracks	1	New	-
	370	376143	5884713	Moose	Sign	Tracks	1	New	-

APPENDIX S BLACKWATER GOLD MINE 2023 CMMP EAC COMPLIANCE REPORT





Blackwater Mine

2023 CMMP EAC Compliance Report

PREPARED FOR



Blackwater
Mine

BW Gold LTD.

DATE

March 2024

REFERENCE

0722163-02



Blackwater Mine

2023 CMMP EAC Compliance Report

March 2024

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CLIENT: BW Gold LTD.

PROJECT NO: 0722163-02

DATE: March 2024

VERSION: B.1

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1. INTRODUCTION

The Blackwater Gold Mine (the Mine) is a proposed gold and silver open pit mine located in central British Columbia (BC), 160 kilometres (km) southwest of Prince George, BC. The Mine is located within the traditional territories of Lhoosk'uz Dené Nation (LDN), Ulkatcho First Nation (UFN), Skin Tye Nation (STN) and Tsilhqot'in Nation. The Kluskus and Kluskus-Ootsa Forest Service Roads and Mine transmission line cross the traditional territories of Nadleh Whut'en First Nation, Saik'uz First Nation, and Stelat'en First Nation (collectively, the Carrier Sekani First Nations; CSFNs) as well as the traditional territories of the Nazko First Nation (NFN), Nee-Tahi-Buhn Band (NTBIB), Cheslatta Carrier Nation (CCN), and Yekooche First Nation (YFN).

Mineral tenures, assets, and rights for the Mine were transferred from New Gold Inc. (New Gold) to Artemis Gold Inc. (Artemis) in August 2020. Artemis transferred the Mine certificate to their subsidiary BW Gold LTD. (BW Gold) who currently runs the Mine. Mine construction is estimated to last two years and includes the establishment of a tailings storage facility (TSF), ore processing facilities, waste rock, overburden and soil stockpiles, borrow areas and quarries, water management infrastructure, water treatment plants, accommodation camps, and ancillary facilities. A 135-km, 230 kilovolt overland transmission line will supply electrical power to the Mine from the Glenannan substation BC Hydro grid.

Early Works construction began in October 2022, and both early works and major works construction was undertaken throughout 2023. Construction works undertaken in 2023 included tree clearing and grubbing, as well as earthworks associated with the plant site, explosives magazine site, topsoil stockpiles, water management pond, TSF, borrow area and various mine site roads. Additionally, upgrades were completed on the existing camp area.

A Caribou Mitigation and Monitoring Plan (CMMP) was developed to manage potential Mine-related adverse effects on caribou and caribou habitat, and to specify offsetting measures for caribou habitat (ERM 2022a). The CMMP incorporates requirements from the Environmental Assessment Certificate #M19-01 (EAC) and the federal Decision Statement (DS).

Many of the reporting requirements for the CMMP are included in the annual Wildlife Mitigation and Monitoring Program (WMMP) compliance report (ERM 2024a). Therefore, the CMMP compliance report is submitted as an appendix to the WMMP compliance report and references applicable sections in the WMMP compliance report instead of duplicating reporting in this document. A concordance table tracking requirements from the DS and EAC is in Appendix A of the WMMP compliance report (ERM 2024a).

As defined by the CMMP and relevant Mine conditions, an annual report for the CMMP will be prepared and will:

1. Summarize the activities undertaken to comply with each of the conditions set out in the federal DS and provincial EAC conditions, including any changes to the Designated Mine and updates to the follow-up program for caribou;
2. Specify compliance with federal DS conditions 2.1 (General Conditions), 2.5 (Follow-up Programs and Adaptive Management), and 2.6 (Follow-up Programs and Adaptive Management);

3. Describe consideration and integration of any views and information received during or as a result of consultation;
4. Describe any modified or additional mitigation measures implemented or proposed, as determined under federal DS condition 2.9, with rationale pursuant to federal DS condition 2.5.4;
5. Be sent to the EAO and Aboriginal Groups by March 31 the year following the reporting year, from the start of Construction through the end of Closure, and at least 30 days prior to the start of Mine Construction, Operations, and Closure;
6. Subsequently, be sent to Environment and Climate Change Canada (ECCC) and Indigenous groups for review and comment by June 30 of the year following the reporting year (DS condition 2.12); and
7. Be delivered in its final version to the Canadian Environmental Assessment Agency by September 30 of the year following the reporting year (DS condition 2.13).

This is the second year the annual CMMP compliance report has been completed and as such, some of the monitoring activities have not yet been initiated.

1.1 STUDY AREA

The Blackwater Gold Mine is on the eastern edge of the Tweedsmuir Local Population Unit (LPU) of southern mountain caribou (*Rangifer tarandus caribou*).

Approximately half of the mine site occurs within the LPU. The entire mine site is within the historic range of the Tweedsmuir caribou, based on Traditional Knowledge from UFN and LDN and within areas mapped as winter caribou habitat (Figure 1.2-1). The mine site is outside of the annual range (1980-2020) used by collared female caribou, although the area is still used intermittently by caribou based on aerial surveys, snow track surveys, and incidental observation. The construction of the Mine will result in the removal and disturbance of three types of Type 1 Matrix habitat (high elevation, low elevation and general) and potential disturbance by noise of High Elevation Winter Range habitat (suitable habitat, but outside of the multi-year range of the herd).

1.2 MONITORING REQUIREMENTS AND OBJECTIVES

This report includes a summary of the CMMP annual monitoring activities as well as a summary of compliance with the offsetting requirements for caribou.

The objectives of the CMMP monitoring programs are to:

- Verify the accuracy of the effects assessment;
- Evaluate the effectiveness in the mitigation measures;
- Monitor the effectiveness of the offsetting program; and
- Determine if adaptive management is required.

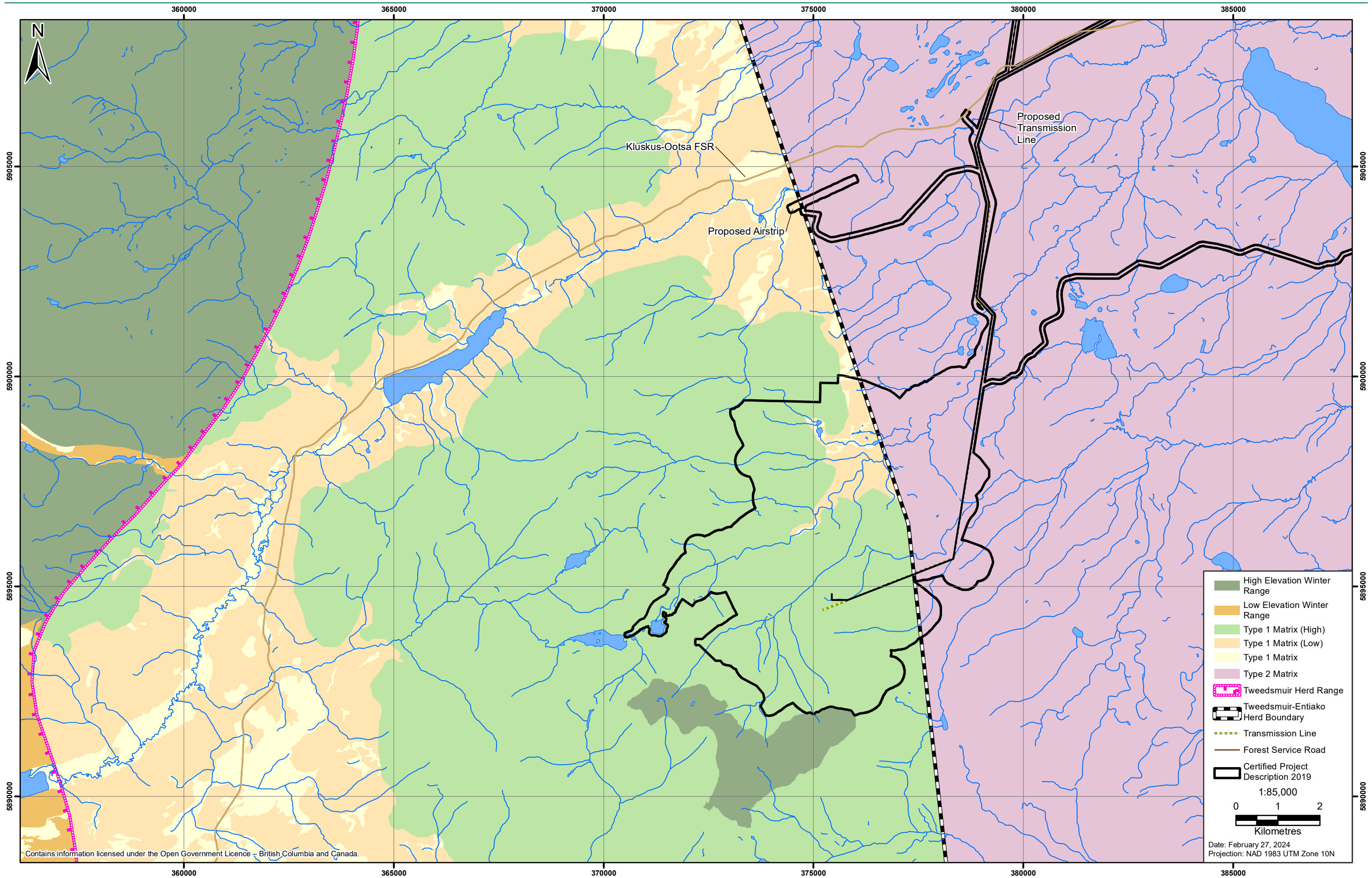


Figure 1: Tweedsmuir Caribou Range Habitat in Relation to the Blackwater Mine Certified Project Description

There are two primary monitoring programs, each with multiple monitoring methods, designed to accomplish these objectives. Adaptive management measures are addressed throughout each section where applicable and summarized in Section 1.4. The majority of the monitoring program results are provided in the WMMP compliance report (ERM 2024a) but are referenced in this document for completeness. The CMMP monitoring programs and their applicable report sections are specified in Table 1.2-1.

TABLE 1.2-1 CMMP MONITORING PROGRAMS

Program	Monitoring Component	Report Section¹
Verifying the Accuracy of the Effects Assessment and Monitoring Effectiveness of Mitigation Measures	Direct Habitat Loss	WMMP 2.2
	Indirect Habitat Loss	CMMP 2 and WMMP 3.1.2 and 3.1.3
	Ungulate Pellet Counts	WMMP 3.1.2.1 and 3.1.3.1
	Snow Track Surveys	WMMP 3.1.2.2 and 3.1.3.2
	Changes in Caribou Population Dynamics	Country Foods Monitoring Program (ERM 2024a)
	Mortality Risk	CMMP 2.2
	Changes in Caribou Health	CMMP 2.3
Caribou Offset Monitoring Program	Road Restoration Monitoring	CMMP 2.4
	Access Monitoring	CMMP 2.5
	Sight Lines Monitoring	WMMP 2.2
	Wildlife Use Monitoring	CMMP 3.4 and WMMP 3.2.2.3 and 3.2.3.1

¹ The WMMP refers to the annual WMMP compliance report (ERM 2024a). The CMMP refers to this report.

1.3 CONSULTATION

BW Gold engages in regular consultation with Indigenous groups (as defined in the DS) and Aboriginal Groups (as defined in the EAC) as well as federal and provincial regulators regarding the CMMP design and progress. Reporting on consultation recommendations and how they were considered and/or incorporated into the CMMP is required by federal DS condition 2.11. In 2023, BW Gold did not receive any consultation recommendations or information on implementation of the CMMP, and as such no updates to the plan were made in 2023.

1.3.1 CARIBOU POPULATION DYNAMICS COORDINATION

The Environmental Impact Statement (EIS) predicted potential changes in caribou population dynamics and movement patterns due to the potential for the increased predator access along the transmission line, and due to increased traffic on Mine roads and the Kluskus Forest Service Road (FSR; ERM 2018). Monitoring the population dynamics and movement of Tweedsmuir caribou at the herd or LPU level is achieved through participation in:

- Environmental Monitoring Committee (established by EAC condition 19), now called the Environmental Life of Mine Committee (ELoMC); and

- Regional programs with FLNRORD, ECCC, and Indigenous groups to monitor caribou herds by sharing data collected as part of BW Gold's caribou monitoring programs and/or coordinating monitoring efforts.

To date, BW Gold has not been made aware of any active regional planning initiatives for the Tweedsmuir herd, based on input sought from LDN, WLRS (formerly FLNRORD), and the Ministry of Energy, Mines and Low Carbon Innovation (EMLI) in early 2024.

1.4 ADAPTIVE MANAGEMENT

An adaptive management framework has been incorporated into the CMMP to meet regulatory requirements and objectives of the CMMP (see the CMMP Section 6; ERM 2022a). The follow-up monitoring programs provide data to assess the effectiveness of the mitigations described in the CMMP Section 6 (ERM 2022a). If necessary, outcomes of the monitoring programs will also support recommendations for changes to the monitoring (objectives, frequency, methods, or timing). The CMMP defines qualitative and quantitative triggers to assess whether mitigation measures need to be altered or additional mitigation measures need to be implemented.

Any adaptive management actions or recommendations will be addressed within the relevant section for this report and are summarized here for compliance with the reporting requirements in federal DS condition 2.11.

To date, no adaptive management actions for the CMMP have been implemented. The second compliance monitoring year occurred in 2023, and program data are now considered to be part of the Construction phase. No adaptive management actions are currently recommended. In future years, a summary of annual and cumulative adaptive management actions will be included in this section.

2. VERIFYING THE ACCURACY OF THE EFFECTS ASSESSMENT AND MONITORING EFFECTIVENESS OF MITIGATION MEASURES

The predicted residual effects of the Project on caribou as identified in the EIS, Vol 4, Section 5.4.11.3 (ERM 2018) are:

- Habitat loss and alteration (not significant, moderate magnitude).
- Changes in caribou population dynamics (not significant, minor magnitude).
- Changes in caribou movement patterns (not significant, negligible magnitude).
- Mortality risk (not significant, negligible magnitude).

Mitigation measures for caribou have been implemented to address these potential effects, and monitoring methods will provide data to confirm the effectiveness of mitigation measures and verify the accuracy of the effects assessment (CMMP Section 6.2 and 6.6; ERM 2022a). The monitoring methods for this program are also carried out for other wildlife, and the results are therefore reported in the WMMP compliance report (ERM 2024a):

- Habitat loss monitoring (WMMP Section 2.2).
- Indirect habitat loss (ungulate distribution) monitoring via:
 - Pellet count surveys (WMMP Sections 3.1.2.1 and 3.1.3.1), and
 - Snow track surveys (WMMP Section 3.1.2.2).
- Caribou offsetting wildlife use monitoring (WMMP Section 3.2.2.3).
- Changes in caribou population dynamics monitored through regional cooperation (Section 1.3.1).
- Mortality risk monitored through wildlife interactions and incidents (WMMP Section 2.3).
- Changes in caribou health (no prediction in the EIS) monitored through the Country Foods Monitoring Program (CFMP):
 - Baseline CFMP report for 2021-2022 available in ERM (2024b).

3. CARIBOU OFFSET MONITORING PROGRAM

The caribou offset monitoring program was designed to evaluate the effectiveness of the caribou offset, as required by federal DS condition 8.18.5 and provincial EAC condition 22.p. This program consists of four separate monitoring methods:

1. Road restoration monitoring.
2. Access monitoring.
3. Sight lines monitoring.
4. Wildlife use monitoring.

The habitat restoration for the caribou offset was not initiated in 2023, and therefore these monitoring programs had not yet begun. However, the following sections outline each monitoring method for completeness of reporting requirements.

3.1 ROAD RESTORATION MONITORING

3.1.1 OBJECTIVES

The objective of road restoration monitoring is to determine success of revegetation along deactivated roads compared to natural restoration.

3.1.2 METHODS

The study area will include the areas where road restoration is planned.

The study will be established as a Before-After, Control-Impact (BACI) design. Before and after measurements will be taken at roads to be removed (impact) and roads that will be left to restore naturally (control). The control will be split into 2 types: 1) roads with evidence of vehicle access, and 2) roads without access where natural restoration is occurring.

Samples will be taken during the Construction period prior to restoration as a "before" sample, and after restoration at years 3, 5, 10, and every 5 years thereafter until the end of Closure pending review through adaptive management framework.

This monitoring program was not yet commenced in 2023.

3.2 ACCESS MONITORING

3.2.1 OBJECTIVES

The objectives of access monitoring are to determine:

- If the public is able to access restored roads; and
- The means and locations of access (if it exists) and prevent further access.

Vehicle and public access and use of restored roads can impede vegetation regrowth and thus discourage wildlife use.

3.2.2 METHODS

The study area will include areas where road restoration has occurred.

The study is designed as a Before-After-Impact study, with records of human access before and after road restoration. Sampling will be conducted in coordination with the monitoring of road restoration at years 3, 5, 10 and every 5 years thereafter until the end of closure or until analysis has shown that the road surface is on a trajectory to be fully restored and no further monitoring is warranted. Camera traps will be monitored on an annual basis, in concert with the wildlife use monitoring (Section 3.4).

This monitoring program was not yet commenced in 2023.

3.3 SIGHT LINES MONITORING

3.3.1 OBJECTIVES

The objective of sight lines monitoring is to determine if sight lines have been blocked for wolves. Sight lines will be blocked by creating visual barriers (mounded soil or piles of debris) and allowing increased vegetation regrowth. This monitoring will be conducted in coordination with access monitoring (Section 3.2).

3.3.2 METHODS

The study area will include all the areas of restored roads.

The study is designed as a Before-After, Control-Impact (BACI) study, with records of sight lines before and after road restoration and on restored roads and control roads that are not restored. Sampling will be conducted in coordination with the monitoring of road restoration at years 3, 5, 10, and every five years thereafter until the end of closure or until analysis has shown that the road surface is on a trajectory to be fully restored and no further monitoring is warranted.

This monitoring program was not yet commenced in 2023.

3.4 WILDLIFE USE MONITORING

3.4.1 OBJECTIVES

The objective of wildlife use monitoring is to track the relative use of common wildlife on restored and control roads, focusing on wildlife that can be detrimental to caribou such as moose and wolves.

3.4.2 METHODS

The study area will include the area where road restoration has occurred.

The study is designed as a Before-After study, with records of wildlife before and after road restoration. Sampling will be conducted in coordination with the monitoring of road restoration at 3, 5, 10, and every five years thereafter until the end of closure, or until analysis has shown that the road surface is on a trajectory to be fully restored and no further monitoring is warranted, or

based on the adaptive management approach should other forms of monitoring be available. Forty remote cameras will be monitored on an annual basis.

This monitoring program was not yet commenced in 2023.

3.5 BASELINE WILDLIFE USE MONITORING

Fifteen cameras were deployed in the caribou offset areas as part of ongoing baseline data collection in 2021 (reported in the Blackwater Pre-construction Baseline Report; ERM 2022b). Sites were chosen based on sign and habitat for focal mammals (caribou, moose, bear, and wolf) and do not align with the monitoring locations required for the wildlife use monitoring program. Data collected between October 2021 and September 2023 are reported in Section 3.2.3.1 of the WMMP Report (ERM 2024a). Baseline results will be used to guide initiation of the CMMP monitoring programs and reported in future CMMP annual compliance reports.

4. REFERENCES

- ERM. 2024a. *Blackwater Gold Project: 2023 Wildlife Mitigation and Monitoring Program Compliance Report*. Prepared for New Gold Inc. by ERM Consultants Canada Ltd.: Vancouver, BC.
- ERM.2024b. *Blackwater Gold Project 2021-2023 Country Foods Monitoring Plan: Environmental Assessment Certificate Condition 41 Annual Report*. Prepared by ERM for BW Gold Ltd. Vancouver, BC.
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- ERM. 2018. *Blackwater Gold Project: New Gold Response to Canadian Environmental Assessment Agency Information Request (IR130, IR132, and IR210) – Updated Assessment of Impacts to Southern Mountain Caribou and Proposed Caribou Offset*. Prepared for New Gold Inc. by ERM Consultants Canada Ltd.: Vancouver, BC.
- New Gold. 2015. *Blackwater Gold Project Application for and Environmental Assessment Certificate*. Prepared for New Gold Inc., Vancouver, BC.

APPENDIX T BASELINE CARIBOU OFFSETTING WILDLIFE CAMERA SITE DATA, 2023



Appendix T: Baseline Caribou Offsetting Wildlife Camera Site Data, 2023

Camera ID	Survey Area	Zone 10U		Deployment Date	Retrieval Date	Servicing Event 1	Servicing Event 2	Camera and Data Status	Habitat Description	Wildlife Feature
		Easting	Northing							
CM01	Johnny Lake	345512	5899706	2021-10-15	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Pine plantation around access trail (only easy movement area for wildlife)	Moose browse, droppings and trail; wolf scat and tracks
CM02	Johnny Lake	341000	5897964	2021-10-14	2023-05-20	2023-05-20	-	Fell 2022-05-27 at 13:44:30. Recovered 2023-05-20, not redeployed.	Burned forest next to wetland creek	Game trail
CM03	Capoose	361594	5906082	2021-10-14	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Wet meadow	Trail and rubbing
CM04	Capoose	360805	5908313	2021-10-14	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Subalpine bench	Trail and rut rubbing
CM05	Capoose	355064	5907440	2021-10-14	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Subalpine opening near trees and alpine parkland	Goat trails and droppings, moose tracks
CM06	Capoose	357794	5909891	2021-10-14	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Open meadow close to park boundary	Moose and possible caribou trails
CM07	Capoose	359048	5908550	2021-10-14	-	2023-05-20	2023-09-25	Still deployed as of 2023-09-25.	Wetland opening	Several trails
CM08	Capoose	357444	5908620	2021-10-14	-	2023-05-20	2023-09-24	Still deployed as of 2023-09-24.	Edge of wetland	Trail with moose rub and forage sign
CM09	Johnny Lake	342317	5900435	2021-10-14	-	2023-05-20	2023-09-24	Still deployed as of 2023-09-24.	Wetland trail	Abundant moose tracks and rut activity
CM10	Capoose	358886	5908588	2021-10-14	-	2023-05-20	2023-09-25	Camera died 2022-12-17 at 16:00:00, servicing 2023-05-20 replaced batteries. Still deployed as of 2023-09-25.	Wetland trail in opening	Moose trail
CM11	Capoose	357629	5908781	-	-	-	-	Could not locate. Data never retrieved.	Edge of opening toward creek	Caribou tracks and trail
CM12	Capoose	359032	5911056	-	-	-	-	Could not locate. Data never retrieved.	Wetland edge	Trail, forage sign, and recent grizzly tracks
CM16	Johnny Lake	339419	5893856	2021-10-15	-	2023-05-20	2023-09-24	Still deployed as of 2023-09-24.	Clear cut / burn with early seral cover	Moose and grizzly tracks and scat near trail
CM19	Johnny Lake	341983	5897811	2021-10-14	2023-05-20	2023-05-20	-	Fell 2021-11-30 at 14:30:06. Recovered 2023-5-20, not redeployed.	Meadow in burn	Moose trail and rut rubbing
CM20	Johnny Lake	341254	5898945	2021-10-14	-	2023-05-20	2023-09-24	Still deployed as of 2023-09-24.	Riparian edge of creek	Moose trail

Appendix T: Baseline Caribou Offsetting Wildlife Camera Site Data, 2023

Camera ID	Survey Area	Zone 10U		Camera Location Description	2021 Camera Deployment Comments
		Easting	Northing		
CM01	Johnny Lake	345512	5899706	Lock code 0000. Land heli at gravel pad, then walk E on road ~100 m, camera is in conifer on right south side of road. Blue flagging in trees on either side of camera.	Near CHA036 along logging trail up from gravel pit.
CM02	Johnny Lake	341000	5897964	Grounded. Retrieved camera and front of case.	Near CHA041; edge of park, near trail, off road.
CM03	Capoose	361594	5906082	Heli can land anywhere in opening. Camera is very high, on NW side of clearing, in two lone conifers, facing N. Lock code 0000.	New site with large meadow and moose trail.
CM04	Capoose	360805	5908313	Camera is very high in tree. Lock code 0000. Heli landing ~10 - 20 m West of camera in clearing where camera faces. In single conifer.	Near CHA009, near moose rut rubbing.
CM05	Capoose	355064	5907440	Camera is very high in conifer. Heli landing ~70 m North open subalpine area - blue flagging on either side.	New site below WHA014 (no trees at WHA site).
CM06	Capoose	357794	5909891	In opening, heli can land within 20 - 40 m of camera (heli is E of camera). In lone conifer with small saplings surrounding.	Close to park boundary. New site in meadow site near trail.
CM07	Capoose	359048	5908550	Use same landing as CM10. Walk 100 m E along length of wetland. Camera is on N side of clearing in cluster of conifers.	Located up wetland from Aero1 and Cam #10 at other end of long opening.
CM08	Capoose	357444	5908620	Heli landing on E edge of wetland, ~ 20 m E of camera. Camera in pine tree facing NW. Blue flagging E and N of camera.	New site with moose rubbed shrub.
CM09	Johnny Lake	342317	5900435	N / NE end of clearing (very wet), heli can land right in front of camera. Blue flagging - many small snags.	Near CHA038, Glen Cahoose father's old trail.
CM10	Capoose	358886	5908588	Heli landing is ~40 m NE of camera. In conifer on edge of opening facing N. Blue flagging on either side.	Near CHA027 with moose antler rub on trees.
CM11	Capoose	357629	5908781	Cannot locate. WPT in pond. Searched both sides plus nearby openings based on description and photo.	Near CHA011 on edge of rocky opening.
CM12	Capoose	359032	5911056	Could not locate. Searched coordinates +/- 100 m in clearing.	Near CHA020 WHA site.
CM16	Johnny Lake	339419	5893856	Cut block, heli landing on road 20 - 30 m ~N of camera. Camera on largest snag at S end of cluster. Blue flagging on snags plus shrub surround. New cards do not have labels. Will need opaque tape plus sharpie. Lock code 0000. Added blue to all - previous orange flagging still in some spots.	Near CHA032 clearcut near trail.
CM19	Johnny Lake	341983	5897811	Grounded. Retrieved camera and front of case.	Near CHA043, observed bull moose at edge.
CM20	Johnny Lake	341254	5898945	Heli landing on N bend (open grassy bank), east bank of wetland, walk ~ 20 - 30 m S to block of small conifers with downed snag in front. Blue flagging.	New site upstream of CHA042.

APPENDIX U BASELINE CARIBOU OFFSETTING WILDLIFE CAMERA DETECTIONS, 2023



Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM01	2021-10-26	8:05	Grizzly Bear	1	-	-	1	Travelling
	2021-11-03	15:59	Moose	2	-	-	2	Travelling
	2021-11-03	19:10	Moose	1	-	-	1	Travelling
	2021-11-22	2:44	Moose	1	-	-	1	Travelling
	2021-12-15	1:39	Moose	1	-	-	1	Travelling
	2021-12-15	10:18	Moose	1	-	-	1	Travelling
	2021-12-17	9:41	Moose	1	-	-	1	Travelling
	2021-12-23	5:46	Moose	1	-	-	1	Travelling
	2022-01-17	13:47	Moose	1	-	-	1	Travelling
	2022-01-23	11:15	Moose	1	-	-	1	Travelling
	2022-01-25	18:10	Moose	1	-	-	1	Travelling
	2022-02-07	22:56	Moose	1	-	-	1	Travelling
	2022-03-02	11:37	Moose	1	-	-	1	Travelling
	2022-04-18	21:35	Moose	1	-	-	1	Travelling
	2022-04-23	14:23	Wolf	1	-	-	1	Travelling
	2022-05-01	12:51	Moose	1	-	-	1	Travelling
	2022-05-09	11:48	Black Bear	1	-	-	1	Travelling
	2022-05-22	18:28	Black Bear	1	-	-	1	Travelling
	2022-05-24	14:52	Black Bear	1	-	-	1	Travelling
	2022-06-11	14:35	Black Bear	1	-	-	1	Feeding
	2022-06-12	18:15	Black Bear	1	-	-	1	Feeding
	2022-06-20	12:00	Black Bear	1	-	-	1	Feeding
	2022-06-29	5:34	Black Bear	1	-	-	1	Travelling
	2022-06-30	12:04	Black Bear	1	2	-	3	Travelling
	2022-06-30	20:06	Black Bear	1	-	-	1	Travelling
	2022-07-14	20:00	Black Bear	1	-	-	1	Travelling
	2022-07-14	22:28	Moose	1	-	-	1	Travelling
	2022-07-15	5:46	Moose	1	-	-	1	Travelling
	2022-07-18	13:22	Black Bear	1	-	-	1	Inspecting camera
	2022-08-06	18:53	Black Bear	1	-	-	1	Inspecting camera
	2022-08-09	22:07	Moose	1	-	-	1	Travelling
	2022-08-12	8:39	Moose	1	-	-	1	Travelling
	2022-08-21	11:05	Black Bear	1	-	-	1	Travelling
	2022-08-21	15:42	Black Bear	1	-	-	1	Travelling
	2022-08-24	6:04	Moose	1	-	-	1	Travelling
	2022-09-03	6:17	Black Bear	1	-	-	1	Travelling
	2022-09-12	9:18	Black Bear	1	-	-	1	Travelling
	2022-09-14	9:03	Black Bear	1	-	-	1	Travelling
	2022-09-24	12:05	Moose	1	-	-	1	Travelling
	2022-10-09	17:08	Grizzly Bear	1	-	-	1	Travelling
2022-10-20	1:59	Moose	1	-	-	1	Travelling	
2022-10-20	7:18	Moose	1	-	-	1	Travelling	
2022-11-02	22:10	Moose	2	-	-	2	Alarmed	
2022-11-08	19:44	Moose	1	-	-	1	Travelling	

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM01 (cont'd)	2022-11-10	13:28	Moose	1	-	-	1	Travelling
	2022-11-15	20:53	Moose	2	-	-	2	Travelling
	2022-11-25	10:59	Moose	1	-	-	1	Travelling
	2022-11-25	11:45	Moose	1	-	-	1	Travelling
	2022-12-17	23:27	Moose	1	-	-	1	Travelling
	2023-01-17	2:50	Moose	1	-	-	1	Travelling
	2023-02-16	6:07	Moose	-	-	1	1	Travelling
	2023-05-21	5:33	Black Bear	1	-	-	1	Inspecting camera
	2023-05-22	16:06	Black Bear	1	-	-	1	Feeding
	2023-05-28	7:04	Moose	1	-	-	1	Travelling
	2023-05-29	13:47	Black Bear	1	-	-	1	Inspecting camera
	2023-05-29	13:48	Black Bear	1	-	-	1	Travelling
	2023-06-02	6:30	Moose	1	-	-	1	Travelling
	2023-06-04	6:56	Moose	1	-	-	1	Travelling
	2023-06-08	19:12	Black Bear	1	-	-	1	Feeding
	2023-06-16	5:29	Moose	1	-	-	1	Travelling
	2023-06-18	15:36	Black Bear	1	-	-	1	Travelling
	2023-06-22	10:14	Black Bear	1	-	-	1	Travelling
	2023-06-24	20:11	Black Bear	1	-	-	1	Travelling
	2023-06-25	6:12	Moose	1	-	-	1	Travelling
	2023-06-29	3:50	Moose	1	-	-	1	Travelling
	2023-07-04	10:44	Moose	1	-	-	1	Travelling
	2023-07-04	16:38	Black Bear	-	1	-	1	Alarmed
	2023-07-11	11:58	Black Bear	1	-	-	1	Travelling
	2023-07-12	23:19	Moose	1	-	-	1	Travelling
	2023-07-14	6:33	Moose	-	-	1	1	Travelling
	2023-07-29	6:33	Moose	1	-	-	1	Travelling
	2023-08-07	20:52	Moose	1	-	-	1	Travelling
	2023-08-25	15:29	Black Bear	1	-	-	1	Inspecting camera
	2023-09-11	9:11	Moose	1	-	-	1	Travelling
CM02	2021-10-18	23:59	Moose	1	-	-	1	Travelling
	2022-05-16	19:41	Moose	1	-	-	1	Travelling
CM03	2022-07-29	6:52	Moose	1	-	-	1	Travelling
	2022-08-17	21:15	Moose	1	1	-	2	Feeding
	2022-08-18	2:38	Moose	1	-	-	1	Travelling
	2022-08-18	5:30	Moose	1	-	-	1	Feeding
	2022-09-06	2:21	Moose	1	-	-	1	Travelling
	2022-10-06	7:31	Moose	1	-	-	1	Travelling
	2022-10-12	15:30	Moose	1	-	-	1	Travelling
2023-06-05	5:13	Wolf	1	-	-	1	Travelling	
CM04	2023-09-17	8:28	Moose	1	-	-	1	Travelling
CM05	2022-11-24	16:21	Caribou	1	-	-	1	Travelling
	2022-12-15	14:20	Caribou	5	-	-	5	Feeding
	2022-12-15	16:00	Caribou	1	-	-	1	Feeding

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM06	2022-07-01	7:24	Moose	-	1	-	1	Travelling
	2022-07-01	8:13	Moose	1	-	-	1	Travelling
	2022-08-14	7:56	Moose	1	1	-	2	Travelling
	2023-08-31	20:00	Moose	1	-	-	1	Travelling
CM07	2021-11-28	15:27	Moose	1	-	-	1	Travelling
	2022-06-18	10:28	Moose	1	-	-	1	Travelling
	2022-06-26	22:02	Moose	1	-	-	1	Alarmed
CM08	2022-06-21	4:59	Moose	1	-	-	1	Alarmed
	2022-07-03	5:06	Moose	1	1	-	2	Travelling
	2022-07-27	20:30	Moose	1	-	-	1	Travelling
	2022-08-06	3:53	Moose	1	-	-	1	Travelling
	2022-08-08	14:54	Black Bear	1	-	-	1	Travelling
	2022-08-09	7:00	Moose	1	1	-	2	Travelling
	2022-08-29	11:09	Moose	1	-	-	1	Feeding
	2022-09-01	5:11	Moose	1	1	-	2	Feeding
	2022-09-01	5:59	Moose	1	-	-	1	Travelling
	2022-09-18	12:10	Moose	1	1	-	2	Travelling
	2022-09-22	15:57	Moose	1	-	-	1	Travelling
	2022-09-28	6:07	Moose	1	-	-	1	Feeding
	2022-09-29	15:35	Moose	1	-	-	1	Feeding
	2022-09-30	22:16	Moose	1	-	-	1	Travelling
	2022-10-01	1:48	Moose	1	-	-	1	Feeding
	2022-10-01	3:55	Moose	1	-	-	1	Travelling
	2022-10-20	18:56	Moose	1	-	-	1	Travelling
	2023-06-27	0:14	Unknown	-	-	1	1	Travelling
	2023-06-30	13:08	Moose	-	-	1	1	Travelling
	2023-07-02	22:18	Moose	1	-	-	1	Alarmed
	2023-07-03	8:12	Moose	1	-	-	1	Travelling
	2023-07-04	8:55	Moose	1	-	-	1	Alarmed
	2023-08-19	17:54	Moose	1	-	-	1	Inspecting camera
	2023-08-19	20:47	Moose	2	-	-	2	Feeding
	2023-08-20	7:27	Moose	1	-	-	1	Feeding
	CM09	2021-10-22	17:56	Moose	1	-	-	1
2021-11-01		16:00	Moose	3	-	-	3	Travelling
2021-11-05		12:56	Moose	2	-	-	2	Travelling
2021-11-06		4:33	Moose	1	-	-	1	Travelling
2022-06-11		0:34	Moose	1	-	-	1	Travelling
2022-06-19		21:18	Moose	1	1	-	2	Feeding
2022-06-26		6:01	Moose	1	-	-	1	Travelling
2022-06-28		16:02	Moose	1	-	-	1	Travelling
2022-07-21		6:43	Moose	1	-	-	1	Travelling
2022-08-09		17:44	Moose	1	-	-	1	Travelling
2022-08-13		5:36	Moose	1	1	-	2	Alarmed
2022-08-20	20:05	Moose	1	-	-	1	Travelling	

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM09 (cont'd)	2022-08-29	17:55	Moose	1	-	-	1	Feeding
	2022-09-07	8:34	Moose	1	1	-	2	Travelling
	2022-09-08	7:32	Moose	1	-	-	1	Travelling
	2022-09-14	8:18	Moose	1	-	-	1	Travelling
	2022-09-17	13:32	Moose	1	-	-	1	Travelling
	2022-09-17	20:15	Moose	1	-	-	1	Travelling
	2022-09-18	19:52	Moose	1	-	-	1	Feeding
	2022-09-20	9:21	Moose	2	-	-	2	Travelling
	2022-09-30	20:09	Moose	1	-	-	1	Travelling
	2022-10-08	9:48	Moose	1	-	-	1	Travelling
	2022-11-21	23:42	Moose	2	-	-	2	Other
	2023-05-15	23:12	Moose	1	-	-	1	Travelling
	2023-05-17	10:40	Moose	1	-	-	1	Travelling
	2023-05-17	17:03	Moose	1	-	-	1	Travelling
	2023-06-07	8:34	Moose	1	-	-	1	Travelling
	2023-06-19	11:48	Moose	1	-	-	1	Alarmed
	2023-06-24	7:14	Moose	1	-	-	1	Travelling
	2023-07-03	6:23	Moose	1	-	-	1	Feeding
	2023-07-05	21:57	Moose	1	-	-	1	Travelling
	2023-07-09	21:15	Moose	1	-	-	1	Travelling
	2023-07-10	6:49	Moose	1	1	-	2	Travelling
	2023-07-20	3:57	Moose	1	-	-	1	Travelling
	2023-07-23	6:56	Moose	1	-	-	1	Inspecting camera
	2023-07-26	13:29	Black Bear	1	-	-	1	Travelling
	2023-07-31	6:59	Moose	2	-	-	2	Feeding
	2023-08-05	21:29	Moose	1	-	-	1	Feeding
	2023-08-19	10:53	Moose	1	-	-	1	Travelling
	2023-08-20	7:15	Moose	1	-	-	1	Feeding
	2023-08-30	6:53	Moose	1	-	-	1	Feeding
	2023-09-01	16:00	Moose	1	-	-	1	Feeding
	2023-09-18	20:54	Moose	1	-	-	1	Travelling
	2023-09-20	19:46	Moose	-	1	-	1	Alarmed
CM10	2021-10-18	21:10	Black Bear	1	-	-	1	Travelling
	2022-06-07	22:22	Moose	1	1	-	2	Feeding
	2022-06-07	22:47	Moose	1	1	-	2	Travelling
	2022-06-08	2:55	Moose	1	1	-	2	Feeding
	2022-06-08	8:58	Moose	1	-	-	1	Feeding
	2022-06-08	9:17	Moose	1	-	-	1	Feeding
	2022-06-08	15:32	Moose	1	1	-	2	Feeding
	2022-06-08	20:19	Moose	1	1	-	2	Feeding
	2022-06-08	21:18	Moose	1	-	-	1	Travelling
	2022-06-09	1:15	Moose	1	-	-	1	Feeding
	2022-06-09	2:14	Moose	1	-	-	1	Feeding
2022-06-09	13:04	Moose	1	1	-	2	Feeding	

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM10 (cont'd)	2022-06-09	19:05	Moose	-	1	-	1	Travelling
	2022-06-09	23:18	Moose	1	1	-	2	Feeding
	2022-06-10	0:28	Moose	1	1	-	2	Travelling
	2022-06-10	5:32	Moose	1	1	-	2	Travelling
	2022-06-10	12:29	Moose	1	1	-	2	Feeding
	2022-06-10	12:49	Moose	-	1	-	1	Travelling
	2022-06-10	18:20	Moose	1	1	-	2	Feeding
	2022-06-11	10:04	Moose	1	1	-	2	Feeding
	2022-06-11	15:54	Moose	1	1	-	2	Feeding
	2022-06-11	21:42	Moose	1	1	-	2	Feeding
	2022-06-12	8:00	Moose	-	1	-	1	Travelling
	2022-06-12	9:06	Moose	1	-	-	1	Feeding
	2022-06-12	13:39	Moose	1	1	-	2	Travelling
	2022-06-12	20:48	Moose	1	1	-	2	Feeding
	2022-06-13	8:10	Moose	1	1	-	2	Travelling
	2022-06-14	4:58	Moose	1	-	-	1	Travelling
	2022-06-14	10:50	Moose	1	1	-	2	Travelling
	2023-06-15	11:01	Black Bear	1	-	-	1	Inspecting camera
	2023-08-18	20:58	Black Bear	1	-	-	1	Travelling
	CM16	2021-10-31	10:26	Moose	1	1	-	2
2021-10-31		10:53	Moose	1	1	-	2	Travelling
2021-12-30		0:10	Moose	2	-	-	2	Feeding
2021-12-30		0:27	Moose	2	-	-	2	Travelling
2022-01-22		14:36	Moose	1	-	-	1	Feeding
2022-05-24		7:02	Moose	1	-	-	1	Travelling
2022-06-10		10:44	Grizzly Bear	1	-	-	1	Travelling
2022-06-15		4:07	Moose	2	-	-	2	Travelling
2022-06-23		14:47	Grizzly Bear	1	-	-	1	Travelling
2022-08-14		11:57	Black Bear	1	-	-	1	Travelling
2022-09-03		8:07	Moose	1	-	-	1	Travelling
2022-09-16		5:50	Moose	1	-	-	1	Travelling
2022-09-19		8:44	Moose	2	-	-	2	Feeding
2022-09-21		7:08	Moose	1	-	-	1	Travelling
2022-09-25		19:48	Moose	1	-	-	1	Resting
2022-09-25		21:43	Moose	1	-	-	1	Travelling
2022-10-17		11:36	Moose	2	-	-	2	Feeding
2022-10-18		8:53	Moose	1	-	-	1	Travelling
2022-10-18		9:25	Moose	3	-	-	3	Feeding
2022-10-20		21:12	Moose	1	-	-	1	Travelling
2022-10-26		9:26	Moose	1	-	-	1	Feeding
2023-01-22		9:52	Moose	1	1	-	2	Feeding
2023-05-26		7:58	Moose	1	-	-	1	Travelling
2023-05-29	2:38	Moose	1	-	-	1	Travelling	
2023-08-31	7:34	Moose	1	-	-	1	Travelling	

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM19	2021-10-15	8:30	Moose	1	-	-	1	Travelling
	2021-10-25	18:10	Moose	1	-	-	1	Travelling
	2021-10-30	0:12	Moose	1	-	-	1	Feeding
	2022-06-01	8:24	Black Bear	1	-	-	1	Inspecting camera
CM20	2021-10-17	21:16	Moose	1	-	-	1	Travelling
	2021-10-19	23:43	Moose	1	-	-	1	Feeding
	2021-10-28	7:57	Moose	2	-	-	2	Feeding
	2022-05-31	22:10	Moose	1	-	-	1	Travelling
	2022-06-13	17:37	Moose	-	-	1	1	Feeding
	2022-06-13	20:49	Moose	1	-	-	1	Feeding
	2022-06-16	23:25	Moose	1	-	-	1	Travelling
	2022-06-17	1:11	Moose	1	-	-	1	Feeding
	2022-06-17	15:42	Moose	1	1	-	2	Alarmed
	2022-06-18	0:11	Moose	1	-	-	1	Feeding
	2022-06-22	17:08	Moose	1	-	-	1	Travelling
	2022-07-02	5:09	Moose	1	-	-	1	Feeding
	2022-07-06	11:17	Moose	1	1	-	2	Feeding
	2022-07-14	0:09	Moose	2	1	-	3	Feeding
	2022-07-14	0:55	Moose	1	1	-	2	Feeding
	2022-07-14	1:21	Moose	1	1	-	2	Travelling
	2022-07-22	7:56	Moose	1	-	-	1	Travelling
	2022-07-23	7:36	Moose	1	1	-	2	Travelling
	2022-07-24	6:09	Moose	1	-	-	1	Travelling
	2022-07-27	15:54	Black Bear	1	-	-	1	Travelling
	2022-08-02	23:08	Moose	1	-	-	1	Travelling
	2022-08-26	2:48	Moose	1	-	-	1	Feeding
	2022-08-27	2:22	Moose	1	-	-	1	Travelling
	2022-08-29	20:30	Moose	1	1	-	2	Travelling
	2022-09-05	22:23	Moose	1	-	-	1	Travelling
	2022-09-21	3:09	Moose	1	-	-	1	Feeding
	2022-10-04	7:52	Moose	1	-	-	1	Travelling
	2022-10-09	14:20	Black Bear	1	-	-	1	Travelling
	2022-10-13	0:10	Moose	1	-	-	1	Travelling
	2022-10-13	8:11	Moose	1	-	-	1	Travelling
	2022-10-15	12:22	Moose	1	-	-	1	Travelling
	2022-10-18	0:55	Moose	1	-	-	1	Travelling
	2022-10-22	4:09	Moose	1	-	-	1	Alarmed
	2023-05-30	8:23	Moose	1	-	-	1	Travelling
2023-05-31	11:02	Moose	3	-	-	3	Alarmed	
2023-06-02	15:29	Moose	1	-	-	1	Travelling	
2023-06-07	2:50	Moose	1	-	-	1	Travelling	
2023-06-12	8:33	Moose	2	-	-	2	Travelling	
2023-06-13	1:26	Moose	1	-	-	1	Travelling	
2023-06-13	5:24	Moose	1	-	-	1	Travelling	

Appendix U: Baseline Caribou Offsetting Wildlife Camera Detections, 2023

Camera ID	Detection Date	Detection Time	Species	# Adults	# Juvenile	# Unknown	Total	Behaviour
CM20 (cont'd)	2023-06-13	6:17	Moose	1	-	-	1	Travelling
	2023-06-13	17:25	Moose	1	1	-	2	Feeding
	2023-06-13	22:02	Moose	1	1	-	2	Travelling
	2023-06-14	8:22	Moose	1	1	-	2	Travelling
	2023-06-14	11:07	Moose	1	-	-	1	Feeding
	2023-06-14	11:26	Moose	1	-	-	1	Travelling
	2023-06-15	15:34	Moose	1	-	-	1	Travelling
	2023-06-17	19:51	Moose	1	-	-	1	Travelling
	2023-06-18	15:57	Moose	1	-	-	1	Feeding
	2023-06-20	22:17	Moose	1	-	-	1	Travelling
	2023-06-25	9:49	Moose	1	-	-	1	Resting
	2023-06-28	12:27	Moose	1	-	-	1	Feeding
	2023-06-28	23:52	Moose	1	-	-	1	Travelling
	2023-06-29	23:58	Moose	1	-	-	1	Travelling
	2023-07-03	22:16	Moose	1	1	-	2	Travelling
	2023-07-05	22:16	Moose	1	-	-	1	Feeding
	2023-07-09	10:37	Moose	1	1	-	2	Feeding
	2023-07-09	21:18	Moose	1	-	-	1	Travelling
	2023-07-10	22:19	Moose	1	-	-	1	Travelling
	2023-07-14	23:44	Moose	1	-	-	1	Feeding
	2023-07-15	4:38	Moose	1	-	-	1	Feeding
	2023-07-20	1:33	Moose	1	-	-	1	Travelling
	2023-07-25	19:27	Moose	1	1	-	2	Feeding
	2023-08-03	23:25	Moose	1	-	-	1	Feeding
	2023-08-05	8:01	Moose	1	1	-	2	Feeding
	2023-09-05	20:29	Moose	1	-	-	1	Travelling
	2023-09-05	21:04	Moose	1	-	-	1	Travelling
	2023-09-06	20:38	Moose	1	-	-	1	Feeding
	2023-09-07	11:40	Moose	1	-	-	1	Travelling
	2023-09-08	8:53	Moose	1	-	-	1	Travelling
	2023-09-10	8:25	Moose	1	-	-	1	Travelling
	2023-09-11	7:39	Moose	1	-	-	1	Feeding
	2023-09-15	2:56	Moose	1	-	-	1	Travelling
2023-09-22	0:02	Moose	1	-	-	1	Travelling	
2023-09-22	5:11	Moose	2	-	-	2	Alarmed	

APPENDIX V BAT AUTOMATED RECORDING UNIT SURVEY SITE DATA, 2023



Appendix V: Bat Automated Recording Unit Survey Site Data, 2023

Site ID	ARU Card ID	Zone 10U		Recording Start Date	Recording End Date	Nights Deployed	Comments
		Easting	Northing				
Bat ARU 01	SMU 08992	376615	5891612	13/09/2023	26/09/2023	13	Wetland beside two track further up from the ore body
Bat ARU 05	SMU 08994	375806	5892421	13/09/2023	26/09/2023	13	Pond at top of ore body
Bat ARU 08	SMU 08998	377045	5894070	13/09/2023	27/09/2023	14	Mature conifer forest beside core shacks at the back of the mine site
Bat ARU 07	SMU09741	375928	5897281	12/09/2023	-	-	Close beside A-Trail (15m). Lost never retrieved.
Bat ARU 10	SMU 09743	376538	5893389	13/09/2023	27/09/2023	14	Small wetland 300 m from ore body, can hear a lot of construction from here
Bat ARU 09	SMU 09747	375992	5893932	12/09/2023	26/09/2023	14	Small wetland between new construction camp and the plant site
Bat ARU 04	SMU 09748	379013	5898499	12/09/2023	26/09/2023	14	Beside old logging road down A trail, small wetland surrounded by mature forest. Part of larger wetland complex.
Bat ARU 06	SMU 09777	375019	5898952	12/09/2023	23/09/2023	11	Large intact wetland beside mature forest. Survived burn.
Bat ARU 03	SMU 09783	378999	5900724	12/09/2023	26/09/2023	14	Wetland beside small lake and mature forest

APPENDIX W BAT ANALYSIS AUTO-ID RESULTS, 2023



Appendix W: Bat Analysis Auto-ID Results, 2023

Site ID	ARU Card ID	Recording Start Date	Recording End Date	Myotis Species							Non Myotis Species					No ID	Total Bat Files	Total Noise Files
				California	Little Brown	Long-legged	Northern	Western Long-eared	Western Small-footed	Yuma	Big Brown Bat	Eastern Red Bat	Hoary Bat	Townsend's Big Eared Bat	Silver-haired Bat			
Bat ARU 01	SMU 08992	13/09/2023	26/09/2023	-	2	-	-	-	1	1	-	1	20	-	11	18	36	79
Bat ARU 05	SMU 08994	13/09/2023	26/09/2023	-	41	1	-	10	74	-	1	3	36	1	8	150	175	555
Bat ARU 08	SMU 08998	13/09/2023	27/09/2023	-	1	-	-	2	1	-	2	-	11	-	22	8	39	135
Bat ARU 10	SMU 09743	13/09/2023	27/09/2023	-	8	-	-	1	1	-	1	6	9	-	12	13	38	367
Bat ARU 04	SMU 09748	12/09/2023	26/09/2023	-	0	-	-	-	-	-	2	-	28	-	37	10	67	239
Bat ARU 06	SMU 09777	12/09/2023	24/09/2023	-	3	-	-	4	1	-	-	-	31	-	12	9	51	162
Bat ARU 03	SMU 09783	12/09/2023	26/09/2023	-	11	-	-	-	1	-	3	1	1	-	67	27	84	268
Bat ARU 09	SMU 09747	12/09/2023	26/09/2023	-	155	-	-	20	14	-	-	2	58	-	13	91	262	196
Total				0	221	1	0	37	93	1	9	13	194	1	182	326	752	2001

APPENDIX X BAT BRANDENBARK LOCATIONS, 2023



Appendix X: Bat BrandenBark Locations, 2023

Site ID	Year Established	Zone 10 U		General Location	Height from Ground	Opening at Base	Notes
		Easting	Northing				
BARK1	2022	362685	5887094	Matthews Creek Wetalnd Offset Area	3.90 m	20 cm	On dead spruce.
BARK2	2022	362678	5887053	Matthews Creek Wetalnd Offset Area	3.43 m	8 cm - 30 cm	On a dead spruce. Opening at bottom varies significantly. Flagging tape inside installation, requires fixing.
BARK3	2022	362468	5886913	Matthews Creek Wetalnd Offset Area	3.45 m	20 cm	On live spruce, very close to small creek.
BB1	2023	370648	5893831	Lake 15/16 Channel	-	-	Partial cover
BB2	2023	370615	5893816	Lake 15/16 Channel	-	-	Full cover
BB3	2023	370552	5893864	Lake 15/16 Channel	-	-	Open cover

APPENDIX Y WATERBIRD SURVEY SITE DATA, 2023



Appendix Y: Waterbird Survey Site Data, 2023

Survey Period	Survey Date	Survey Area	Time Start	Time End	Navigator	Observer	Pilot	Waypoint Range	Air Temp (°C)	Cloud Cover	Wind Speed (km/h)	Visibility/Lighting	Comment
Spring Pair	2023-05-17	Transmission Line	10:15	12:15	HV	DB	M	15-47	19	Clear, Hazy	<10	Hazy	Considerable smoke in the air. Visibility for surveys was ok. First of two flights on this date.
	2023-05-17	Transmission Line	13:27	14:55	HV	DB	M	48-87	23	Clear, Hazy	<10	Hazy	Considerable smoke in the air. Visibility for surveys was ok. Second of two flights on this date.
	2023-05-18	Mine Site	8:18	9:45	HV	DB, Quian (BWG)	M	88-116	14	Clear, Hazy	15	Hazy	Smokey and hazy. Diffused lighting. First of three flights on this date.
	2023-05-18	Transmission Line	10:43	11:43	HV	DB	M	117-136	14	Clear, Hazy	15	Hazy	Smokey, enough to blur horizon. Hazy diffused light. Second of three flights on this date.
	2023-05-18	Transmission Line/ Mine Site	13:46	15:23	HV	DB	M	137-164	22	Clear, Hazy	<10	Hazy	Smokey and hazy. Sun started to shine through smoke at times. Diffused light. Wind picked up during portions of the survey. Third of three flights on this date.
	2023-05-19	Mine Site	9:25	11:26	DB	HV	M	165-206	15	0%	15-20	Bright	Smoke cleared up today. Blue skies and variable wind. First of three flights on this date.
	2023-05-19	Mine Site	12:42	14:30	HV	Sam Lynch (BWG), DB	M	207-240	18	40%	15-20	Bright	Smoke cleared up today. Blue skies and variable wind. Second of three flights on this date.
	2023-05-19	Matthews Creek	15:20	16:08	HV	DB	M	241-250	20	60%	<10	Flat	Smoke cleared up today. Variable wind. Third of three flights on this date.
Fall Staging	2023-09-09	Mine Site/LSA	9:58	13:04	KC	KC, KB	D	009-057	10	0%	5	Bright	Really good and clear conditions
	2023-09-09	Mine Site/LSA	14:58	15:58	KC	KC, KB	D	057-061	10	0%	5	Bright	Really good and clear conditions
	2023-09-10	Mine Site/ LSA/ Transmission Line	8:07	11:26	KC	KC, KB	D	062-115	10	0%	20	Bright	-
	2023-09-10	Mine Site/ LSA/ Transmission Line	12:56	15:17	KC	KC, KB	D	115-158	10	0%	20	Bright	Missed section of transmission line due to NOTAM over prescribed fire area.
	2023-09-11	Transmission Line	8:18	9:37	KC	KC, KB	D	159-184	5	100%	7	Low	Recovered some of NOTAM area, unable to complete very top of the transmission line due to low visibility due to smoke.
	2023-09-11	Transmission Line	12:21	13:28	KC	KC, KB	D	184-218	5	100%	7	Low	Recovered some of NOTAM area, unable to complete very top of the transmission line due to low visibility due to smoke.

APPENDIX Z WATERBIRD SURVEY OBSERVATION DATA, 2023



Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-17	30	AMWI	American Wigeon	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-18	155	AMWI	American Wigeon	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-17	15	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	20	BAGO	Barrow's Goldeneye	1	1	-	2	Pond M	Pair	-
Spring Pair	2023-05-17	37	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-17	39	BAGO	Barrow's Goldeneye	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-17	40	BAGO	Barrow's Goldeneye	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-17	52	BAGO	Barrow's Goldeneye	1	1	-	2	Sedge Meadow M	Pair	-
Spring Pair	2023-05-17	78	BAGO	Barrow's Goldeneye	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	72	BAGO	Barrow's Goldeneye	2	1	-	3	Creek	Pair	-
Spring Pair	2023-05-17	75	BAGO	Barrow's Goldeneye	1	3	-	4	Creek	Pair	-
Spring Pair	2023-05-17	23	BAGO	Barrow's Goldeneye	-	-	1	1	Pond M	-	-
Spring Pair	2023-05-18	99	BAGO	Barrow's Goldeneye	1	-	-	1	Pond L	-	-
Spring Pair	2023-05-18	100	BAGO	Barrow's Goldeneye	1	-	-	1	Pond S	-	-
Spring Pair	2023-05-18	138	BAGO	Barrow's Goldeneye	1	-	-	1	Pond M	-	-
Spring Pair	2023-05-18	96	BAGO	Barrow's Goldeneye	2	-	-	2	Pond S	-	-
Spring Pair	2023-05-18	95	BAGO	Barrow's Goldeneye	-	1	-	1	Wetland L	-	-
Spring Pair	2023-05-18	136	BAGO	Barrow's Goldeneye	-	1	-	1	Creek	-	-
Spring Pair	2023-05-18	90	BAGO	Barrow's Goldeneye	1	1	-	2	Pond M	Pair	-
Spring Pair	2023-05-18	93	BAGO	Barrow's Goldeneye	1	1	-	2	Lake L	Pair	Flying
Spring Pair	2023-05-18	109	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-18	122	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-18	124	BAGO	Barrow's Goldeneye	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	128	BAGO	Barrow's Goldeneye	1	1	-	2	Lake S	Pair	-
Spring Pair	2023-05-18	145	BAGO	Barrow's Goldeneye	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	147	BAGO	Barrow's Goldeneye	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	154	BAGO	Barrow's Goldeneye	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	98	BAGO	Barrow's Goldeneye	2	1	-	3	Pond L	Pair	-
Spring Pair	2023-05-18	143	BAGO	Barrow's Goldeneye	3	3	-	6	Pond M	Pair	-
Spring Pair	2023-05-18	89	BAGO	Barrow's Goldeneye	4	3	-	7	Pond L	-	-
Spring Pair	2023-05-18	102	BAGO	Barrow's Goldeneye	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-19	204	BAGO	Barrow's Goldeneye	1	-	-	1	Pond	-	-
Spring Pair	2023-05-19	204	BAGO	Barrow's Goldeneye	1	-	-	1	Pond	-	-
Spring Pair	2023-05-19	234	BAGO	Barrow's Goldeneye	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-19	237	BAGO	Barrow's Goldeneye	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-19	238	BAGO	Barrow's Goldeneye	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-19	250	BAGO	Barrow's Goldeneye	1	-	-	1	Lake M	-	-
Spring Pair	2023-05-19	218	BAGO	Barrow's Goldeneye	1	1	-	2	Pond S	Pair	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-19	173	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland	-	-
Spring Pair	2023-05-19	202	BAGO	Barrow's Goldeneye	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	207	BAGO	Barrow's Goldeneye	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-19	212	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-19	217	BAGO	Barrow's Goldeneye	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-19	223	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-19	224	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-19	235	BAGO	Barrow's Goldeneye	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-19	192	BAGO	Barrow's Goldeneye	2	1	-	3	Lake	Pair	-
Spring Pair	2023-05-19	227	BAGO	Barrow's Goldeneye	1	2	-	3	Wetland M	-	-
Spring Pair	2023-05-17	70	BOGU	Bonaparte's Gull	-	-	2	2	Wetland L	Pair	-
Spring Pair	2023-05-18	124	BOGU	Bonaparte's Gull	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	125	BOGU	Bonaparte's Gull	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	88	BOGU	Bonaparte's Gull	-	-	2	2	Pond L	Pair	-
Spring Pair	2023-05-18	89	BOGU	Bonaparte's Gull	-	-	2	2	Pond L	Nest Found	Boneparte Gulls on nest
Spring Pair	2023-05-18	129	BOGU	Bonaparte's Gull	-	-	2	2	Lake M	-	-
Spring Pair	2023-05-18	119	BOGU	Bonaparte's Gull	-	-	3	3	Lake L	-	-
Spring Pair	2023-05-18	108	BOGU	Bonaparte's Gull	-	-	4	4	Pond L	Pair	-
Spring Pair	2023-05-19	206	BOGU	Bonaparte's Gull	-	-	1	1	Lake	-	-
Spring Pair	2023-05-19	241	BOGU	Bonaparte's Gull	-	-	3	3	Wetland L	-	-
Spring Pair	2023-05-17	18	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	49	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	51	BUFF	Bufflehead	1	-	-	1	Lake S	-	-
Spring Pair	2023-05-17	55	BUFF	Bufflehead	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-17	57	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	59	BUFF	Bufflehead	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-17	70	BUFF	Bufflehead	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-17	71	BUFF	Bufflehead	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-17	43	BUFF	Bufflehead	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-17	58	BUFF	Bufflehead	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	62	BUFF	Bufflehead	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-17	72	BUFF	Bufflehead	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	74	BUFF	Bufflehead	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	53	BUFF	Bufflehead	1	2	-	3	Wetland M	Pair	-
Spring Pair	2023-05-17	87	BUFF	Bufflehead	2	2	-	4	Lake L	Pair	-
Spring Pair	2023-05-17	87	BUFF	Bufflehead	4	3	-	7	Lake L	Pair	-
Spring Pair	2023-05-17	50	BUFF	Bufflehead	6	4	-	10	Lake M	Pair	-
Spring Pair	2023-05-18	107	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-18	114	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-18	115	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-18	116	BUFF	Bufflehead	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-18	118	BUFF	Bufflehead	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-18	138	BUFF	Bufflehead	1	-	-	1	Pond M	-	-
Spring Pair	2023-05-18	120	BUFF	Bufflehead	-	1	-	1	Lake L	-	-
Spring Pair	2023-05-18	103	BUFF	Bufflehead	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	105	BUFF	Bufflehead	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-18	106	BUFF	Bufflehead	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-18	110	BUFF	Bufflehead	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-18	112	BUFF	Bufflehead	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-18	121	BUFF	Bufflehead	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-18	123	BUFF	Bufflehead	1	1	-	2	Pond L	Pair	-
Spring Pair	2023-05-18	139	BUFF	Bufflehead	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	140	BUFF	Bufflehead	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	119	BUFF	Bufflehead	2	1	-	3	Lake L	-	-
Spring Pair	2023-05-18	143	BUFF	Bufflehead	3	2	-	5	Pond M	Pair	-
Spring Pair	2023-05-19	188	BUFF	Bufflehead	1	-	-	1	Wetland	-	-
Spring Pair	2023-05-19	189	BUFF	Bufflehead	1	-	-	1	Wetland	-	-
Spring Pair	2023-05-19	204	BUFF	Bufflehead	1	-	-	1	Pond	-	-
Spring Pair	2023-05-19	247	BUFF	Bufflehead	1	-	-	1	Creek	-	-
Spring Pair	2023-05-19	241	BUFF	Bufflehead	2	-	-	2	Wetland L	-	-
Spring Pair	2023-05-19	176	BUFF	Bufflehead	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	185	BUFF	Bufflehead	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	190	BUFF	Bufflehead	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	192	BUFF	Bufflehead	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	200	BUFF	Bufflehead	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	205	BUFF	Bufflehead	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	231	BUFF	Bufflehead	1	1	-	2	Creek	-	-
Spring Pair	2023-05-19	236	BUFF	Bufflehead	1	1	-	2	Wetland M	-	-
Spring Pair	2023-05-19	240	BUFF	Bufflehead	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-19	199	BUFF	Bufflehead	2	1	-	3	Lake	Pair	-
Spring Pair	2023-05-19	211	BUFF	Bufflehead	4	1	-	5	Pond M	Pair	-
Spring Pair	2023-05-19	174	BUFF	Bufflehead	1	2	-	3	Pond	-	-
Spring Pair	2023-05-19	177	BUFF	Bufflehead	1	2	-	3	Pond	Pair	-
Spring Pair	2023-05-19	193	BUFF	Bufflehead	-	-	2	2	Pond	Pair	-
Spring Pair	2023-05-17	62	BWTE	Blue-winged Teal	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-17	65	BWTE	Blue-winged Teal	1	1	-	2	Wetland L	Pair	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-17	80	BWTE	Blue-winged Teal	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-18	164	BWTE	Blue-winged Teal	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-18	164	BWTE	Blue-winged Teal	2	2	-	4	Pond S	Pair	-
Spring Pair	2023-05-19	247	BWTE	Blue-winged Teal	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	53	CANG	Canada Goose	-	-	1	1	Wetland M	-	-
Spring Pair	2023-05-17	56	CANG	Canada Goose	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-17	65	CANG	Canada Goose	-	-	1	1	Wetland L	-	-
Spring Pair	2023-05-17	66	CANG	Canada Goose	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-17	85	CANG	Canada Goose	-	-	1	1	River	Pair	-
Spring Pair	2023-05-17	30	CANG	Canada Goose	-	-	2	2	Creek	-	-
Spring Pair	2023-05-17	42	CANG	Canada Goose	-	-	2	2	Creek	Pair	-
Spring Pair	2023-05-17	84	CANG	Canada Goose	-	-	2	2	River	Pair	-
Spring Pair	2023-05-17	87	CANG	Canada Goose	-	-	3	3	Lake L	-	-
Spring Pair	2023-05-17	21	CANG	Canada Goose	-	-	4	4	Pond M	-	-
Spring Pair	2023-05-17	32	CANG	Canada Goose	-	-	4	4	Wetland S	Pair	-
Spring Pair	2023-05-17	30	CANG	Canada Goose	-	-	41	41	Creek	-	-
Spring Pair	2023-05-18	93	CANG	Canada Goose	-	-	1	1	Wetland L	-	-
Spring Pair	2023-05-18	119	CANG	Canada Goose	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	130	CANG	Canada Goose	-	-	1	1	Other	-	On land
Spring Pair	2023-05-18	160	CANG	Canada Goose	-	-	2	2	River	-	-
Spring Pair	2023-05-19	233	CANG	Canada Goose	1	-	-	1	Creek	-	-
Spring Pair	2023-05-19	165	CANG	Canada Goose	-	-	1	1	Creek	-	-
Spring Pair	2023-05-19	170	CANG	Canada Goose	-	-	1	1	Creek	-	-
Spring Pair	2023-05-19	192	CANG	Canada Goose	-	-	1	1	Lake	Pair	-
Spring Pair	2023-05-19	193	CANG	Canada Goose	-	-	1	1	Pond	-	-
Spring Pair	2023-05-19	197	CANG	Canada Goose	-	-	1	1	Wetland	-	-
Spring Pair	2023-05-19	202	CANG	Canada Goose	-	-	1	1	Lake	-	-
Spring Pair	2023-05-19	241	CANG	Canada Goose	-	-	1	1	Wetland L	-	-
Spring Pair	2023-05-19	188	CANG	Canada Goose	-	-	2	2	Wetland	-	-
Spring Pair	2023-05-19	194	CANG	Canada Goose	-	-	2	2	Wetland	Pair	-
Spring Pair	2023-05-19	240	CANG	Canada Goose	-	-	2	2	Wetland M	-	-
Spring Pair	2023-05-17	87	COLO	Common Loon	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-17	19	COLO	Common Loon	-	-	1	1	Pond M	-	-
Spring Pair	2023-05-17	34	COLO	Common Loon	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-17	41	COLO	Common Loon	-	-	2	2	Lake M	Pair	-
Spring Pair	2023-05-17	56	COLO	Common Loon	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-17	66	COLO	Common Loon	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-17	69	COLO	Common Loon	-	-	2	2	Lake L	Pair	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-18	94	COLO	Common Loon	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-18	108	COLO	Common Loon	-	-	2	2	Pond L	-	-
Spring Pair	2023-05-18	144	COLO	Common Loon	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-18	148	COLO	Common Loon	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-19	179	COLO	Common Loon	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	202	COLO	Common Loon	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	206	COLO	Common Loon	1	1	-	2	Lake	Nest Found	Common Loons on nest
Spring Pair	2023-05-19	201	COLO	Common Loon	-	-	1	1	Lake	-	-
Spring Pair	2023-05-19	220	COLO	Common Loon	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-19	222	COLO	Common Loon	-	-	1	1	Lake M	-	-
Spring Pair	2023-05-19	226	COLO	Common Loon	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-19	209	COLO	Common Loon	-	-	2	2	Wetland M	Pair	-
Spring Pair	2023-05-19	230	COLO	Common Loon	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-19	232	COLO	Common Loon	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-17	31	COME	Common Merganser	2	-	-	2	Creek	-	Photo 408
Spring Pair	2023-05-17	86	COME	Common Merganser	-	1	-	1	River	-	-
Spring Pair	2023-05-17	82	COME	Common Merganser	-	-	3	3	Creek	-	-
Spring Pair	2023-05-18	151	COME	Common Merganser	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-18	126	COME	Common Merganser	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	152	COME	Common Merganser	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-18	146	COME	Common Merganser	2	2	-	4	River	Pair	-
Spring Pair	2023-05-18	161	COME	Common Merganser	2	2	-	4	River	-	-
Spring Pair	2023-05-18	158	COME	Common Merganser	3	4	-	7	River	-	-
Spring Pair	2023-05-19	229	COME	Common Merganser	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	44	GADW	Gadwall	-	-	1	1	Lake M	-	-
Spring Pair	2023-05-18	107	GWTE	Green-winged Teal	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-19	194	GWTE	Green-winged Teal	1	1	-	2	Wetland	Pair	-
Spring Pair	2023-05-18	156	HOGR	Horned Grebe	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-17	26	HOME	Hooded Merganser	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-19	218	HOME	Hooded Merganser	2	-	-	2	Pond S	-	-
Spring Pair	2023-05-19	210	HOME	Hooded Merganser	1	1	-	2	Wetland S	-	-
Spring Pair	2023-05-19	214	HOME	Hooded Merganser	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-17	20	LESC	Lesser Scaup	1	-	-	1	Pond M	-	-
Spring Pair	2023-05-17	45	LESC	Lesser Scaup	1	-	-	1	Lake M	-	-
Spring Pair	2023-05-17	76	LESC	Lesser Scaup	5	-	-	5	Creek	-	-
Spring Pair	2023-05-17	18	LESC	Lesser Scaup	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	21	LESC	Lesser Scaup	1	1	-	2	Pond M	Pair	-
Spring Pair	2023-05-17	25	LESC	Lesser Scaup	1	1	-	2	Wetland M	Pair	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-17	50	LESC	Lesser Scaup	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-17	60	LESC	Lesser Scaup	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	64	LESC	Lesser Scaup	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-17	67	LESC	Lesser Scaup	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	76	LESC	Lesser Scaup	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	59	LESC	Lesser Scaup	2	1	-	3	Lake L	Pair	-
Spring Pair	2023-05-17	87	LESC	Lesser Scaup	35	35	-	70	Lake L	-	-
Spring Pair	2023-05-18	88	LESC	Lesser Scaup	1	-	-	1	Pond L	-	-
Spring Pair	2023-05-18	90	LESC	Lesser Scaup	1	-	-	1	Pond M	-	-
Spring Pair	2023-05-18	112	LESC	Lesser Scaup	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-18	129	LESC	Lesser Scaup	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-18	89	LESC	Lesser Scaup	3	1	-	4	Pond L	-	-
Spring Pair	2023-05-18	141	LESC	Lesser Scaup	3	2	-	5	Pond M	Pair	-
Spring Pair	2023-05-18	124	LESC	Lesser Scaup	3	3	-	6	Lake L	Pair	-
Spring Pair	2023-05-18	123	LESC	Lesser Scaup	4	4	-	8	Pond L	Pair	-
Spring Pair	2023-05-19	203	LESC	Lesser Scaup	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	200	LESC	Lesser Scaup	2	1	-	3	Lake	Pair	-
Spring Pair	2023-05-19	205	LESC	Lesser Scaup	4	1	-	5	Pond	-	-
Spring Pair	2023-05-19	187	LESC	Lesser Scaup	2	2	-	4	Pond	Pair	-
Spring Pair	2023-05-19	177	LESC	Lesser Scaup	3	2	-	5	Lake	-	-
Spring Pair	2023-05-19	177	LESC	Lesser Scaup	6	3	-	9	Lake	-	-
Spring Pair	2023-05-19	191	LESC	Lesser Scaup	2	4	-	6	Wetland	-	-
Spring Pair	2023-05-19	180	LESC	Lesser Scaup	5	5	-	10	Pond	-	-
Spring Pair	2023-05-19	177	LESC	Lesser Scaup	10	10	-	20	Lake	-	-
Spring Pair	2023-05-17	15	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	38	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	56	MALL	Mallard	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-17	58	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	61	MALL	Mallard	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-17	62	MALL	Mallard	1	-	-	1	Wetland L	-	-
Spring Pair	2023-05-17	71	MALL	Mallard	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-17	83	MALL	Mallard	1	-	-	1	Creek	-	-
Spring Pair	2023-05-17	24	MALL	Mallard	2	-	-	2	Wetland S	-	-
Spring Pair	2023-05-17	29	MALL	Mallard	2	-	-	2	Creek	-	-
Spring Pair	2023-05-17	57	MALL	Mallard	2	-	-	2	Wetland M	-	-
Spring Pair	2023-05-17	64	MALL	Mallard	3	-	-	3	Wetland L	-	-
Spring Pair	2023-05-17	46	MALL	Mallard	-	1	-	1	Wetland M	-	-
Spring Pair	2023-05-17	48	MALL	Mallard	-	1	-	1	Pond M	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-17	77	MALL	Mallard	-	1	-	1	Creek	-	-
Spring Pair	2023-05-17	26	MALL	Mallard	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	32	MALL	Mallard	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-17	68	MALL	Mallard	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	81	MALL	Mallard	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	82	MALL	Mallard	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-17	75	MALL	Mallard	-	2	-	2	Creek	-	-
Spring Pair	2023-05-17	65	MALL	Mallard	1	2	-	3	Wetland L	Pair	-
Spring Pair	2023-05-18	104	MALL	Mallard	1	-	-	1	Wetland S	-	-
Spring Pair	2023-05-18	105	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-18	107	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-18	118	MALL	Mallard	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-18	122	MALL	Mallard	1	-	-	1	Wetland S	-	-
Spring Pair	2023-05-18	132	MALL	Mallard	1	-	-	1	Wetland S	Pair	-
Spring Pair	2023-05-18	162	MALL	Mallard	1	-	-	1	Wetland S	-	-
Spring Pair	2023-05-18	95	MALL	Mallard	2	-	-	2	Wetland L	-	-
Spring Pair	2023-05-18	115	MALL	Mallard	2	-	-	2	Wetland M	-	-
Spring Pair	2023-05-18	131	MALL	Mallard	2	-	-	2	Wetland M	-	-
Spring Pair	2023-05-18	112	MALL	Mallard	3	-	-	3	Wetland L	-	-
Spring Pair	2023-05-18	143	MALL	Mallard	3	-	-	3	Pond M	-	-
Spring Pair	2023-05-18	164	MALL	Mallard	3	-	-	3	Wetland S	-	-
Spring Pair	2023-05-18	110	MALL	Mallard	-	1	-	1	Wetland S	-	-
Spring Pair	2023-05-18	120	MALL	Mallard	-	1	-	1	Wetland S	-	-
Spring Pair	2023-05-18	98	MALL	Mallard	1	1	-	2	Pond L	Pair	-
Spring Pair	2023-05-18	111	MALL	Mallard	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	123	MALL	Mallard	1	1	-	2	Pond L	Pair	-
Spring Pair	2023-05-18	129	MALL	Mallard	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-18	159	MALL	Mallard	1	1	-	2	River	Pair	-
Spring Pair	2023-05-18	93	MALL	Mallard	3	1	-	4	Lake L	-	-
Spring Pair	2023-05-19	177	MALL	Mallard	1	-	-	1	Lake	-	-
Spring Pair	2023-05-19	183	MALL	Mallard	1	-	-	1	Creek	-	-
Spring Pair	2023-05-19	216	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-19	218	MALL	Mallard	1	-	-	1	Pond S	-	-
Spring Pair	2023-05-19	249	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-19	213	MALL	Mallard	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-19	194	MALL	Mallard	2	-	-	2	Wetland	-	-
Spring Pair	2023-05-19	248	MALL	Mallard	2	-	-	2	Creek	-	-
Spring Pair	2023-05-19	186	MALL	Mallard	3	-	-	3	Pond	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-19	225	MALL	Mallard	3	-	-	3	Wetland S	-	-
Spring Pair	2023-05-19	166	MALL	Mallard	1	1	-	2	Wetland	Pair	-
Spring Pair	2023-05-19	181	MALL	Mallard	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-19	192	MALL	Mallard	1	1	-	2	Lake	Pair	-
Spring Pair	2023-05-19	198	MALL	Mallard	1	1	-	2	Wetland	Pair	-
Spring Pair	2023-05-19	228	MALL	Mallard	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-19	239	MALL	Mallard	1	1	-	2	Wetland L	-	-
Spring Pair	2023-05-19	209	MALL	Mallard	1	2	-	3	Wetland M	Pair	-
Spring Pair	2023-05-18	112	NOSH	Northern Shoveler	1	1	-	2	Wetland L	Pair	-
Spring Pair	2023-05-19	203	NOSH	Northern Shoveler	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	201	PBGR	Pied-billed Grebe	-	-	3	3	Lake	-	-
Spring Pair	2023-05-17	26	RNDU	Ring-necked Duck	1	-	-	1	Wetland M	-	-
Spring Pair	2023-05-17	59	RNDU	Ring-necked Duck	1	-	-	1	Lake L	-	-
Spring Pair	2023-05-17	27	RNDU	Ring-necked Duck	1	1	-	2	Wetland M	-	-
Spring Pair	2023-05-17	34	RNDU	Ring-necked Duck	1	1	-	2	Lake L	Pair	-
Spring Pair	2023-05-17	36	RNDU	Ring-necked Duck	1	1	-	2	Wetland S	Pair	-
Spring Pair	2023-05-17	45	RNDU	Ring-necked Duck	1	1	-	2	Lake M	Pair	-
Spring Pair	2023-05-17	52	RNDU	Ring-necked Duck	1	1	-	2	Sedge Meadow M	Pair	-
Spring Pair	2023-05-17	72	RNDU	Ring-necked Duck	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-17	79	RNDU	Ring-necked Duck	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-17	48	RNDU	Ring-necked Duck	2	1	-	3	Pond M	Pair	-
Spring Pair	2023-05-17	77	RNDU	Ring-necked Duck	2	2	-	4	Creek	Pair	-
Spring Pair	2023-05-17	35	RNDU	Ring-necked Duck	3	2	-	5	Wetland M	Pair	-
Spring Pair	2023-05-17	65	RNDU	Ring-necked Duck	4	2	-	6	Wetland L	Pair	-
Spring Pair	2023-05-17	55	RNDU	Ring-necked Duck	5	3	-	8	Wetland L	Pair	-
Spring Pair	2023-05-18	164	RNDU	Ring-necked Duck	1	-	-	1	Pond S	-	-
Spring Pair	2023-05-18	129	RNDU	Ring-necked Duck	3	-	-	3	Lake M	-	-
Spring Pair	2023-05-18	96	RNDU	Ring-necked Duck	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	111	RNDU	Ring-necked Duck	1	1	-	2	Pond S	Pair	-
Spring Pair	2023-05-18	127	RNDU	Ring-necked Duck	1	1	-	2	Wetland M	Pair	-
Spring Pair	2023-05-18	91	RNDU	Ring-necked Duck	1	2	-	3	Wetland L	-	-
Spring Pair	2023-05-18	140	RNDU	Ring-necked Duck	2	2	-	4	Pond S	Pair	-
Spring Pair	2023-05-18	134	RNDU	Ring-necked Duck	5	2	-	7	Wetland M	-	-
Spring Pair	2023-05-19	172	RNDU	Ring-necked Duck	3	-	-	3	Creek	-	-
Spring Pair	2023-05-19	218	RNDU	Ring-necked Duck	3	-	-	3	Pond S	-	-
Spring Pair	2023-05-19	186	RNDU	Ring-necked Duck	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	242	RNDU	Ring-necked Duck	1	1	-	2	Creek	Pair	-
Spring Pair	2023-05-19	243	RNDU	Ring-necked Duck	1	1	-	2	Creek	Pair	-

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Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-19	208	RNDU	Ring-necked Duck	3	1	-	4	Wetland L	Pair	-
Spring Pair	2023-05-19	167	RNDU	Ring-necked Duck	2	2	-	4	Wetland	Pair	-
Spring Pair	2023-05-19	201	RNDU	Ring-necked Duck	2	2	-	4	Lake	Pair	-
Spring Pair	2023-05-19	224	RNDU	Ring-necked Duck	5	2	-	7	Wetland L	Pair	-
Spring Pair	2023-05-19	215	RNDU	Ring-necked Duck	11	11	-	22	Wetland M	Pair	-
Spring Pair	2023-05-18	120	RNGR	Red-necked Grebe	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	117	RNGR	Red-necked Grebe	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-18	155	RNGR	Red-necked Grebe	-	-	6	6	Lake L	Pair	-
Spring Pair	2023-05-19	184	RNGR	Red-necked Grebe	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-19	196	RNGR	Red-necked Grebe	1	1	-	2	Pond	Pair	-
Spring Pair	2023-05-18	92	SACR	Sandhill Crane	-	-	1	1	Wetland L	Nest Found	Sandhill crane with nest
Spring Pair	2023-05-19	246	SACR	Sandhill Crane	-	-	1	1	Other	-	Flying
Spring Pair	2023-05-17	30	SNGO	Snow Goose	-	-	1	1	Creek	-	-
Spring Pair	2023-05-17	59	SUSC	Surf Scoter	1	2	-	3	Lake L	Pair	-
Spring Pair	2023-05-17	33	SUSC	Surf Scoter	5	2	-	7	Lake L	Pair	-
Spring Pair	2023-05-18	149	SUSC	Surf Scoter	2	1	-	3	Lake L	Pair	-
Spring Pair	2023-05-18	150	SUSC	Surf Scoter	2	1	-	3	Lake L	Pair	-
Spring Pair	2023-05-18	157	SUSC	Surf Scoter	14	10	-	24	Lake L	-	-
Spring Pair	2023-05-19	178	SUSC	Surf Scoter	11	4	-	15	Lake	-	-
Spring Pair	2023-05-18	137	TRUS	Trumpeter Swan	-	-	2	2	Lake L	Pair	-
Spring Pair	2023-05-19	175	TRUS	Trumpeter Swan	1	1	-	2	Pond	Nest Found	Possible nest
Spring Pair	2023-05-17	20	UNDI	Unspecified Diving Duck	-	-	1	1	Pond M	-	-
Spring Pair	2023-05-17	71	UNDI	Unspecified Diving Duck	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-19	250	UNDI	Unspecified Diving Duck	-	-	1	1	Lake M	-	Dove repeatedly.
Spring Pair	2023-05-18	88	UNDU	Unspecified Duck	-	-	1	1	Pond L	-	-
Spring Pair	2023-05-19	189	UNDU	Unspecified Duck	-	-	3	3	Wetland	-	-
Spring Pair	2023-05-18	153	UNLG	Unspecified Gull	-	-	1	1	Lake L	-	White head, black wing tips.
Spring Pair	2023-05-19	175	UNLG	Unspecified Gull	-	-	1	1	Pond	-	Soaring. White head, grey wings.
Spring Pair	2023-05-19	202	UNLG	Unspecified Gull	-	-	1	1	Lake	-	-
Spring Pair	2023-05-19	209	UNLG	Unspecified Gull	-	-	2	2	Wetland M	-	-
Spring Pair	2023-05-17	17	UNSA	Unspecified Sandpiper	-	-	1	1	Wetland S	-	-
Spring Pair	2023-05-17	28	UNSA	Unspecified Sandpiper	-	-	2	2	Creek	-	-
Spring Pair	2023-05-18	101	UNSA	Unspecified Sandpiper	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-19	185	UNSA	Unspecified Sandpiper	-	-	1	1	Pond	-	-
Spring Pair	2023-05-17	22	UNSH	Unspecified Shorebird	-	-	1	1	Pond M	-	-
Spring Pair	2023-05-17	39	UNSH	Unspecified Shorebird	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-17	70	UNSH	Unspecified Shorebird	-	-	1	1	Wetland L	-	-
Spring Pair	2023-05-17	73	UNSH	Unspecified Shorebird	-	-	1	1	Creek	-	-

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Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Spring Pair	2023-05-18	103	UNSH	Unspecified Shorebird	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	107	UNSH	Unspecified Shorebird	-	-	1	1	Wetland M	-	-
Spring Pair	2023-05-18	114	UNSH	Unspecified Shorebird	-	-	1	1	Wetland M	-	-
Spring Pair	2023-05-18	110	UNSH	Unspecified Shorebird	-	-	2	2	Wetland S	-	-
Spring Pair	2023-05-19	169	UNSH	Unspecified Shorebird	-	-	1	1	Wetland	-	Orange/yellow legs
Spring Pair	2023-05-19	209	UNSH	Unspecified Shorebird	-	-	4	4	Wetland M	-	-
Spring Pair	2023-05-18	126	UNTE	Unspecified Teal	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-17	38	UNYE	Unspecified Yellowlegs	-	-	1	1	Wetland M	-	-
Spring Pair	2023-05-17	54	UNYE	Unspecified Yellowlegs	-	-	1	1	Wetland M	-	-
Spring Pair	2023-05-17	71	UNYE	Unspecified Yellowlegs	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-18	128	UNYE	Unspecified Yellowlegs	-	-	1	1	Lake S	-	-
Spring Pair	2023-05-18	93	UNYE	Unspecified Yellowlegs	-	-	2	2	Lake L	-	-
Spring Pair	2023-05-19	185	UNYE	Unspecified Yellowlegs	-	-	1	1	Pond	-	-
Spring Pair	2023-05-19	207	UNYE	Unspecified Yellowlegs	-	-	1	1	Lake M	-	-
Spring Pair	2023-05-19	211	UNYE	Unspecified Yellowlegs	-	-	1	1	Pond M	-	-
Spring Pair	2023-05-19	221	UNYE	Unspecified Yellowlegs	-	-	1	1	Lake L	-	-
Spring Pair	2023-05-18	97		Horned Grebe	-	-	1	1	Pond S	-	-
Fall Staging	2023-09-09	18	BEKI	Belted Kingfisher	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	35	BEKI	Belted Kingfisher	-	-	1	1	Pond	-	-
Fall Staging	2023-09-09	13	BUFF	Bufflehead	-	2	2	4	Lake	-	-
Fall Staging	2023-09-09	28	BWTE	Blue-winged Teal	1	2	-	3	Lake	-	-
Fall Staging	2023-09-09	19	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	38	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	39	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	40	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	41	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	42	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	33	COLO	Common Loon	-	-	2	2	Lake	-	-
Fall Staging	2023-09-09	31	COLO	Common Loon	-	-	3	3	Lake	-	-
Fall Staging	2023-09-09	36	COME	Common Merganser	-	-	3	3	Pond	-	-
Fall Staging	2023-09-09	22	LESC	Lesser Scaup	-	-	5	5	Lake	-	-
Fall Staging	2023-09-09	54	MALL	Mallard	-	1	-	1	Pond	-	-
Fall Staging	2023-09-09	53	MALL	Mallard	-	5	-	5	Pond	-	-
Fall Staging	2023-09-09	16	MALL	Mallard	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	55	MALL	Mallard	-	-	1	1	Pond	-	-
Fall Staging	2023-09-09	9	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-09	50	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-09	12	MALL	Mallard	-	-	18	18	Lake	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Fall Staging	2023-09-09	20	NOSH	Northern Shoveler	-	1	-	1	Lake	-	-
Fall Staging	2023-09-09	17	NOSH	Northern Shoveler	-	4	1	5	Lake	-	-
Fall Staging	2023-09-09	25	RUDU	Ruddy Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-09	11	TRUS	Trumpeter Swan	1	1	2	4	Lake	-	-
Fall Staging	2023-09-09	57	UNDA	Unspecified Dabbling Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	21	UNDA	Unspecified Dabbling Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-09	48	UNDA	Unspecified Dabbling Duck	-	-	4	4	Lake	-	-
Fall Staging	2023-09-09	60	UNDA	Unspecified Dabbling Duck	-	-	4	4	Pond	-	-
Fall Staging	2023-09-09	29	UNDA	Unspecified Dabbling Duck	-	-	10	10	Pond	-	-
Fall Staging	2023-09-09	10	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	14	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	27	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	44	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	51	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-09	61	UNDI	Unspecified Diving Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-09	47	UNDI	Unspecified Diving Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-09	52	UNDU	Unspecified Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-09	56	UNDU	Unspecified Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-09	23	UNDU	Unspecified Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-09	45	UNDU	Unspecified Duck	-	-	2	2	Lake	-	Small with no marking on wing, brown
Fall Staging	2023-09-09	59	UNGO	Unspecified Goldeneye	-	-	2	2	Pond	-	-
Fall Staging	2023-09-09	30	UNGO	Unspecified Goldeneye	-	-	3	3	Pond	-	-
Fall Staging	2023-09-10	79	BAGO	Barrow's Goldeneye	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	108	BEKI	Belted Kingfisher	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	84	BUFF	Bufflehead	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	74	BUFF	Bufflehead	-	-	2	2	Lake	-	-
Fall Staging	2023-09-10	63	BUFF	Bufflehead	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	93	BUFF	Bufflehead	-	-	3	3	Pond	-	-
Fall Staging	2023-09-10	145	BUFF	Bufflehead	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	114	BUFF	Bufflehead	-	-	4	4	Lake	-	-
Fall Staging	2023-09-10	136	BUFF	Bufflehead	-	-	4	4	Lake	-	-
Fall Staging	2023-09-10	81	BUFF	Bufflehead	-	-	6	6	Lake	-	-
Fall Staging	2023-09-10	65	BWTE	Blue-winged Teal	1	-	-	1	Pond	-	-
Fall Staging	2023-09-10	68	BWTE	Blue-winged Teal	1	-	-	1	Pond	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Fall Staging	2023-09-10	120	BWTE	Blue-winged Teal	-	3	-	3	Pond	-	-
Fall Staging	2023-09-10	71	BWTE	Blue-winged Teal	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	150	BWTE	Blue-winged Teal	-	-	100	100	Lake	-	-
Fall Staging	2023-09-10	143	CANG	Canada Goose	-	-	8	8	Lake	-	-
Fall Staging	2023-09-10	154	COGO	Common Goldeneye	-	1	-	1	Lake	-	-
Fall Staging	2023-09-10	155	COGO	Common Goldeneye	-	1	-	1	Lake	-	-
Fall Staging	2023-09-10	156	COGO	Common Goldeneye	-	1	1	2	Lake	-	-
Fall Staging	2023-09-10	94	COGO	Common Goldeneye	-	-	2	2	Pond	-	-
Fall Staging	2023-09-10	101	COGO	Common Goldeneye	-	-	7	7	Lake	-	-
Fall Staging	2023-09-10	80	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	82	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	83	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	86	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	115	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	123	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	153	COLO	Common Loon	-	-	2	2	Lake	-	-
Fall Staging	2023-09-10	148	COME	Common Merganser	-	-	4	4	Lake	-	-
Fall Staging	2023-09-10	69	GADW	Gadwall	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	75	GWTE	Green-winged Teal	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	141	MALL	Mallard	1	6	-	7	Lake	-	-
Fall Staging	2023-09-10	77	MALL	Mallard	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	106	MALL	Mallard	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	112	MALL	Mallard	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	144	MALL	Mallard	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	146	MALL	Mallard	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	70	MALL	Mallard	-	-	2	2	Lake	-	-
Fall Staging	2023-09-10	72	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	73	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	92	MALL	Mallard	-	-	4	4	Pond	-	-
Fall Staging	2023-09-10	67	MALL	Mallard	-	-	6	6	Pond	-	-
Fall Staging	2023-09-10	118	MALL	Mallard	-	-	6	6	Pond	-	-
Fall Staging	2023-09-10	110	MALL	Mallard	-	-	7	7	Pond	-	-
Fall Staging	2023-09-10	135	MALL	Mallard	-	-	7	7	Lake	-	-
Fall Staging	2023-09-10	138	MALL	Mallard	-	-	7	7	Lake	-	-
Fall Staging	2023-09-10	64	MALL	Mallard	-	-	10	10	Lake	-	-
Fall Staging	2023-09-10	149	MALL	Mallard	-	-	10	10	Lake	-	-
Fall Staging	2023-09-10	71	MALL	Mallard	-	-	40	40	Lake	-	-
Fall Staging	2023-09-10	134	NOSH	Northern Shoveler	-	-	2	2	Lake	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Fall Staging	2023-09-10	130	RNDU	Ring-necked Duck	1	6	-	7	Lake	-	-
Fall Staging	2023-09-10	125	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	128	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	129	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	132	RNDU	Ring-necked Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	104	RNDU	Ring-necked Duck	-	-	2	2	Pond	-	-
Fall Staging	2023-09-10	127	RNDU	Ring-necked Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-10	113	RNDU	Ring-necked Duck	-	-	3	3	Pond	-	-
Fall Staging	2023-09-10	147	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-10	89	RNDU	Ring-necked Duck	-	-	7	7	Lake	-	-
Fall Staging	2023-09-10	139	RNDU	Ring-necked Duck	-	-	7	7	Lake	-	-
Fall Staging	2023-09-10	131	RNDU	Ring-necked Duck	-	-	8	8	Lake	-	-
Fall Staging	2023-09-10	107	RNDU	Ring-necked Duck	-	-	11	11	Pond	-	-
Fall Staging	2023-09-10	151	RUDU	Ruddy Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	142	TRUS	Trumpeter Swan	-	-	5	5	Lake	-	-
Fall Staging	2023-09-10	111	UNDA	Unspecified Dabbling Duck	-	-	2	2	Pond	-	-
Fall Staging	2023-09-10	96	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	100	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	105	UNDI	Unspecified Diving Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	109	UNDI	Unspecified Diving Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	119	UNDI	Unspecified Diving Duck	-	-	1	1	Pond	-	-
Fall Staging	2023-09-10	157	UNDI	Unspecified Diving Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	103	UNDI	Unspecified Diving Duck	-	-	2	2	Pond	-	-
Fall Staging	2023-09-10	140	UNDI	Unspecified Diving Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-10	87	UNSC	Unspecified Scaup	-	-	4	4	Lake	-	-
Fall Staging	2023-09-10	88	UNSH	Unspecified Shorebird	-	-	1	1	Wetland	-	-
Fall Staging	2023-09-10	78	UNTE	Unspecified Teal	-	-	1	1	Lake	-	-
Fall Staging	2023-09-10	137	UNTE	Unspecified Teal	-	-	6	6	Lake	-	-
Fall Staging	2023-09-10	76	UNTE	Unspecified Teal	-	-	20	20	Lake	-	-
Fall Staging	2023-09-11	218	AMWI	American Wigeon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	177	BUFF	Bufflehead	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	184	BUFF	Bufflehead	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	188	BUFF	Bufflehead	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	195	BUFF	Bufflehead	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	209	BUFF	Bufflehead	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	210	BUFF	Bufflehead	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	176	BUFF	Bufflehead	-	-	3	3	Lake	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Fall Staging	2023-09-11	193	BUFF	Bufflehead	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	201	BUFF	Bufflehead	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	175	BUFF	Bufflehead	-	-	4	4	Lake	-	-
Fall Staging	2023-09-11	183	BUFF	Bufflehead	-	-	5	5	Lake	-	-
Fall Staging	2023-09-11	191	BWTE	Blue-winged Teal	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	189	COGO	Common Goldeneye	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	197	COGO	Common Goldeneye	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	206	COGO	Common Goldeneye	-	-	1	1	Pond	-	-
Fall Staging	2023-09-11	217	COGO	Common Goldeneye	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	203	COGO	Common Goldeneye	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	194	COGO	Common Goldeneye	-	-	7	7	Lake	-	-
Fall Staging	2023-09-11	208	COGO	Common Goldeneye	-	-	8	8	Lake	-	-
Fall Staging	2023-09-11	160	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	161	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	167	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	185	COLO	Common Loon	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	213	COLO	Common Loon	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	166	COLO	Common Loon	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	196	COME	Common Merganser	-	-	6	6	Lake	-	-
Fall Staging	2023-09-11	205	GADW	Gadwall	-	1	-	1	Pond	-	-
Fall Staging	2023-09-11	202	MALL	Mallard	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	216	MALL	Mallard	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	165	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	182	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	187	MALL	Mallard	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	169	MALL	Mallard	-	-	5	5	Lake	-	-
Fall Staging	2023-09-11	191	MALL	Mallard	-	-	5	5	Lake	-	-
Fall Staging	2023-09-11	204	MALL	Mallard	-	-	11	11	Lake	-	-
Fall Staging	2023-09-11	179	MALL	Mallard	-	-	17	17	Lake	-	-
Fall Staging	2023-09-11	200	NOSH	Northern Shoveler	-	-	8	8	Lake	-	-
Fall Staging	2023-09-11	173	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	180	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	181	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	211	RNDU	Ring-necked Duck	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	215	RNDU	Ring-necked Duck	-	-	2	2	Lake	-	-
Fall Staging	2023-09-11	164	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	168	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	192	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-

Appendix Z: Waterbird Survey Observation Data, 2023

Survey Period	Date	Way-point	Species Code	Species Common Name	# Male	# Female	# Unk	Total	Habitat Type	Breeding Behaviour	Comment
Fall Staging	2023-09-11	197	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	198	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	207	RNDU	Ring-necked Duck	-	-	3	3	Lake	-	-
Fall Staging	2023-09-11	210	RNDU	Ring-necked Duck	-	-	6	6	Lake	-	-
Fall Staging	2023-09-11	199	RNDU	Ring-necked Duck	-	-	8	8	Lake	-	-
Fall Staging	2023-09-11	178	RNDU	Ring-necked Duck	3	-	12	15	Lake	-	-
Fall Staging	2023-09-11	190	RNGR	Red-necked Grebe	-	-	1	1	Lake	-	-
Fall Staging	2023-09-11	212	UNGO	Unspecified Goldeneye	-	-	2	2	Lake	-	-

APPENDIX AA UPLAND BIRD VARIABLE RADIUS POINT COUNT SURVEY SITE DATA, 2023

Appendix AA: Upland Bird Variable Radius Point Count Survey Site Data, 2023

Transect ID	Site ID	Survey Date	Zone 10U		Time Start	Noise	Temp (°C)	Sky	Wind	Wind Direction	Call Play Back Completed (Y/N)	Call Play Back Results	BEC SubZone	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer Forest	% Deciduous Forest	% Mixed Forest	
			Easting	Northing																		
UB01_2023	S1	2023-07-07	376442	5893256	5:21	0	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-	-
	S2	2023-07-07	376608	5893164	5:48	1	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-	-
	S3	2023-07-07	376627	5893383	6:25	0	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-	-
	S4	2023-07-07	376583	5893599	6:52	1	-	4	0-1	-	-	-	-	-	-	-	-	-	-	-	-	-
	S5	2023-07-07	376410	5893718	7:13	1	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-	-
UB02	S1	2023-06-16	374481	5894123	4:50	0	-	4	0	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S2	2023-06-16	374480	5894332	5:10	0	-	4	0	E	-	-	ESSFmv1	0	10	0	0	0	0	90	0	0
	S3_2023	2023-06-16	374279	5894342	5:32	1	-	4	0	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4_2023	2023-06-16	374059	5894317	5:55	1	-	4	0	E	-	-	ESSFmv1	0	30	0	0	0	0	0	0	0
	S5_2023	2023-06-16	374064	5894115	6:15	2	-	4	0	E	-	-	ESSFmv1	0	20	0	0	0	0	0	0	0
UB04	S1	2023-06-15	378593	5887727	10:07	0	-	0	1	E	Yes	No Detections	ESSFmv1	0	0	0	0	0	0	60	0	0
	S2	2023-06-15	378381	5887644	10:35	0	-	0	2	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S3	2023-06-15	378282	5887814	10:57	0	-	0	1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4	2023-06-15	378229	5888021	11:17	0	-	0	2	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S5	2023-06-15	378437	5888077	11:36	0	-	0	1	NE	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
UB05	S1	2023-06-14	369390	5891207	7:50	0	6	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S2	2023-06-14	369194	5891212	8:08	0	7	0	0	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S3	2023-06-14	369160	5891005	8:32	0	8	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4	2023-06-14	369100	5890800	8:53	0	8	0	0	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S5	2023-06-14	369309	5890806	9:11	0	8	0	0-1	E	Yes	No Detections	ESSFmv1	0	0	0	0	0	0	100	0	0
UB06	S1	2023-06-15	373621	5890335	7:46	1	8	0	4	NW	Yes	2 visuals, no call back	BAFaun	0	0	0	0	0	0	0	0	0
	S2	2023-06-15	373492	5890120	8:03	1	8	0	4	NE	Yes	Call response 100 m, calling back, getting closer	BAFaun	0	0	0	0	0	0	0	0	0
	S3	2023-06-15	373293	5889961	8:23	1	-	0	4	E	Yes	No Detections	BAFaun	0	0	0	0	0	0	0	0	0
	S4	2023-06-15	373126	5889930	8:37	1	-	0	4	E	Yes	No Detections	BAFaun	0	0	0	0	0	0	0	0	0
	S5	2023-06-15	373174	5890103	8:56	1	-	0	4	W	Yes	No Detections	BAFaun	0	0	0	0	0	0	0	0	0
UB07	S1	2023-06-11	367484	5895893	04:30	0	-	0	0	NE	-	-	ESSFmv1	0	0	0	0	0	0	10	0	0
	S2	2023-06-11	367460	5895687	04:55	0	-	0	0	E	-	-	ESSFmv1	0	0	0	0	0	0	70	0	0
	S3	2023-06-11	367659	5895750	5:24	0	6	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4	2023-06-11	367870	5895677	5:50	0	-	0	0	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S5	2023-06-11	367948	5895848	6:07	0	-	0	0	E	Yes	Single adult call response from 60 m away	ESSFmv1	0	40	0	0	0	0	60	0	0
UB08	S1	2023-06-11	369890	5896082	6:47	0	6	0	0-1	E	-	-	ESSFmv1	0	40	0	0	0	0	60	0	0
	S2	2023-06-11	370087	5896071	07:15	0	6	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S3	2023-06-11	370256	5895976	7:32	0	8	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4	2023-06-11	370287	5896180	7:51	0	-	0	0-1	E	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S5	2023-06-11	370252	5896394	8:09	1	-	0	0-1	E	Yes	No Detections	ESSFmv1	0	60	0	0	0	0	40	0	0
UB09	S1	2023-06-15	372586	5896010	6:08	1	6	0	1	NW	-	-	ESSFmv1	0	0	0	0	0	0	10	0	0
	S2	2023-06-15	372599	5896190	5:52	0	5	0	1	N	-	-	ESSFmv1	0	0	0	0	0	0	0	0	0
	S3	2023-06-15	372393	5896196	5:32	1	5	0	1	NW	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S4	2023-06-15	372216	5896295	5:03	0	5	0	0	NE	-	-	ESSFmv1	0	0	0	0	0	0	100	0	0
	S5	2023-06-15	372245	5896111	4:43	1	-	0	0-1	N	Yes	No Detections	ESSFmv1	0	45	0	0	0	0	55	0	0

Appendix AA: Upland Bird Variable Radius Point Count Survey Site Data, 2023

Transect ID	Site ID	Survey Date	Zone 10U		% Mountain	% Tundra	% Crown Closure	Stand Age	Dominant Plants	General Habitat	Comments
			Easting	Northing							
UB01_2023	S1	2023-07-07	376442	5893256	-	-	-	-	-	-	-
	S2	2023-07-07	376608	5893164	-	-	-	-	-	-	-
	S3	2023-07-07	376627	5893383	-	-	-	-	-	-	-
	S4	2023-07-07	376583	5893599	-	-	-	-	-	-	-
	S5	2023-07-07	376410	5893718	-	-	-	-	-	-	-
UB02	S1	2023-06-16	374481	5894123	0	0	40	Old	Spruce and Moss	Mature conifer forest, middle of footprint	-
	S2	2023-06-16	374480	5894332	0	0	30	Old	Spruce and Moss	Mature conifer forest	-
	S3_2023	2023-06-16	374279	5894342	0	0	40	Old	Spruce and Moss	Mature conifer forest	-
	S4_2023	2023-06-16	374059	5894317	70	0	40	Old	Spruce and Moss	Shallow wetland and stream in mature conifer forest	-
	S5_2023	2023-06-16	374064	5894115	80	0	40	Old	Spruce and Moss	Wetland and creek in mature conifer forest	-
UB04	S1	2023-06-15	378593	5887727	0	0	70	Old	Spruce and Moss	Forest beside cut block	-
	S2	2023-06-15	378381	5887644	0	0	70	Old	Spruce	Mature conifer forest	-
	S3	2023-06-15	378282	5887814	0	0	60	Old	Spruce and Moss	Mature conifer forest	-
	S4	2023-06-15	378229	5888021	0	0	40	Old	Pine	Generally drier than other points	-
	S5	2023-06-15	378437	5888077	0	0	30	Medium	Fir and Pine	On the edge of an old replanted cut block, half old half young	-
UB05	S1	2023-06-14	369390	5891207	0	0	40	Old	Spruce and Moss	Mature conifer forest	-
	S2	2023-06-14	369194	5891212	0	0	55	Old	Spruce and Moss	Mature conifer forest	-
	S3	2023-06-14	369160	5891005	0	0	20	Old	Spruce and Moss	Mature conifer forest	-
	S4	2023-06-14	369100	5890800	0	0	25	Old	Spruce and Moss	Mature conifer forest	-
	S5	2023-06-14	369309	5890806	0	0	45	Old	Spruce and Moss	Mature conifer forest	-
UB06	S1	2023-06-15	373621	5890335	100	0	0	Old	Pine and Lichen	Barren top of mountain	-
	S2	2023-06-15	373492	5890120	100	0	0	Old	Pine and Lichen	Barren top of mountain, white bark pine	-
	S3	2023-06-15	373293	5889961	100	0	0	Old	Pine and Lichen	Barren top of mountain	-
	S4	2023-06-15	373126	5889930	100	0	0	Old	Pine and Lichen	Barren top of mountain	-
	S5	2023-06-15	373174	5890103	100	0	0	Old	Willow, Pine, and Lichen	Barren top of mountain	-
UB07	S1	2023-06-11	367484	5895893	0	0	0	Unknown	Spruce	Cut block	-
	S2	2023-06-11	367460	5895687	0	0	30	Old	Spruce and Moss	Forest beside cut block	-
	S3	2023-06-11	367659	5895750	0	0	40	Old	Spruce and Moss	Mature conifer forest	-
	S4	2023-06-11	367870	5895677	0	0	30	Old	Spruce and Moss	Mature conifer forest	-
	S5	2023-06-11	367948	5895848	0	0	20	Old	Spruce, Grass, and Sedge	Wetland in conifer forest	-
UB08	S1	2023-06-11	369890	5896082	0	0	25	Old	Spruce and Shrub	Wetland and mature forest by a cut block	-
	S2	2023-06-11	370087	5896071	0	0	45	Old	Spruce	-	-
	S3	2023-06-11	370256	5895976	0	0	40	Old	Spruce and Moss	Mature conifer forest	-
	S4	2023-06-11	370287	5896180	0	0	30	Old	Spruce and Moss	Mature conifer forest	-
	S5	2023-06-11	370252	5896394	0	0	10	Old	Spruce, Grass, and Sedge	Wetland with creek in mature conifer forest	-
UB09	S1	2023-06-15	372586	5896010	0	0	1	Old	None	Cut block between two patches of conifer forest. Can hear security generator in distance.	-
	S2	2023-06-15	372599	5896190	0	0	0	Unknown	None	Cut block near C trail	Previous forest is now clear cut
	S3	2023-06-15	372393	5896196	0	0	30	Old	Spruce and Moss	Mature conifer forest. Near security gate, can hear generator faintly in background	-
	S4	2023-06-15	372216	5896295	0	0	30	Old	Spruce and Moss	Mature conifer forest	-
	S5	2023-06-15	372245	5896111	0	0	10	Old	Spruce, Sedge, and Moss	Wetland by road, generator sound in background	-

Appendix AA: Upland Bird Variable Radius Point Count Survey Site Data, 2023

Transect ID	Site ID	Survey Date	Zone 10U		Time Start	Noise	Temp (°C)	Sky	Wind	Wind Direction	Call Play Back Completed (Y/N)	Call Play Back Results	BEC SubZone	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer Forest	% Deciduous Forest	% Mixed Forest
			Easting	Northing																	
UB10	S1	2023-06-14	371477	5896290	5:52	0	5	0	0	E	Yes	No Detections	ESSFmv1	0	0	0	0	0	100	0	0
	S2	2023-06-14	371338	5896131	5:33	0	5	0	0-1	N	-	-	ESSFmv1	0	0	0	0	0	100	0	0
	S3	2023-06-14	371151	5896152	5:17	0	5	0	0	E	-	-	ESSFmv1	0	0	0	0	0	100	0	0
	S4	2023-06-14	371008	5896326	4:56	0	5	0	0-1	E	-	-	ESSFmv1	0	70	0	0	0	30	0	0
	S5	2023-06-14	371040	5896530	4:37	0	5	3	0-1	E	-	-	ESSFmv1	0	0	0	0	0	100	0	0
UB11	S1	2023-07-07	377845	5893161	8:47	0	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-
	S5	2023-07-07	377422	5893329	8:10	0	-	2	0-1	-	-	-	-	-	-	-	-	-	-	-	-
UB12	S1	2023-06-18	376621	5899490	9:59	0	5	2	1	W	Yes	No Detections	SBSmc3	0	0	0	0	0	100	0	0
	S2_2023	2023-06-18	376840	5899545	9:36	0	-	2	1	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S3	2023-06-18	376850	5899325	9:12	0	3	2	1	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S4	2023-06-18	376839	5899138	8:44	0	-	2	1	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S5	2023-06-18	376664	5899152	8:21	0	2	2	1	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
UB14	S1	2023-06-17	378270	5897769	7:21	1	-	1	2	W	Yes	No Detections	SBSmc3	0	0	0	0	0	100	0	0
	S2	2023-06-17	378247	5897971	7:07	0	5	1	2	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S3	2023-06-17	378436	5898039	6:46	1	5	1	1	NW	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S4	2023-06-17	378552	5897861	6:22	0	5	1	1	NW	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S5	2023-06-17	378648	5897687	5:59	0	4	1	1	NW	-	-	SBSmc3	0	0	0	0	0	100	0	0
UB15	S1	2023-06-17	378220	5897519	7:40	1	-	1	2	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S2	2023-06-17	378331	5897325	8:05	1	6	1	2	W	-	-	SBSmc3	0	70	0	0	0	30	0	0
	S3	2023-06-17	378496	5897240	8:31	1	-	1	2	W	-	-	SBSmc3	0	20	0	0	0	80	0	0
	S4	2023-06-17	378691	5897162	8:59	1	-	2	2	W	-	-	SBSmc3	0	0	0	0	0	100	0	0
	S5	2023-06-17	378840	5897025	9:16	1	-	2	1	W	Yes	No Detections	SBSmc3	0	0	0	0	0	100	0	0

Appendix AA: Upland Bird Variable Radius Point Count Survey Site Data, 2023

Transect ID	Site ID	Survey Date	Zone 10U		% Mountain	% Tundra	% Crown Closure	Stand Age	Dominant Plants	General Habitat	Comments
			Easting	Northing							
UB10	S1	2023-06-14	371477	5896290	0	0	20	Old	Spruce and Shrub	Mature conifer forest	-
	S2	2023-06-14	371338	5896131	0	0	45	Old	Spruce and Moss	Mature conifer forest	-
	S3	2023-06-14	371151	5896152	0	0	35	Old	Spruce and Grass	Mature conifer forest	-
	S4	2023-06-14	371008	5896326	0	0	10	Old	Grass and Sedge	Wetland in mature conifer forest	-
	S5	2023-06-14	371040	5896530	0	0	45	Old	Spruce	Mature conifer forest	-
UB11	S1	2023-07-07	377845	5893161	-	-	-	-	-	-	-
	S5	2023-07-07	377422	5893329	-	-	-	-	-	-	-
UB12	S1	2023-06-18	376621	5899490	0	0	40	Medium	Pine and Spruce	Medium growth forest beside replanted pine cut block	-
	S2_2023	2023-06-18	376840	5899545	0	0	30	Young	Pine	Replanted cut block	-
	S3	2023-06-18	376850	5899325	0	0	15	Old	Pine and Spruce	Old conifer forest on edge of replanted cut block	-
	S4	2023-06-18	376839	5899138	0	0	25	Young	Pine	Replanted cut block	-
	S5	2023-06-18	376664	5899152	0	0	15	Young	Pine	Replanted cut block	-
UB14	S1	2023-06-17	378270	5897769	0	0	20	Young	Pine	Replanted cut block	-
	S2	2023-06-17	378247	5897971	0	0	10	Young	Pine	Replanted cut block	-
	S3	2023-06-17	378436	5898039	0	0	30	Medium	Pine	Mature pine forest	Creaky trees
	S4	2023-06-17	378552	5897861	0	0	40	Old	Spruce	Moved into edge of mature spruce forest	-
	S5	2023-06-17	378648	5897687	0	0	30	Young	Pine	Replanted cut block	-
UB15	S1	2023-06-17	378220	5897519	0	0	60	Old	Spruce and Moss	Mature conifer forest on edge of cut block	-
	S2	2023-06-17	378331	5897325	0	0	10	Old	Grass and Sedge	Wetland in mature forest beside cut block	-
	S3	2023-06-17	378496	5897240	0	0	10	Old	Spruce	Mature conifer forest by wetland	-
	S4	2023-06-17	378691	5897162	0	0	30	Medium	Spruce/Pine	Edge of replanted cut block	-
	S5	2023-06-17	378840	5897025	0	0	40	Old	Spruce and Moss	Mature conifer forest near small creek	-

APPENDIX BB UPLAND BIRD VARIABLE RADIUS POINT COUNT SURVEY OBSERVATION DATA, 2023



Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB01_2023	S1	RCKI	Ruby-crowned Kinglet	-	-	1	-	1	Visual	NW	0-50	-	-
	S1	BOCH	Boreal Chickadee	1	-	-	-	1	Song	NE	50-100	-	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	-	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	-	-
	S1	LISP	Lincoln's Sparrow	1	1	-	-	2	Song	NE	50-100	-	-
	S1	YRWA	Yellow-rumped Warbler	-	-	1	-	1	Song	NE	50-100	-	Flew from 75-50 m within the NE quadrant
	S2	DEJU	Dark-eyed Junco	-	-	2	-	2	Call	SW	50-100	-	-
	S2	GCKI	Golden-crowned Kinglet	-	-	1	-	1	Call	SE	0-50	-	Flew from 0-50 m to 50-100 m in SE quadrant
	S2	VATH	Varied Thrush	1	-	-	-	1	Song	SE	50-100	-	-
	S3	CAJA	Canada Jay	-	-	1	-	1	Call	NE	0-50	-	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	-	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	-	-
	S3	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	NE	50-100	-	-
	S4	CAJA	Canada Jay	-	-	1	-	1	Call	NW	50-100	-	-
	S4	GCKI	Golden-crowned Kinglet	-	-	1	-	1	Call	NW	0-50	-	-
	S4	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	50-100	-	-
	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	-	-
	S5	AMRO	American Robin	1	-	-	-	1	Song	NW	50-100	-	-
	S5	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NE	50-100	-	-
	S5	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SE	0-50	-	-
S5	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	-	-	
UB02	S1	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	SW	50-100	0-3	-
	S1	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	NE	50	0-3	-
	S1	TOWA	Townsend's Warbler	1	-	-	-	1	Song	NW	50-100	0-3	-
	S1	TOWA	Townsend's Warbler	1	-	-	-	1	Song	NW	0-50	0-3	-
	S1	VATH	Varied Thrush	1	-	-	-	1	Song	NE	50-100	0-3	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SW	0-50	0-3	-
	S2	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	3-5	-
	S2	PISI	Pine Siskin	-	-	1	-	1	Call	SW	0-50	0-3	Flew from 40 m SW to 45 m NW
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NE	100	0-3	-
	S3_2023	CAJA	Canada Jay	-	-	1	-	1	Call	NE	50-100	3-5	-
	S3_2023	VATH	Varied Thrush	1	-	-	-	1	Song	NW	100	0-3	-
	S4_2023	CAJA	Canada Jay	-	-	-	-	0	Call	NE	50-100	0-3	-
	S4_2023	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NW	50-100	0-3	-
	S5_2023	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SE	0-50	0-3	-
UB04	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	0-50	0-3	Flew from 45 m SW to >100 m NW
	S2	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	SW	50-100	0-3	-
	S3	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	NW	50-100	0-3	-
	S3	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	SE	50-100	0-3	-
	S3	CAJA	Canada Jay	-	-	1	-	1	Call	NE	50	3-5	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	3-5	-
S4	CAJA	Canada Jay	-	-	1	-	1	Call	NW	50-100	3-5	-	

Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB04 (cont'd)	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	0-50	0-3	-
	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	0-3	Flew from 75 m NE to 70 m SE
UB05	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	100	0-3	-
	S1	PAWR	Pacific Wren	1	-	-	-	1	Song	NW	100	0-3	Flew from 100 m to 50 m in same quadrant
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-1	-
	S2	DEJU	Dark-eyed Junco	-	-	1	-	1	Call	SW	0-50	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	0-3	Flew from 50 m to 80 m in same quadrant
	S2	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	SE	100	3-5	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	0-3	-
	S4	PISI	Pine Siskin	1	-	-	-	1	Song	NE	50-100	3-5	Flew from 75 m NE to 70 m SE
	S5	CHSP	Chipping Sparrow	1	-	-	-	1	Song	NW	0-50	0-3	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	3-5	-
	S5	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NW	50-100	0-3	-
	S5	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	0-3	-
	S5	TOWA	Townsend's Warbler	1	-	-	-	1	Song	SE	50-100	3-5	-
UB06	S1	CLNU	Clark's Nutcracker	-	-	1	-	1	Visual	NE	50-100	0-3	Flew from 60 m NE to 75 m NW
	S1	CLNU	Clark's Nutcracker	-	-	1	-	1	Call	SE	50-100	0-3	-
	S1	UNSP	Unknown Sparrow	-	-	1	-	1	Visual	NE	0-50	0-3	Flew from 40 m NE to 40 m SW
	S2	AMRO	American Robin	-	-	1	-	1	Visual	NW	50-100	0-3	Flew from 60 m NW to 40 m SW
	S2	CLNU	Clark's Nutcracker	-	-	1	-	1	Call	NE	50-100	0-3	-
	S2	CLNU	Clark's Nutcracker	-	-	1	-	1	Call	SE	50-100	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	3-5	-
	S4	DEJU	Dark-eyed Junco	-	-	1	-	1	Song	SE	50-100	0-3	-
	S4	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SW	50-100	3-5	-
	S5	AMRO	American Robin	-	-	1	-	1	Call	-	50	3-5	-
	S5	CHSP	Chipping Sparrow	1	-	-	-	1	Song	-	50-100	3-5	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	-	50-100	3-5	-
	S5	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	-	50-100	0-3	-
S5	SAVS	Savannah Sparrow	-	-	1	-	1	Visual	-	50-100	3-5	-	
UB07	S1	AMRO	American Robin	1	-	-	-	1	Song	NW	0-50	0-3	-
	S1	AMRO	American Robin	1	-	-	-	1	Song	SW	0-50	3-5	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	3-5	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	3-5	-
	S1	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SW	0-50	3-5	-
	S1	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	SE	50-100	0-3	-
	S1	SAVS	Savannah Sparrow	1	-	-	-	1	Song	NW	0-50	0-3	-
	S1	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	0-50	0-3	-
	S1	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SW	0-50	3-5	-
	S1	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SE	50-100	0-3	-
	S2	AMRO	American Robin	1	-	-	-	1	Song	NW	50-100	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	50-100	3-5	Flew from 75 m SE to 30 m SE

Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB07 (cont'd)	S2	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	SE	0-50	0-3	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	0-50	0-3	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SE	50-100	0-3	-
	S3	AMRO	American Robin	1	-	-	-	1	Song	NW	0-50	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	0-50	0-3	-
	S3	OSFL	Olive-sided Flycatcher	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	OSFL	Olive-sided Flycatcher	1	-	-	-	1	Song	NE	50-100	3-5	-
	S3	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	3-5	-
	S3	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SE	0-50	0-3	-
	S4	AMRO	American Robin	1	-	-	-	1	Song	NW	0-50	0-3	-
	S4	OSFL	Olive-sided Flycatcher	1	-	-	-	1	Song	SE	0-50	0-3	Flew from 35 m SE to 50 m SW
	S4	VATH	Varied Thrush	1	-	-	-	1	Song	NW	100	0-3	-
	S4	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SW	50-100	0-3	-
	S4	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SW	0-50	0-3	-
	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SE	50-100	3-5	-
	S5	ALFL	Alder Flycatcher	1	-	-	-	1	Song	NW	0-50	0-3	Flew in a circle from 30 m NW to 45 m NW and back
	S5	AMRO	American Robin	1	-	-	-	1	Song	NW	50	0-3	-
	S5	AMRO	American Robin	1	-	-	-	1	Song	NE	50-100	0-3	Flew from NE 60 m to SW 75 m
	S5	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SE	50	3-5	-
	S5	OSFL	Olive-sided Flycatcher	1	-	-	-	1	Song	SW	50	0-3	-
	S5	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
S5	WIWA	Wilson's Warbler	1	-	-	-	1	Song	SW	50-100	0-3	-	
S5	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SE	50-100	0-3	-	
UB08	S1	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	SE	50-100	0-3	-
	S1	CHSP	Chipping Sparrow	1	-	-	-	1	Song	SW	0-50	0-3	-
	S1	CLNU	Clark's Nutcracker	-	-	1	-	1	Call	NW	50-100	0-3	-
	S1	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SE	0-50	0-3	-
	S1	PISI	Pine Siskin	1	-	-	-	1	Song	NW	0-50	0-3	-
	S1	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NW	100	0-3	-
	S1	VATH	Varied Thrush	1	-	-	-	1	Song	SE	50-100	0-3	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	0-3	-
	S2	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	NW	0-50	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	0-50	0-3	-
	S2	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SW	0-50	0-3	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NW	0-50	3-5	-
	S2	VATH	Varied Thrush	1	-	-	-	1	Song	NW	50	0-3	-
	S2	VATH	Varied Thrush	1	-	-	-	1	Song	SE	50-100	0-3	-
	S2	WWCR	White-winged Crossbill	-	-	1	-	1	Call	SW	0-50	3-5	Flew from 30 m SW to 40 m NW
	S2	WWCR	White-winged Crossbill	-	-	4	-	4	Call	SE	0-50	0-3	Flew from 15 m SE to 45 m NE
	S3	AMRO	American Robin	1	-	-	-	1	Song	SW	50-100	3-5	-
	S3	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	SW	0-50	0-3	-
S3	PAWR	Pacific Wren	1	-	-	-	1	Song	NW	0-50	0-3	-	

Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB08 (cont'd)	S3	PISI	Pine Siskin	1	-	-	-	1	Song	NW	0-50	0-3	-
	S3	VATH	Varied Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
	S3	VATH	Varied Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
	S3	VATH	Varied Thrush	1	-	-	-	1	Song	NE	50-100	0-3	-
	S4	AMRO	American Robin	1	-	-	-	1	Song	NW	50	0-3	-
	S4	AMRO	American Robin	1	-	-	-	1	Song	NE	100	0-3	-
	S4	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	SE	100	0-3	-
	S4	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	0-3	Flew from 40 m to 10 m in NW quadrant
	S4	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	NE	50-100	3-5	-
	S4	PISI	Pine Siskin	1	-	-	-	1	Song	NE	0-50	0-3	Flew from 40 m NE to 40 m NW
	S4	VATH	Varied Thrush	1	-	-	-	1	Song	NW	100	0-3	-
	S5	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Drum	SW	50	0-3	-
	S5	CHSP	Chipping Sparrow	1	-	-	-	1	Song	SW	0-50	0-3	-
	S5	CLNU	Clark's Nutcracker	-	-	1	-	1	Call	NE	50-100	0-3	-
	S5	DEJU	Dark-eyed Junco	-	-	1	-	1	Call	NW	0-50	0-3	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	0-50	0-3	-
	S5	PISI	Pine Siskin	-	-	1	-	1	Call	NE	0-50	0-3	-
	S5	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NW	0-50	0-3	-
	S5	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	3-5	-
	S5	VATH	Varied Thrush	1	-	-	-	1	Song	SE	0-50	0-3	Cross calling with another VATH in SE quadrant
	S5	VATH	Varied Thrush	1	-	-	-	1	Song	SE	50-100	3-5	Cross calling with another VATH in SE quadrant
UB09	S1	AMRO	American Robin	-	-	1	-	1	Call	SW	75-100	3-5	-
	S1	ATTW	American Three-toed Woodpecker	-	-	1	-	1	Visual	SW	50-75	0-3	Flew from 75 m NE to 50 m SW
	S1	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SE	75-100	0-3	-
	S1	PISI	Pine Siskin	-	-	1	-	1	Call	NW	50-75	0-3	-
	S2	CAJA	Canada Jay	-	-	1	-	1	Visual	NW	0-50	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	100	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	50-100	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2	PISI	Pine Siskin	-	-	1	-	1	Visual	SW	0-50	0-3	Flew from 45 m SW to 75 m SE
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	50-100	3-5	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
	S2	YRWA	Yellow-rumped Warbler	-	-	1	-	1	Call	NW	0-50	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	0-50	3-5	-
	S3	NOFL	Northern Flicker	1	-	-	-	1	Song	SE	50-100	3-5	-
	S3	YRWA	Yellow-rumped Warbler	-	-	1	-	1	Call	NW	0-50	0-3	-
	S3	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	0-3	-
	S4	CAJA	Canada Jay	-	-	3	-	3	Call	NE	0-50	0-3	-
	S4	CAJA	Canada Jay	1	-	-	2	3	Visual	NE	50	0-3	-
S4	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	50-100	0-3	-	
S4	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	3-5	-	
S4	VATH	Varied Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-	

Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB09 (cont'd)	S4	VATH	Varied Thrush	1	-	-	-	1	Song	SE	50-100	0-3	-
	S5	AMRO	American Robin	1	-	-	-	1	Song	NE	50-100	3-5	-
	S5	AMRO	American Robin	1	-	-	-	1	Song	SW	50-100	0-3	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	0-3	-
	S5	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SW	50-100	0-3	-
	S1	AMRE	American Redstart	1	-	-	-	1	Song	SE	50-100	0-3	-
UB10	S1	AMRO	American Robin	1	-	-	-	1	Song	SW	0-50	0-3	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	0-3	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	0-3	-
	S1	RBNU	Red-breasted Nuthatch	-	-	1	-	1	Call	NW	50-100	3-5	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SW	0-50	0-3	-
	S2	AMRO	American Robin	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2	CAJA	Canada Jay	1	-	-	-	1	Song	SE	50-100	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	0-3	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	0-50	3-5	-
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NW	0-50	0-3	-
	S2	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
	S2	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	100	0-3	-
	S3	AMRO	American Robin	1	-	-	-	1	Song	SE	50-100	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	0-50	0-3	-
	S3	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	0-50	0-3	-
	S3	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NE	0-50	0-3	-
	S3	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	0-3	-
	S4	AMRO	American Robin	1	-	-	-	1	Song	NE	50-100	0-3	-
	S4	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50	0-3	-
	S4	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SE	50-100	0-3	-
	S4	LISP	Lincoln's Sparrow	1	-	-	-	1	Song	SW	0-50	0-3	-
	S4	RCKI	Ruby-crowned Kinglet	1	-	-	-	1	Song	SE	0-50	3-5	-
	S4	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SE	0-50	0-3	-
	S4	TRES	Tree Swallow	1	-	-	-	1	Song	NE	50-100	3-5	-
	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SE	50-100	3-5	-
	S5	AMRO	American Robin	1	-	-	-	1	Song	SW	50-100	0-3	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	0-3	-
	S5	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	0-3	-
	S5	VATH	Varied Thrush	1	-	-	-	1	Song	SW	50-100	0-3	-
	UB11	S1	CAJA	Canada Jay	-	-	1	-	1	Call	SE	50-100	-
S1		DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	50-100	-	-
S1		YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	-	-
S5		PISI	Pine Siskin	-	-	1	-	1	Visual	NE	0-50	-	Fly over from NE to SW
S5		YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	-	-

Appendix BB: Upland Bird Variable Radius Point Count Observation Data, 2023

Transect ID	Site ID	Species Code	Species Common Name	# Male	# Female	# Unk	# Young	Total	Behaviour	Quadrant	Distance (m)	Timing (min)	Comment
UB12	S1	DEJU	Dark-eyed Junco	-	-	1	-	1	Call	SE	0-50	3-5	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	50-100	0-3	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2_2023	AMRO	American Robin	-	-	1	-	1	Call	NW	50-100	3-5	-
	S2_2023	DEJU	Dark-eyed Junco	-	-	1	-	1	Visual	NE	0-50	0-3	-
	S2_2023	DEJU	Dark-eyed Junco	-	-	1	-	1	Call	NE	0-50	0-3	-
	S4	GCKI	Golden-crowned Kinglet	1	-	-	-	1	Song	NE	50-100	0-3	-
	S4	VATH	Varied Thrush	1	-	-	-	1	Song	NE	50-100	0-3	Cross calling with another VATH in NE quadrant
	S4	VATH	Varied Thrush	1	-	-	-	1	Song	NE	50-100	0-3	Cross calling with another VATH in NE quadrant
	S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	0-3	-
S5	PISI	Pine Siskin	-	-	3	-	3	Call	SW	0-50	0-3	-	
UB14	S1	AMRO	American Robin	1	-	-	-	1	Song	SW	50-100	0-3	-
	S1	PISI	Pine Siskin	-	-	1	-	1	Call	NW	0-50	0-3	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NW	50-100	0-3	-
	S2	AMRO	American Robin	1	-	-	-	1	Song	NE	50-100	0-3	-
	S2	CAJA	Canada Jay	1	-	-	-	1	Song	SE	50-100	3-5	-
	S4	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NE	50-100	3-5	-
	S5	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NE	0-50	0-3	-
	S5	OCWA	Orange-crowned Warbler	1	-	-	-	1	Song	NE	0-50	0-3	Cross singing with other OCWA in same quadrant
	S5	OCWA	Orange-crowned Warbler	1	-	-	-	1	Song	NE	0-50	0-3	Cross singing with other OCWA in same quadrant
S5	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SW	0-50	0-3	-	
UB15	S1	AMRO	American Robin	1	-	-	-	1	Song	SW	100	0-3	-
	S1	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	SW	0-50	0-3	-
	S1	DEJU	Dark-eyed Junco	-	-	3	-	3	Call	SW	0-50	0-3	-
	S1	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SW	0-50	0-3	Flew from 50 m SW to 50 m NE
	S2	DEJU	Dark-eyed Junco	1	-	-	-	1	Song	NW	50-100	0-3	-
	S3	SWTH	Swainson's Thrush	1	-	-	-	1	Song	SE	100	3-5	-
	S3	SWTH	Swainson's Thrush	1	-	-	-	1	Song	NE	100	3-5	-
	S3	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	NE	50-100	0-3	-
S4	YRWA	Yellow-rumped Warbler	1	-	-	-	1	Song	SE	0-50	0-3	-	

APPENDIX CC COMMON NIGHTHAWK AUTOMATED RECORDING UNIT SURVEY SITE DATA, 2023

Appendix CC: Common Nighthawk Automated Recording Unit Survey Site Data, 20

Site ID	ARU Card ID	Site Type	Recorder	Additional Crew	Deployment Date	Retrieval Date	Days Deployed	Nights Recording	Zone 10U		Comments
									Easting	Northing	
CONI ARU 01	SMU08992	Impact	KB	ED	2023-06-12	2023-07-09	27	27	373931	5897999	Beside cutblock.
CONI ARU 02	SMU08984	Impact	KB	ED	2023-06-12	-	-	-	373509	5899114	On cutblock edge. Serviced 2023-06-17 11:22. Attempted to retrieve on Jul-9, area recently cleared and device assumed lost.
CONI ARU 03	SMU09783	Impact	KB	ED	2023-06-12	2023-07-09	27	27	375161	5898977	No standing water, wet meadow. Serviced 2023-06-17 11:42
CONI ARU 04	SMU09748	Control	KB	ED	2023-06-12	2023-07-09	27	27	376791	5899745	Dry creek bed. Serviced 2023-06-17 11:54
CONI ARU 05	SMU08994	Control	KB	ED	2023-06-12	2023-07-09	27	27	371388	5894584	Beside pullout/bridge on K road. Serviced 2023-06-17 12:28
CONI ARU 06	SMU09777	Impact	KB	ED	2023-06-12	2023-07-09	27	27	371803	5895517	Pullout by K road. Serviced 17/06/2023 12:22
CONI ARU 07	SMU08998	Impact	KB	ED	2023-06-12	2023-09-13	93	27	375851	5895994	Beside creek by road. Serviced 17/06/2023 10:45
CONI ARU 08	SMU09741	Impact	KB	ED	2023-06-12	2023-09-12	92	27	375923	5897272	Beside e trail. Serviced 2023-06-17 10:50
CONI ARU 09	SMU09747	Impact	KB	ED	2023-06-12	2023-07-09	27	27	375974	5893930	Wetland between camp buildings. Serviced 2023-06-17 12:53
CONI ARU 10	SMU09743	Control	KB	ED	2023-06-12	2023-09-13	93	27	376528	5893388	Small ponds scattered. Serviced 2023-08-17 13:01

APPENDIX DD COMMON NIGHTHAWK AUTOMATED RECORDING UNIT AUTO-ID RESULTS, 2023



Appendix DD: Common Nighthawk Automated Recording Unit Auto-ID Results, 2023

Site ID	ARU Card ID	Recording Start Date	Recording End Date	Auto-ID				Manual ID			
				Boom	Call	Call and Boom	Noise	Boom	Call	Call and Boom	Noise
CONI ARU 01	SMU08992	2023-06-12	2023-07-09	3	24	10	1,519	0	0	0	356
CONI ARU 02	SMU08984	2023-06-12	2023-07-09	-	-	-	-	-	-	-	-
CONI ARU 03	SMU09783	2023-06-12	2023-07-09	1	19	2	370	0	0	0	151
CONI ARU 04	SMU09748	2023-06-12	2023-07-09	3	16		1,385	0	0	0	354
CONI ARU 05	SMU08994	2023-06-12	2023-07-09	3	7	2	764	0	0	0	217
CONI ARU 06	SMU09777	2023-06-12	2023-07-09	0	7	1	518	0	0	0	177
CONI ARU 07	SMU08998	2023-06-12	2023-07-09	0	212	2	967	0	187	9	297
CONI ARU 08	SMU09741	2023-06-12	2023-07-09	1	8	10	466	0	0	0	124
CONI ARU 09	SMU09747	2023-06-12	2023-07-09	2	60	1	1,326	0	0	0	384
CONI ARU 10	SMU09743	2023-06-12	2023-07-09	1	74	1	2,398	0	2	0	817
Total				14	427	29	9,713	0	189	9	2,877

APPENDIX EE SWALLOW AND SWIFT SURVEY SITE DATA, 2023



Appendix EE: Swallow and Sift Survey Site Data, 2023

Site ID	Date	Site Zone 10U		Sky	Wind	Noise	Wind Direction	BEC SubZone	% River	% Wetland	% Marsh	% Pond	% Lake	% Conifer Forest	% Deciduous Forest	% Mixed Forest	% Mountain	% Tundra	% Crown Closure	Stand Age	Dominant Plants	General Habitat
		Easting	Northing																			
SW4	2023-06-11	374665	5895239	0	3	2	SW	ESSFmv1	0	0	0	0	0	20	0	0	0	0	10	Old	Spruce	Roadside, large laydown area and intersection
SW5	2023-06-11	373647	5895621	0	1	0	SE	ESSFmv1	0	0	0	0	0	40	0	0	0	0	20	Old	Spruce	Mature forest beside road
SW6	2023-06-11	372264	5896007	0	1	1	W	ESSFmv1	0	0	0	0	0	30	0	0	0	0	20	Old	Spruce	Roadside by laydown area
SW7	2023-06-11	371739	5896330	0	1	0	W	ESSFmv1	0	0	0	0	0	100	0	0	0	0	20	Old	Spruce	Mature forest
SW16	2023-06-11	368321	5895828	0	1	0	SE	ESSFmv1	0	0	0	0	0	0	0	100	0	0	0	Young	Spruce and	Old cutblock
SW17	2023-06-11	371471	5895876	0	2	0	SE	ESSFmv1	0	0	0	0	0	100	0	0	0	0	10	Old	Spruce	Laydown beside mature forest
SW19	2023-06-11	375645	5894163	0	2	2	SE	ESSFmv1	0	0	0	0	0	10	0	0	0	0	5	Old	Spruce	Camp entrance
SS02	2023-06-14	375920	5894044	1	2	2	S	ESSFmv1	0	0	0	0	0	0	0	0	0	0	0	-	none	Gravel pad near buildings and waste bins, potential nesting structure in roofed buildings
BW2	2023-06-14	375905	5894089	1	2	2	SW	ESSFmv1	0	0	0	0	0	0	0	0	0	0	0	-	none	Gravel yard between buildings and construction in background. Roofs with perching spots
SW2	2023-06-14	375800	5894002	1	2	1	S	ESSFmv1	0	0	0	0	0	20	0	0	0	0	5	Old	Spruce	Parking lot beside offices
BW3	2023-06-14	375937	5894015	1	2	2	SE	ESSFmv1	0	0	0	0	0	20	0	0	0	0	10	Old	Spruce	Gravel pad by forest
SS03	2023-06-14	375715	5894033	1	1	2	SW	ESSFmv1	0	0	0	0	0	5	0	0	0	0	1	Old	Spruce	Parking lot beside camp buildings
SW10	2023-06-14	375289	5893192	1	2	1	E	ESSFmv1	0	0	0	0	0	0	0	0	0	0	0	-	Grass	Middle of ore body
SW11	2023-06-14	375746	5893402	1	1	2	E	ESSFmv1	0	0	0	0	0	10	0	0	0	0	5	Old	Spruce	By ore body
SW20	2023-06-14	376743	5894071	1	2	1	SW	ESSFmv1	0	0	0	0	0	30	0	0	0	0	3	Old	Spruce	Gravel pit with core shacks
SW22	2023-06-14	376308	5894078	1	2	2	SW	ESSFmv1	0	0	0	0	0	30	0	0	0	0	5	Old	Spruce	Forest beside project site, cleared gravel pit
SW24	2023-06-14	373981	5894003	1	2	1	SE	ESSFmv1	0	0	0	0	0	100	0	0	0	0	20	Old	Spruce	Mature forest by roadside
SW13	2023-06-15	378280	5893714	1	2	1	SE	ESSFmv1	0	0	0	0	0	80	0	0	0	0	30	Old	Spruce	Old logging road
SW14	2023-06-15	377595	5893434	1	2	0	SE	ESSFmv1	0	0	0	0	0	80	0	0	0	0	20	Old	Spruce	Old logging road
SW15	2023-06-15	376498	5893471	1	2	1	SE	ESSFmv1	0	0	0	0	0	80	0	0	0	0	10	Old	Spruce	Old logging road
BBC1	2023-06-18	375939	5893824	2	2	2	W	ESSFmv1	0	0	0	0	0	20	0	0	0	0	0	Old	Spruce	Parking lot beside new construction camp
SW8	2023-06-18	375951	5893866	2	1	2	W	ESSFmv1	0	0	0	0	0	40	0	0	0	0	10	Old	Spruce	Core shack near forest
SW9	2023-06-18	375872	5893822	2	2	2	W	ESSFmv1	0	0	0	0	0	15	0	0	0	0	5	Old	Spruce	Camp parking lot by forest
SW12	2023-07-07	378593	5893479	-	-	-	-	ESSFmv1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FF SWALLOW AND SWIFT SURVEY OBSERVATION DATA, 2023



Appendix FF: Swallow and Swift Survey Observation Data, 2023

Site ID	Species Name	Observation Type	# Male	# Female	# Unknown	# Young	Total	Behaviour	Comments
BBC1	Barn Swallow	Visual	0	0	4	0	4	Flying	Flying around the camp structures
	Tree Swallow	Visual	0	0	1	0	1	Flying	Flying over active construction into the forest
SS02	Barn Swallow	Visual	1	2	3	0	6	Flying	Flying over gravel parking lot and flying into roofing structure
BW2	Barn Swallow	Visual	0	6	0	0	6	Flying	Flying into the camp roof structures
SW2	Barn Swallow	Visual	0	1	1	0	2	Flying	-
	Violet-green Swallow	Visual	0	0	1	0	1	Flying	-
	Tree swallow	Visual	0	0	1	0	1	Flying	-
BW3	Barn Swallow	Visual	4	1	1	0	6	Flying	Flying overhead into roof structure
SS03	Barn Swallow	Visual	0	1	1	0	2	Flying	Carrying mud into the roofing structure
SW4	Barn Swallow	Visual	0	0	1	0	1	Flying	-
SW5	None	-	-	-	-	-	-	-	-
SW6	None	-	-	-	-	-	-	-	-
SW7	None	-	-	-	-	-	-	-	-
SW8	None	-	-	-	-	-	-	-	-
SW9	Barn Swallow	Visual	1	0	0	0	1	Flying	-
SW10	None	-	-	-	-	-	-	-	-
SW11	None	-	-	-	-	-	-	-	-
SW12	None	-	-	-	-	-	-	-	-
SW13	None	-	-	-	-	-	-	-	-
SW14	None	-	-	-	-	-	-	-	-
SW15	None	-	-	-	-	-	-	-	-
SW16	None	-	-	-	-	-	-	-	-
SW17	None	-	-	-	-	-	-	-	-
SW19	Barn Swallow	Visual	0	2	0	0	2	Flying	Flying over camp
	Violet-green Swallow	Visual	0	0	1	0	1	Flying	-
	Tree Swallow	Visual	0	0	2	0	2	Flying	-
SW20	None	-	-	-	-	-	-	-	-
SW22	Tree Swallow	Visual	0	0	1	0	1	Flying	Flying over construction area
SW24	None	-	-	-	-	-	-	-	-

APPENDIX GG WESTERN TOAD MORTALITY TRANSECT SITE DATA, 2023



Appendix GG: Western Toad Mortality Transect Site Data, 2023

Site ID	WPT	Transect Details	Start Time	End Time	Weather	Wind (km/h)	Temp (°C)	Observations
TOAD1	TOAD1	TOAD1 start and end - I trail from heli pad to ~1 km	7:30	7:45	Partly cloudy	15	10	Some roadside puddles pot. Suitable for WETO, none seen (including egg sacs or tadpoles).
TOAD2	TOAD2	TOAD2 start and TOAD2 end 100 m N of old C trail ~km 11.75 on access road to ~km 11)	8:15	8:30	Partly cloudy	20	11	Puddles on either side with pot. Suitability but no toads, eggs, or tadpoles.
TOAD3	TOAD3	TOAD3 start and TOAD3 end between km 12 and 14 on access road	8:40	9:00	NA	NA	NA	No toads. S/E side of road has small running creek with pot. Suitable puddles.

APPENDIX HH WESTERN TOAD BREEDING SURVEY OBSERVATIONS, 2023



Appendix HH: Western Toad Breeding Survey Observations, 2023

Site ID	2023 Salvage or Relocation Site	2023 Salvage or Relocation Site ID	Surveyed in 2022	Zone 10U		Amphibian Presence	Species Observed
				Easting	Northing		
0	-	-	Yes	374283	5895048	No	
9	-	-	Yes	373938	5895978	No	
14	-	-	Yes	378763	5900598	No	
46	-	-	Yes	375065	5893617	No	
47	-	-	Yes	375009	5893595	No	
48	-	-	Yes	374878	5893611	No	
49	-	-	Yes	374843	5893596	No	
50	-	-	Yes	374839	5893606	No	
51	-	-	Yes	374850	5893608	No	
57	-	-	Yes	375118	5893614	No	
80	-	-	Yes	370747	5893763	Yes	Western Toad, Columbia Spotted Frog
81	-	-	Yes	370926	5893994	No	
84	-	-	Yes	378867	5900564	No	
85	-	-	Yes	378420	5900601	No	
109	Salvage	BW PO03	No	374919	5893568	No	
110	Salvage	BW PO04	No	374854	5893530	No	-
111	Relocation	REL AMP 01	No	370189	5896331	No	
112	Relocation	REL AMP 02	No	370192	5896307	No	
48	Salvage	BW PO01/02	Yes	374882	5893615	Yes	Columbia Spotted Frog
51	Salvage	BW PO01/02	Yes	374854	5893616	Yes	Columbia Spotted Frog