Chapter 19

Wildlife and Wildlife Habitat Effects Assessment

SKEENA™ RESOURCES

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ACRONYMS AND ABBREVIATIONS

AOI	Areas of Interest
ARU	Autonomous Recording Unit
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BEC	Biogeoclimatic Ecosystem Classification
BGC	biogeoclimatic
BMP	best management practice
Brucejack	Newcrest Mining's Brucejack Mine Project
CEA	Cumulative Effects Assessment
CEAA	Cumulative Effects Assessment Area
CIS LRMP	Cassiar Iskut-Stikine Land and Resource Management Plan
COPC	Contaminants of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
Declaration Act Agreement	*Declaration Act Consent Decision-Making Agreement for Eskay Creek Project*
EAC Application	Application for an Environmental Assessment Certificate / Impact Statement
EAO	British Columbia's Environmental Assessment Office
ECCC	Environment and Climate Change Canada
Ecoprovinces	A subdivision of an ecozone containing one or more ecoregions
Ecoregions	Areas where ecosystems are generally similar
Ecozone	Ecologically and geographically defined areas
Effective Habitat	Moderate to high suitability habitat as identified by habitat suitability modelling
EMLI	Ministry of Energy, Mines and Low Carbon Innovation
Engaged Indigenous Nations	Defined as the Indigenous Nations identified by the EAO in Section 2 of "Schedule B—Assessment Plan" (EAO 2023a), which refers to the Tahltan Central Government/Tahltan Nation, Tsetsaut Skii km Lax Ha Nation, Nisg̲a'a Lisims Government/Nisg̲a'a Nation, Gitanyow Nation, and Métis people, as represented by the Métis Nation British Columbia.
ENV	Ministry of Environment and Climate Change Strategy
Galore Creek	Galore Creek Mining Corporation's Galore Creek Mine Project
GBPU	Grizzly Bear Population Unit
HSM	Habitat Suitability Model
Hybrid AIR	Hybrid Application Information Requirements
ILMB	Integrated Land Management Bureau
KSM	Seabridge Gold's KSM Mine Project

LAA	Local Assessment Area
LRMP	Land and Resource Management Plan
MAR	Mine Access Road
MFLNRO	Ministry of Forests, Lands, and Natural Resource Operations
MNBC	Métis Nation British Columbia
MOE	Ministry of Environment and Climate Change Strategy
MOF	British Columbia Ministry of Forests
MRSA	Mine Rock Storage Area
MSP	Moose Stewardship Plan
NPAG	non-potentially acid generating
Okane	Okane Consultants
Project	Eskay Creek Revitalization Project
RAA	Regional Assessment Area
RIC	Resources Inventory Committee
ROM	Run of Mine
SARA	*Species at Risk Act*
Skeena Resources	Skeena Resources Limited
SRMP	Sustainable Resource Management Plan
SU	Survey Unit
Sub-VC	Sub-valued Component
Tahltan – Allnorth	Tahltan – Allnorth Consultants Limited Partnership
TCAA	Traffic Corridor Assessment Area
TCG	Tahltan Central Government
TEM	Terrestrial Ecosystem Mapping
THREAT	Tahltan Heritage Resources Environmental Assessment Team
TMSF	Tom MacKay Storage Facility
TSKLH	Tsetsaut Skii km Lax Ha
UWR	Ungulate Winter Range
VC	Valued Component
WARS	Wildlife Accident Reporting System
WHA	Wildlife Habitat Area
WMP	Wildlife Management Plan
WMU	Wildlife Management Unit

SYMBOLS AND UNITS OF MEASUREMENT

%	percent
<	less than
>	greater than
≤	less than or equal to
≥	greater than or equal to
dBA	A-weighted decibel
ha	hectare
mg/L	milligram per metre
KM	kilometre marker
km	kilometre
km/h	kilometre per hour
km^2	square kilometre
kV	kilovolt
m	metre
masl	metre above sea level
$mg/dm^2/day$	milligram per square decimetre per day

TAHLTAN, COMMON, AND SCIENTIFIC NAMES

The following Tahltan, common, and scientific names are used in the body of this chapter. Common names are used throughout, with Tahltan and scientific names following in select mentions.

Tahltan Name	Common Name	Scientific Name
debēhe	Stone's sheep	*Ovis dalli stonei*
dediye	hoary marmot (or groundhog)	*Marmota caligata*
dih chō	sooty grouse	*Dendragapus fuliginosus*
isbā	mountain goat	*Oreamnos americanus*
kedā	moose	*Alces alces*
khoh	grizzly bear	*Ursus arctos*
naghā	wolverine	*Gulo gulo*
nust'ihe	marten	*Martes americanus*
sas	black bear	*Ursus americanus*

Sources: Tahltan Central Government (2021) and RTEC (2008).

19.0 WILDLIFE AND WILDLIFE HABITAT EFFECTS ASSESSMENT

19.1 Introduction

The Wildlife and Wildlife Habitat effects assessment identifies existing conditions in the area surrounding the proposed Eskay Creek Revitalization Project (the Project) and evaluates potential, residual, and cumulative effects of the Project on this Valued Component (VC). The process for selecting VCs and Sub-valued Components (Sub-VCs) is described in Chapter 9, Valued Component Selection, and involved engagement with Indigenous Nations,[1] government agencies, local governments, the public, and other stakeholders. This chapter includes the following Sub-VCs:

- Kedā[2] (moose, *Alces alces*);
- Isbā (mountain goat, *Oreamnos americanus*);
- Furbearers;
- Et'anesjide (bats);
- Raptors;
- Waterbirds;
- Upland breeding birds; and
- Amphibians.

The assessment focuses on potential effects on the VC and Sub-VCs (including representative species) related to potential Project-related effects and does not describe or evaluate larger processes associated with biodiversity, food webs, and trophic linkages.

This chapter discusses the regulatory context, scope, and boundaries for assessment, existing conditions, potential effects, potential residual and cumulative effects of the Project, and proposed mitigation of such potential effects. In addition to being considered a VC, Wildlife and Wildlife Habitat is also a pathway effect assessed as part of Chapter 12, Air Quality Effects Assessment, Chapter 13, Noise and Vibration Effects Assessment, Chapter 15, Surface Water Effects Assessment, Chapter 16, Fish and Fish Habitat Effects Assessment, Chapter 18, Vegetation and Ecosystems Effects Assessment, Chapter 20, Human Health Effects Assessment, Chapter 22, Non-traditional Land and Resource Use Effects Assessment, Chapter 23, Visual Resources Effects Assessment, Chapter 26, Current and Future Use of Land and Resources for Traditional Purposes Effects Assessment, and Chapter 27, Quiet Enjoyment of Land Effects Assessment (Table 9.4-3, Chapter 9, Valued Component Selection). The findings of the Wildlife and Wildlife Habitat Effects Assessment summarized in this section will also be used to assist with the assessment of these other VCs.

[1] Engaged Indigenous Nations are defined as the Indigenous Nations identified by British Columbia's Environmental Assessment Office (EAO) in Section 2 of the "Schedule B – Assessment Plan" (EAO 2023a), which refers to the Tahltan Nation/Tahltan Central Government, Tsetsaut Skii km Lax Ha, the Nisga'a Nation/Nisga'a Lisims Government, the Gitanyow Nation, and Métis people, as represented by the Métis Nation British Columbia.

[2] Tahltan terms are from the "Tāłtān Dictionary" (TCG 2024), unless otherwise indicated.

The Project is located within the territories[3] of the Tahltan Nation and the Tsetsaut Skii km Lax Ha Nation (TSKLH), and the associated transportation corridor traverses the territory of the Nisga'a Nation and Gitanyow Nation, as well as lands used by Métis Nation British Columbia (MNBC) members. Publicly available Indigenous Knowledge for the Engaged Indigenous Nations was considered in this chapter, particularly in regards to the insights that Indigenous Knowledge offers regarding characterization and assessment of the Wildlife and Wildlife Habitat VC.

The contents of this chapter conform to the "Hybrid Application Information Requirements" (Hybrid AIR; British Columbia's [BC's] Environmental Assessment Office [EAO] 2023b) established for the Project and have been developed in consideration of the Tahltan Values presented in Section 4.0, Tahltan Application Information Requirements, of the Hybrid AIR (EAO 2023b). In particular, consideration of the Wildlife and Wildlife Habitat VC has been informed by the parallel Tahltan Value of Wildlife and Wildlife Habitat, as discussed in Section 4.3.2.7, Wildlife and Wildlife Habitat, of the Hybrid AIR (EAO 2023b, 57); the relationship between this VC and the associated Tahltan Value is further discussed in Section 19.1.1, Wildlife and Wildlife Habitat Tahltan Value.

19.1.1 Wildlife and Wildlife Habitat Tahltan Value

Consistent with the selection of Wildlife and Wildlife Habitat as a VC for this environmental assessment, Wildlife and Wildlife Habitat was selected as a Tahltan Value for the purposes of the Tahltan Risk Assessment presented in Chapter 4, Tahltan Application Information Requirements. Identification of Tahltan Values was based on a broad array of social, cultural, spatial, ecological, and other factors of relevance and concern to Tahltan; these were considered in an integrative fashion consistent with the holistic and reciprocal understanding of human-environment relations that underlies Tahltan culture.

Like the other Tahltan Values, Wildlife and Wildlife Habitat are regarded not simply as valued aspects of the current landscape. Instead, they are interrelated with all aspects of the natural world, including humans, as a deeply interconnected system linked by bonds of kinship. As such, respect and reciprocity are required to support these interconnections, and humans must act as responsible stewards or risk negative consequences stemming from inattention to or violation of the principles of proper behaviour and stewardship (Tahltan Heritage Resources Environmental Assessment Team [THREAT] 2024).

The Tahltan story of Atsentmā, or the Meat Mother, encapsulates the importance of respectful and reciprocal behaviour, specifically in relation to wildlife and its habitat. Having brought forth the game animals and given each of their distinctive attributes, Atsentmā retreated to the north (Teit 1919); however, Atsentmā continues to watch over her children, as well as the behaviour of the humans who rely on them (EAO 2023b; THREAT 2024):

> *When people do not follow the taboos, and do not treat animals rightly, the latter tell their mother; and she punishes the people by taking the game away for a while, or by making it wild, and then the people starve. When she sees good people starving for want of game, she sends game to them, and they are made happy* (Teit 1919, 231–232).

[3] As in the "Hybrid Application Information Requirements" (EAO 2023b), for the purposes of this chapter, "territory" is defined as the established or territories of Indigenous Nations, except in relation to the Nisga'a Nation, which refers to Nisga'a Lands, the Nass Area, and the Nass Wildlife Area, as applicable.

Per Section 4.3.2.7, Wildlife and Wildlife Habitat, of the Hybrid AIR (EAO 2023b, 57), this Tahltan Value must be understood based on applicable Tahltan Knowledge, along with spatial information, and related to appropriate Tahltan Standards and Significance Measurements. As such, this chapter and Chapter 4, Tahltan Application Information Requirements, provide somewhat different but complementary and linked assessments of Wildlife and Wildlife Habitat.

Note Regarding Linkage with Chapter 4, Tahltan Application Information Requirements

Chapter 4, Tahltan Application Information Requirements, of this EAC Application, under the authorship of the Tahltan Central Government, lays the foundation for the Tahltan Assessment through the identification of potential effects to Tahltan Values and barriers to the Tahltan Way of Life, based on the effects assessment presented within the EAC Application. The chapter considers effects and barriers in relation to Tahltan Areas of Interest across the Tahltan Continuum, which will inform the application of Tahltan Risk Assessment Factors and Sustainability Requirements during the Effects Assessment and Recommendation phase of the environmental assessment process. During the Application Development stage of the process, Skeena Resources collaborated with the Tahltan Heritage Resources Environmental Assessment Team and Tahltan Central Government on permit applications, baseline programs and reporting, workshops, and available draft EAC Application chapters. However, due to the timing of completed chapters—particularly those chapters related to Tahltan Common Values identified in Sections 4.2.10 and 4.2.11—not being available until very close to Skeena Resources' EAC Application submission date, there was insufficient time for Tahltan Central Government to assess Skeena Resources' technical methods, existing conditions, and potential singular and cumulative effects information with Tahltan Knowledge to complete Tahltan assessment requirements. Chapter 4 will be updated and provided during the Application Review phase, when there is sufficient time to bring all the information together to be assessed by Tahltan. All relevant cross-references and hyperlinks in this chapter will be updated and provided once this occurs.

19.2 Regulatory and Policy Framework

This section provides an overview of the relevant regulatory framework and requirements for potential wildlife and wildlife habitat effects. The relevant legislation, policies, standards, and guidelines are included in Table 19.2-1.

Table 19.2-1: Legislation, Policy, Standards, and Guidelines of Relevance to Wildlife and Wildlife Habitat

Name	Year	Type	Level of Government	Description
Declaration on the Rights of Indigenous Peoples Act (SBC 2019, c 44)	2019	Act	Provincial	Also known as the *Declaration Act*, the legislation establishes the United Nations Declaration on the Rights of Indigenous Peoples as the Province's framework for reconciliation, as called for by the Truth and Reconciliation Commission's Calls to Action.
"Tahltan Tribal Council Resource Development Policy Statement" (Tahltan Tribal Council 1987)	1987	Policy	Indigenous	This policy asserts that any resource development within Tahltan Territory must adhere to Tahltan Values as land stewards, as well as principles developed by Tahltan Tribal Council.

Name	Year	Type	Level of Government	Description
"1910 Declaration of the Tahltan Tribe" (TCG 1910)	1910	Declaration	Indigenous	This declaration asserts ownership and sovereignty over Tahltan lands and resources. It serves as a guiding principle for TCG and expresses Tahltan's associated expectations and objectives in working with the federal and provincial governments.
(*Declaration Act* Agreement (2022) between the Province of BC and TCG	2022	Agreement	Provincial, Indigenous	This agreement recognizes Tahltan's Title and Rights and acknowledges Tahltan's jurisdiction in land management decisions in Tahltan Territory. Includes provisions for consent-based decision-making and outlines Tahltan Values-based approach to environmental assessment and permitting related to the Project (*Declaration Act* Agreement 2022).
"Tahltan Impact Assessment Policy" (TCG 2022a)	2022	Policy	Indigenous	This policy guides Tahltan decision-making in relation to projects and provides information to the Crown, Crown regulatory agencies, and proponents in relation to TCG's implementation of impact assessments.
Nisg̲a'a Final Agreement Act (SC 2000, c 7)	2000	Act	Indigenous	This Act establishes an agreement between the Nisg̲a'a Nation, the Government of BC, and the Government of Canada regarding Nisg̲a'a rights to self-government, and the authority to manage lands and resources.
Wildlife Act (RSBC 1996, c 488)	1996	Act	Provincial	This act provides for conservation of specific ecosystems and ecosystem components that provide habitat for species managed by the ENV (2023).
SARA (SC 2002, c 29)	2002	Act	Federal	This act was enacted to prevent species at risk from becoming extirpated or extinct and to ensure that appropriate management actions are undertaken to prevent listed species from becoming at risk.
Land Act (RSBC 1996a, c 245)	1996	Act	Provincial	This act is the primary article of legislation that is used by the government to convey land to the public for community, industrial, and business uses. The Act allows the granting of land, and the issuance of Crown land tenure in the form of leases, licences, permits, and rights-of-way.
Migratory Birds Convention Act (SC 1994, c 22)	1994	Act	Federal	This act provides the framework for the protection of migratory birds and their nests in Canada.
Migratory Birds Regulations (CRC, c 1035)	2022	Regulations	Federal	These regulations, associated with the *Migratory Birds Convention Act* (SC 1994, c 22), outlines regulations for the conservation of migratory birds and their nests.

Name	Year	Type	Level of Government	Description
Government Actions Regulation under the *Forest and Range Practices Act* (BC Reg 582/2004)	2002	Act	Provincial	This act governs all forestry activities including logging, road building, reforestation and riparian area management. The Act requires that all forestry-related development be completed in accordance with the rules and regulations identified in the Act to ensure the protection of environmental values. The Act also manages ecosystems as wildlife habitat through the Identified Wildlife Management Strategy. The Government Actions Regulation under the Act directs how the Government of BC established land designation or stewardship measures for forest and range values.
CIS LRMP (ILMB 2000)	2000	Planning	Provincial	A planning framework for Crown land resource access, development, and management.
SRMP (BC ILMB 2012)	2012	Planning	Provincial	A planning framework at the landscape level that addresses sustainable management of land, water, and resources.
BC Conservation Framework and the Conservation Data Centre (BC CDC 2023a)	2009	Framework	Provincial	This framework provides a set of decision-support tools to enable collaboration between government and non-government groups using clearly defined criteria to prioritize species and ecosystems for conservation and determine the most appropriate and effective management actions. The Conservation Framework is designed to optimize allocation of resources, including staff time and dollars. The CDC is a key provincial data source In the Conservation Framework. The CDC lists species of conservation concern through their Red and Blue lists. The Red list includes any species that is at risk of being lost (extirpated, endangered, or threatened) and the Blue, list includes any species that is of special concern.
“A Framework for Scientific Assessment of Potential Project Impact on Birds” (Hanson et al. 2009)	2009	Framework	Provincial	This framework provides guidance to help proponents make scientifically based conclusions on potential and realized Project impacts on birds and how to evaluate the effectiveness of mitigation strategies in support of the environmental assessment decision-making progress.
“Migratory Birds Environmental Assessment Guideline” (Milko 1998)	1998	Guideline	Provincial	The guidelines presented in this publication have been developed to identify the types of information and analyses that ECCC would expect in an Environmental Impact Statement for projects that would affect the forest habitat of migratory birds. It covers background legislation and related materials, contextual and specific information requirements, and a discussion of the environmental effects with reference to cumulative effects, mitigation, residual effects, monitoring, and additional considerations for forest management plans.

Name	Year	Type	Level of Government	Description
"Bird Survey Inventories in Canada" (ECCC 2023a)	-	Planning	Federal	Data from bird surveys provide information on population status and trends that help identify species or populations requiring conservation action. Changes in distribution and status can also serve as an early-warning system by highlighting potential environmental problems, can help refine research priorities, and can help track the success of ongoing management activities.
COSEWIC status reports (Government of Canada 2024)	-	Planning	Federal	A status report is a comprehensive technical document that compiles and analyzes the best available information on a wildlife species" status in Canada. It contains information on the basic biology of a wildlife species, as well as information on a wildlife species" distribution in Canada, population sizes and trends, habitat availability and trends, and threats to the wildlife species.
"General Nesting Periods of Migratory Birds" (ECCC 2023b)	2022	Guidance	Federal	This federal guidance provides estimated nesting period timelines for migratory birds.
"Environmental Mitigation Policy for BC" (Government of BC 2014)	2014	Policy	Provincial	This policy and supporting procedures outline a process for making well-informed, sound decisions about how to use or develop BC's natural resources.
BC "Cumulative Effects Framework" (Government of BC 2023)	-	Framework	Provincial	This framework includes policy, procedures, and decision support tools that complement current land management achieved through BC's legislative framework, land use plans, and various best practices and processes.
"Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia" (Wetland Stewardship Partnership 2009)	2009	Guideline	Provincial	This document is intended for those who are planning some form of activity or development near wetlands and those looking for guidance on ways to best maintain the high ecological values in these areas.
"Guidelines to Avoid Harm to Migratory Birds" (ECCC 2022)	2022	Guideline	Federal	Information on the risk activities can pose to migratory birds and guidelines to avoid causing harm to migratory birds as well as their nests when they are protected.
TCG – British Columbia Accord on Wildlife Management (TCG 2022b)	2022	Accord	Provincial	This accord represents a 5-year commitment to jointly establish a world-class wildlife stewardship regime for Tahltan Territory. The three core elements of the new wildlife management system include joint wildlife governance, co-management, and joint information and data collection.
Relevant recovery strategies, management plans, management strategies, guidelines and action plans for migratory birds and species at risk (Government of Canada 2024)	-	Planning	Federal	A recovery strategy is a planning document that identifies what needs to be done to arrest or reverse the decline of a species.

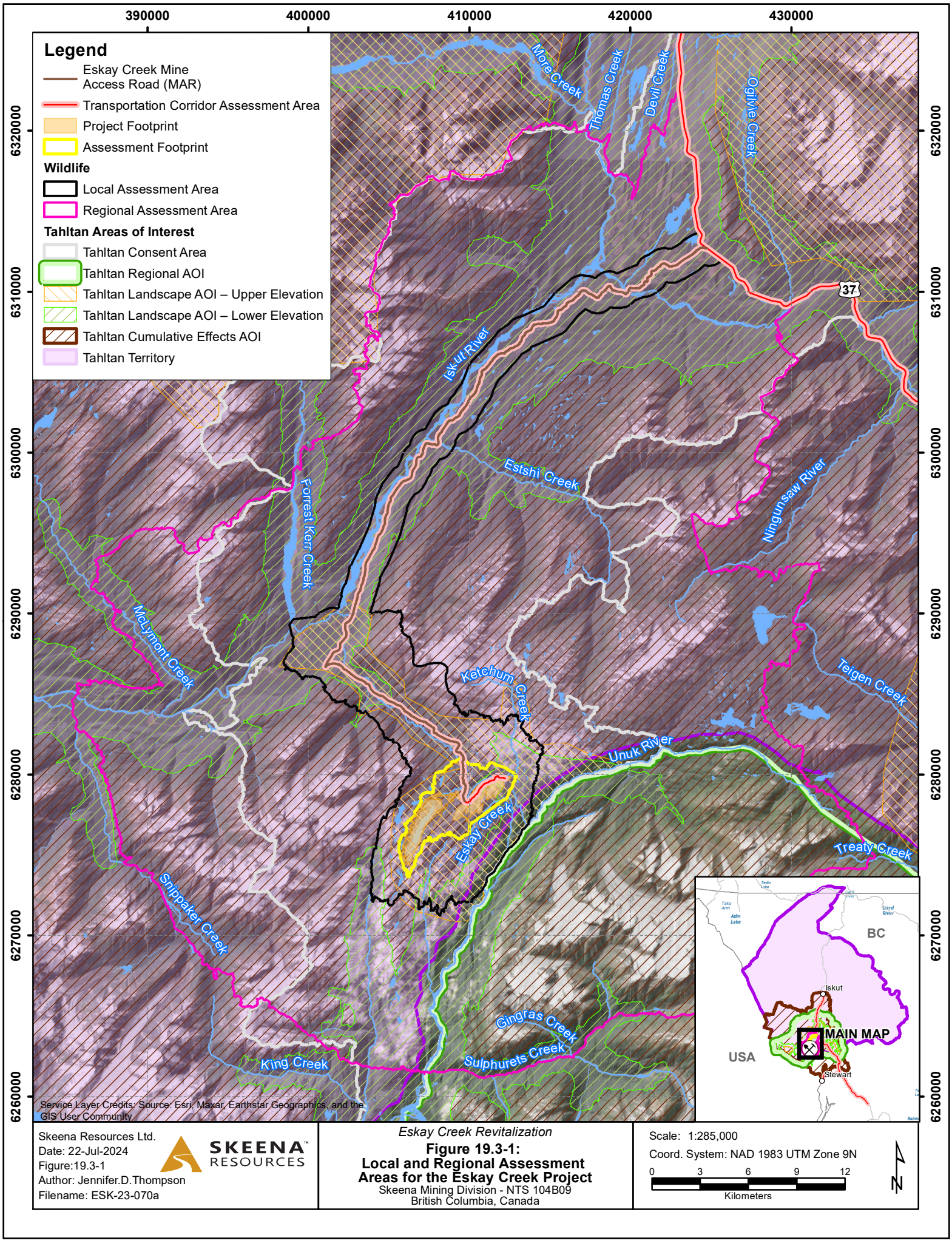
Name	Year	Type	Level of Government	Description
"Best Management Practices for Bats in British Columbia" (Holroyd and Craig 2016)	2023	Guideline	Provincial	Guidelines to minimize potential impacts of resource development and anthropogenic activity on bats and their habitats.
"Guidelines for Amphibian and Reptile Conservation During Road Building and Management Activities in British Columbia" (MOE 2020)	2020	Guideline	Provincial	Provincial guidelines to assess, avoid, minimize, and mitigate potential road impacts on amphibian and reptile species.
"Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia" (MOE 2014)	2014	Guideline	Provincial	A document providing guidelines to protect and enhance amphibian and reptile habitats during the development of rural and urban areas. Guidelines include proposed methods for monitoring the success of amphibian and reptile management approaches.
"Best Management Practices for Amphibian and Reptile Salvages in British Columbia" (MOE 2016)	2016	Guideline	Provincial	A document providing guidance on how to avoid amphibian and reptile salvages where possible in addition to guidelines on how to complete amphibian and reptile salvages including permitting requirements.
"A Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia" (MFLNRO 2014)	2014	Guideline	Provincial	A document providing guidance to identify and mitigate potential threats of industrial development activities to both wildlife and wildlife habitat.

Notes:

BC = British Columbia; CDC = Conservation Data Centre; CIS LRMP = Cassiar Iskut-Stikine Land and Resource Management Plan; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; Declaration Act *Agreement* = Declaration Act *Consent Decision-Making Agreement for Eskay Creek Project; ECCC = Environment and Climate Change Canada; ENV= Ministry of Environment and Climate Change Strategy; ILMB = Integrated Land Management Bureau; MFLNRO = Ministry of Forests, Lands, and Natural Resource Operations; MOE = Ministry of Environment; SARA* = Species at Risk Act*; SRMP = Sustainable Resource Management Plan; TCG = Tahltan Central Government*

19.3 Assessment Boundaries

Assessment boundaries define the geographic and temporal scope or limits of the expected potential effects of the Project on the Wildlife and Wildlife Habitat VC (as identified in Chapter 10, Valued Component Effects Assessment Methods) and define where the assessment is focused. These boundaries encompass the geographic areas (spatial boundaries) and times (temporal boundaries) at which the Project is expected to interact with the Wildlife and Wildlife Habitat VC (Figure 19.3-1). Additionally, these boundaries encompass the constraints that may be placed on the assessment of those interactions due to political, social, and economic realities (administrative boundaries), and limitations in predicting or measuring changes (technical boundaries; Figure 19.3-1).



Skeena Resources Ltd.
Date: 22-Jul-2024
Figure:19.3-1
Author: Jennifer.D.Thompson
Filename: ESK-23-070a

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.3-1:
Local and Regional Assessment Areas for the Eskay Creek Project
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

19.3.1 Spatial Boundaries

The spatial boundaries for the Wildlife and Wildlife Habitat assessment are defined in Sections 19.3.1.1 through 19.3.1.6. This section also describes the relationship of these boundaries to the Tahltan Nation Areas of Interest (AOIs; Section 19.3.1.7, Tahltan Areas of Interest), which will be considered in Chapter 4, Tahltan Application Information Requirements.

19.3.1.1 Project Footprint

The Project Footprint is the smallest scale boundary and includes existing infrastructure and newly constructed infrastructure that will be utilized at the Project mine site. The Project Footprint includes temporary (e.g., borrow areas, laydowns, and ore processing facilities) and permanent (e.g., mine rock storage areas, and Tom MacKay Storage Facility) infrastructure where Project physical works and activities will occur. [The Project Footprint will include an area of approximately 705 hectares (ha), of which approximately 502 ha will be new disturbance required for Project development.] Refer to Chapter 1, Project Overview, for a detailed description of the Project components that comprise the Project Footprint.

19.3.1.2 Assessment Footprint

The Assessment Footprint is an area delineated around the Project Footprint that represents the area conservatively assumed to be lost due to Project activities. The Assessment Footprint allows for an area of disturbance beyond the anticipated Project Footprint and provides a conservative area assumed to be lost due to Project activities (Figure 19.3-1). The Assessment Footprint is 2,275.8 ha and allows for an area of disturbance beyond the anticipated Project Footprint to allow for minor adjustments in the realized Project Footprint disturbances between the completion of this effects assessment and ground disturbance during physical activities. For more information on the rationale behind the Assessment Footprint, please refer to Section 10.3.1 of Chapter 10, Effects Assessment Methodology.

The Assessment Footprint falls within the boundaries of all the Tahltan AOIs (Section 19.3.1.7 Tahltan Areas of Interest and Figure 19.3-1), except for the Tahltan Lower Elevation AOI, which it only intersects at its northeastern extent (Figure 19.3-1).

19.3.1.3 Local Assessment Area

The Local Assessment Area (LAA) includes a buffer extending to the height of land or 1.0 to 1.5 km around the outer limits of the proposed infrastructure and linear developments (the exploration access road and the proposed mine site), whichever comes first (Figure 19.3-1). The LAA is 21,273.2 ha and has been established to include the area in which most direct and indirect Project effects (i.e., changes to habitat, movement, mortality risk, and wildlife health) are expected to occur, while also considering recommended setback distances for wildlife and wildlife habitat features (BC FLNRO 2014). The size of the proposed LAA is also consistent with other recently approved mining projects in the region (e.g., Seabridge Gold Inc. 2013a; Pretium Resources 2015).

The LAA falls entirely within the Tahltan Consent Area and the Tahltan Regional AOI. The portion associated with the mine site and the immediately adjacent segment of the Eskay Creek Mine Access Road (Eskay Creek MAR) is largely overlapped by the Tahltan Upper Elevation Landscape AOI, while the segment of the Eskay Creek MAR along the Iskut River is largely within the Tahltan Lower Elevation Landscape AOI.

19.3.1.4 Regional Assessment Area

The Regional Assessment Area (RAA) is used to provide context for Project-specific effects and potential cumulative effects (Figure 19.3-1). The RAA is 184,365.9 ha and the development of the RAA considered species information (e.g., home range sizes, habitat use, seasonal movement patterns) and other ecological factors (e.g., watershed boundaries or height of land which can act as a barrier to movement), which is consistent with other recently approved mining projects in the region (e.g., Seabridge Gold Inc. 2013a; Pretium Resources 2015).

The RAA falls largely within the Tahltan Regional AOI, although its southeastern edge extends beyond the Tahltan Regional AOI boundary. The RAA covers much of the same area the Tahltan Consent Area, but is slightly larger, and its boundary follows different terrain features, falling within or beyond the Tahltan Consent Area's edges in various places.

19.3.1.5 Cumulative Effects Assessment Area

The Cumulative Effects Assessment Area (CEAA) encompasses the area within which the residual effects of the Project are likely to interact cumulatively with the effects of other past, present, and reasonably foreseeable future projects and activities on the Vegetation and Ecosystems VC. The CEAA boundary is the same as the RAA spatial boundary (see Section 19.7, Cumulative Effects Assessment).

19.3.1.6 Transportation Corridor Assessment Area

The Transportation Corridor Assessment Area (TCAA) is the route that is used for the transportation of Project-related concentrate, supplies, and personnel between the mine site and the ports in the District of Stewart; between the mine site and Łuwechōn (Iskut), and from the mine site along Highway 37 within the Nass Area and the Nass Wildlife Area (Figure 19.3-1). In addition to the use of Highway 37, Project activities conducted in the TCAA also include the loading, unloading, handling, and storage of concentrate at the port facilities, up to and including the point at which the loading of concentrate onto a vessel is complete.

The portion of the TCAA where the Eskay Creek MAR extends from the Project Footprint and then turns to run along the Iskut River is located within the Tahltan Lower and Upper Elevation AOIs, as well as the Tahltan Consent Area and Regional AOI (Section 19.3.1.6, Tahltan Areas of Interest). Highway 37 lies within the Tahltan Regional AOI from approximately Bowser Lake to just south of K'ineskehne (Kinaskan Provincial Park). From Iskut to between Bowser Lake and Meziadin Lake, it falls within the Tahltan Cumulative Effects AOI (see Section 19.7, Cumulative Effects Assessment). The Tahltan Consent Area's northeastern boundary runs along Highway 37 from north of Bob Quinn Lake to Ningunsaw Provincial Park, approximately.

19.3.1.7 Tahltan Areas of Interest

Tahltan Nation spatial assessment boundaries, or AOIs, are described in Section 4.5.1, Assessment Boundaries, of the Hybrid AIR (EAO 2023b) and include consideration of the Tahltan Consent Area described in the "*Declaration Act* Consent Decision-Making Agreement for Eskay Creek Project" (*Declaration Act* Agreement; 2022). Section 4.2.9 of the Hybrid AIR explains that the AOIs were developed by the Tahltan Nation "through confidential Tahltan Knowledge and tools like the confidential Land Use and Occupancy

Studies" (EAO 2023b, 44). For this reason, the AOIs are more than technical boundaries; they have cultural significance and meaning. For example, key features used to define the AOIs, like place names,

> *record a history of relationship to the land, provide a map of how to interact with the land, and memorialize a cultural identity that is tied to the land…placenames tell a story, how a boy drowned in a lake, or a smokehouse collapsed, or a porcupine escaped in a rockpile. Other placenames indicate a point of navigational importance, such as Kiniskan (Kinaskan Lake), which means "raft crossing." Many names demonstrate an intimate knowledge of the flora and fauna of the country* (EAO 2023b, 43).

The Tahltan AOIs are presented on Figure 19.3-1. The Hybrid AIR further clarifies that "the project footprint and infrastructure as defined in the Process Order documents will be considered as site-specific AOIs," as well as sites identified within the Tahltan Consent Area and Transportation Corridor Assessment Footprint (EAO 2023b, 45). The other Tahltan AOIs are:

- **Tahltan Landscape AOIs**: the Hybrid AIR identifies a Landscape AOI as "an area defined at a broader scale but still with effects expected to occur at a scale or magnitude specific to the sensitivity of the value" (EAO 2023b, 61). A list of some of the features considered in the development of the Site-specific and Landscape AOIs includes "Head Family Territories; Family Areas; Tahltan High Sensitivity Areas; Ethnographic and Tahltan History; Cultural Area(s); Sacred Area(s); Place Names; Settlement and Assembly Area(s); Harvesting and Gathering Area(s); Environmentally Sensitive Areas; Trade Area(s); and, Warfare/Boundary Area(s)" (EAO 2023b, 44). For the current Project, the following are included as Landscape AOIs in Tahltan Territory: the Tahltan Consent Area; Lower Elevation Level AOI, and Upper Elevation Level AOI (EAO 2023b, 44).
    - **Tahltan Consent Area:** per Section 4.3 of the *Declaration Act* Agreement (2022), the Tahltan Consent Area is the area in which consent of the Tahltan Central Government (TCG) "is required for the Project to proceed" (EAO 2023b, 13), although "the Consent Area does not limit the geographic scope of Project effects" that will be subject to effects assessments" (EAO 2023b, 13).
    - **Tahltan Lower Elevation Level AO**I: the following lower-elevation areas comprise this AOI (EAO 2023b, 44):
        - Lower elevation river valleys of Iskut and Ningunsaw Rivers north and south of the consent area, including tributaries.
        - Unuk River lower elevation valley from the mouth of Ketchum Creek and downstream to the Nation's border; and
        - Lower elevation river valleys of the Bell-Irving River, including tributaries.
    - **Tahltan Upper Elevation Level AOI**: the following upper elevation areas comprise this AOI: upper elevation areas of the Oweegee and Snowslide Ranges, Bell-Irving headwaters, Skeena Mountain Ranges east of Bob Quinn Lake, Upper More and Forrest Kerr creeks drainages, Jekili River, and Zippa Mountain Range (EAO 2023b, 44).
- **Tahltan Regional AOI**: this is "the broadest spatial extent over which project-specific related effects of the [the Project] are to be assessed against Tahltan Values […]. However, when considering cumulative effects, the AOI may expand to capture all the relevant Tahltan Values and resource development pressures" (EAO 2023b, 61). Features considered in the development of the Regional AOI include "Clan Area(s); Head Family Territories; Sacred Area(s); Place Names; and, Ethnographic and Tahltan History" (EAO 2023b, 44). Multiple AOIs, including Site-specific and Landscape, can be found within the Regional AOI.
- **Tahltan Cumulative Effects AOI**: as identified in Section 4.5.7 of the Hybrid AIR (EAO 2023b).

19.3.2 Temporal Boundaries

The Wildlife and Wildlife Habitat assessment considers four Project phases*:*

- **Construction phase:** 2 years;
- **Operations phase:** 12 years;
- **Reclamation and Closure phase:** 3 years; and
- **Post-closure phase:** timeframe will be in accordance with permit conditions.

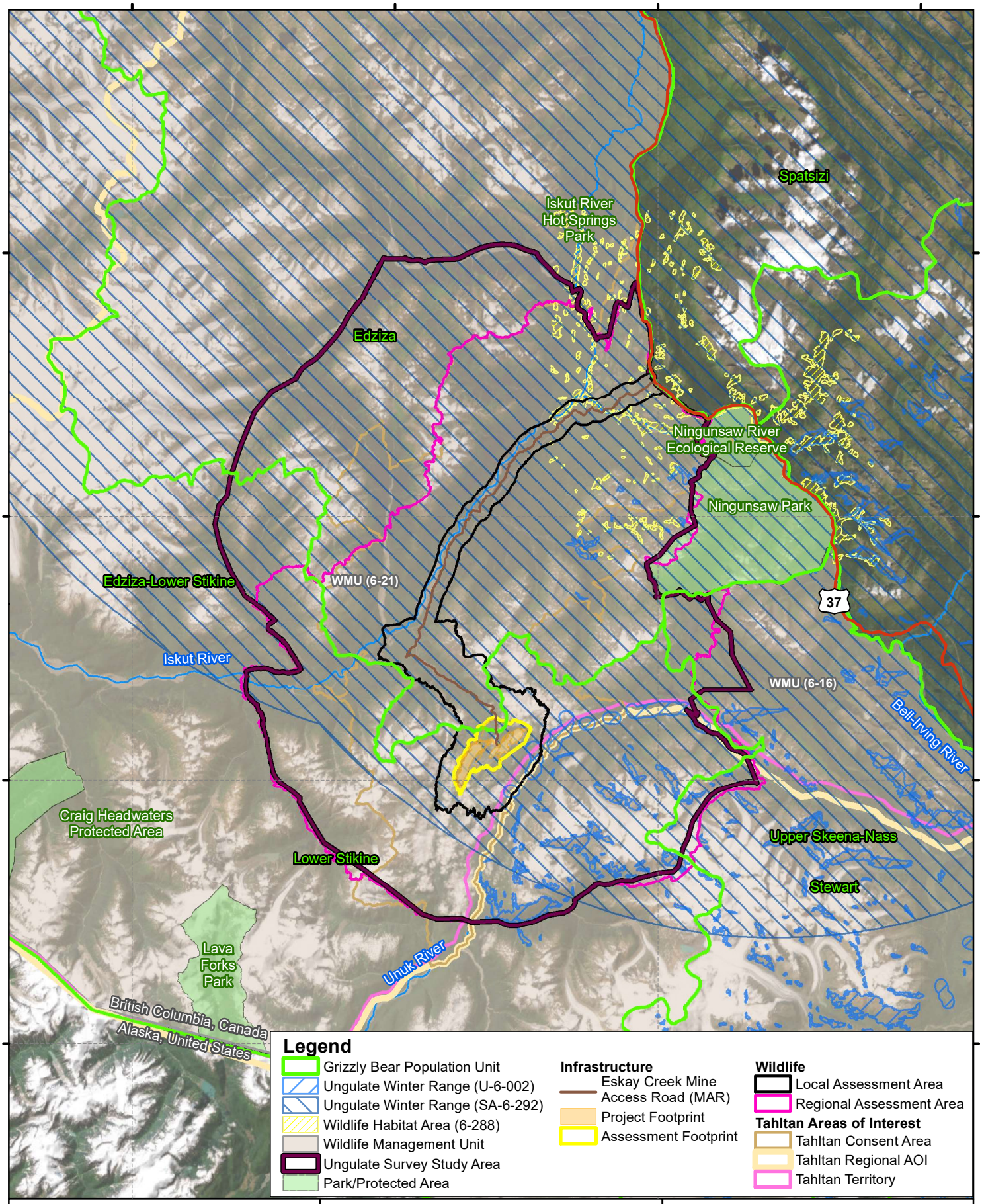
Refer to Chapter 1, Project Overview, for a detailed description of the Project phases and activities.

Per Section 4.0, Tahltan Application Information Requirements, of the Hybrid AIR's (EAO 2023b) discussion of time frames to be considered by the Tahltan Risk Assessment, this chapter considers the outlined approach of backcasting and forecasting across one to three generations (short-term) and across four to seven generations (long-term) to provide a perspective that reflects the Tahltan Continuum of ancient, contemporary and future knowledge and practices, as grounded in Tahltan's past, present and future interconnection to the land. For example, Section 19.4.2.1, Historical Overview, provides historical context that situates the Wildlife and Wildlife Habitat VC in relation to a past time scale consistent with the backcasting aspect of this approach, while Section 19.8, Tahltan Sustainability Requirements and Tahltan Risk Assessment Factors for Understanding Potential Effects to Current and Future Generations, takes a forecasting approach of multiple generations.

19.3.3 Administrative and Technical Boundaries

Administrative boundaries that are relevant to the Wildlife and Wildlife Effects Assessment include the Project location within the Regional District of Kitimat-Stikine on Provincial Crown land mineral tenures held by Skeena Resources Limited (Skeena Resources), in addition to the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP) area which guides resource development and conservation for each of the planning area's 15 resource management zones. The province of BC is divided into nine administrative regions which are further divided into Wildlife Management Units (WMUs); the RAA falls within the Skeena Resources administrative unit and is situated within two of the 255 WMUs: 6-16 and 6-21. Ungulate Winter Ranges (UWR) were reviewed to identify important designated areas for ungulates and Wildlife Habitat Areas (WHA) were reviewed to identify important designated areas for various wildlife species (Figure 19.3-2; BC Conservation Data Centre [CDC] 2023b). The LAA is within Bird Conservation Region 10 Northern Rockies and the RAA also includes Bird Conservation Region 5 Northern Pacific Rainforest. The RAA overlaps with 2 of 55 khoh (grizzly bear, *Ursus arctos*) population units (GBPUs) which are used to regionally manage grizzly bear populations and threats in the province of BC. The two units relevant to the Project are the Edziza-Lower Stikine GBPU which overlaps most of the RAA and the Stewart GBPU, which overlaps with a small portion of the RAA southern edge. A portion of the TCAA that occurs south of the junction of Highway 37 and 37A is within the Cranberry GBPU. The Project falls within District 10 (Bulkley-Stikine) of the Wildlife Accident Reporting System as defined by the BC Ministry of Transportation and Infrastructure which includes Highway 37 that borders the east side of the RAA.

Technical boundaries were identified for the Wildlife and Wildlife Habitat Effects Assessment using Terrestrial Ecosystem Mapping (TEM) and the Habitat Suitability Model (HSM). The TEM used provincial standards and a predefined classification system to delineate and attribute ecosystem units through air photo interpretation. HSMs were created for several identified Sub-VCs using the TEM and RAA boundaries.



Skeena Resources Ltd.
Date: 24-Jul-2024
Figure: 19.3-2
Author: Jennifer.D.Thompson
Filename: ESK-23-070b

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Eskay Creek Revitalization

Figure 19.3-2:
Administrative Boundaries for the Eskay Creek Project

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:475,000
Coord. System: NAD 1983 UTM Zone 9N

0 5 10 15 20
Kilometres

N

Indigenous Knowledge for this assessment was primarily derived from public sources that did not focus on areas associated with the Project. Instead, the Indigenous Knowledge associated information broadly covers the territories and activities of the Engaged Indigenous Nations, providing a general basis for understanding wildlife and wildlife habitat in relation to the Project.

19.4 Existing Conditions and Future Trends

This section characterizes the existing condition for the Wildlife and Wildlife Habitat VC within the LAA and RAA, particularly as it relates to the potential effects identified in the Hybrid AIR (EAO 2023b) relating to changes in habitat, movement, mortality risk, and wildlife health. The characterization includes spatial (local and regional) and temporal (current and historical) contexts of the Project, the relevant field studies that have been completed to support the assessment to date, and other available information sources, as applicable. A description of future trends relating to the Wildlife and Wildlife Habitat VC is presented at the end of this section in Section 19.4.11, Future Trends.

19.4.1 Information Sources

The following subsections provide an overview of the field studies, other information sources, and Indigenous Knowledge that were used to characterize the existing conditions for the Wildlife and Wildlife Habitat VC.

19.4.1.1 Baseline Field Studies

The Project-specific Wildlife Cumulative Baseline Report 2020-2021 (Appendix 19-1) contains a comprehensive description of the methods used to gather information on mammals, birds, and amphibians within the Wildlife LAA and RAA, and characterizes wildlife presence and distribution using field studies, baseline habitat suitability modelling, and literature review. Additional wildlife surveys were completed in 2023 to 1) characterize the existing wildlife and wildlife habitat where data gaps may exist for the Project; and 2) complete pre-disturbance surveys, which entail both pre-construction and pre-clearing surveys, in support of ongoing care and maintenance activities and ongoing mine activities through the completion of pre-disturbance surveys (Appendix 19-2, 2023 Overall Fieldwork Report). Baseline studies included wildlife species that are regionally important for cultural, ecological, social, or economic reasons and are summarized in Table 19.4-1. Regionally important species or groups have been identified by Indigenous Knowledge, biologists, and from information in the CIS LRMP (BC ILMB 2000).

Table 19.4-1: Baseline Surveys Completed for Wildlife Valued Sub-valued Components

Target Species (and Tahltan Name, If Applicable)	Survey Type	Years Completed	Brief Description
Moose (kedā)	Aerial Survey	2020 and 2021	Following a standardized survey protocol (RIC 2002), aerial surveys were completed in late winter to evaluate population size and calf recruitment.
Mountain goat (isbā)	Aerial Survey	2020	Following a standardized survey protocol (RIC 2002), aerial surveys were completed in summer and winter. Summer surveys were used to evaluate population size and kid recruitment. Winter surveys were used to evaluate population size and identify important winter habitat.

Target Species (and Tahltan Name, If Applicable)	Survey Type	Years Completed	Brief Description
Hoary marmot (dediye)	Aerial and Ground Surveys	2020	Following a standardized survey protocol (RIC 1998a), aerial and ground surveys were completed in the summer. Aerial surveys were used to locate marmot colonies, document general habitat features, and inform colony density. Ground surveys were used to characterize and confirm habitat features and confirm presence.
Bats	Acoustic Surveys	2020 and 2021	Following a standardized survey protocol (RIC 1998b), acoustic surveys were completed in late summer to characterize the bat community.
Raptors	Aerial Stick Nest Surveys	2020 and 2021	Following a standardized survey protocol (RIC 2001), aerial surveys were completed in early summer to identify raptor nests and raptors if present.
Waterbirds	Aerial Surveys (spring pair, summer brood, and fall migration)	2020 and 2021	Following a standardized survey protocol (RIC 1998c; 1998d; 1999b), aerial surveys were completed annually in spring, summer, and fall. The surveys were used to characterize seasonal use of waterbird habitat, breeding activity, brood activity, and migration activity. Surveys also characterized the species composition of the waterbird community.
Upland breeding birds	Variable Radius Point Counts	2020 and 2021	Following a standardized survey protocol (RIC 1999c), variable radius point-count surveys were completed in early summer to characterize relative abundance, species richness, species occurrence, and habitat associations of upland birds.
	ARUs	2021	Following a standardized survey protocol (Knight et al. 2019), acoustic surveys using ARUs were completed in the summer to characterize the occurrence of common nighthawk.
Western toad	Aerial and Ground Survey	2020 and 2021	Aerial surveys were completed to determine areas of potential western toad breeding habitat. Following a standardized survey protocol (RIC 1998e), ground visual surveys were then completed in the summer to determine western toad occurrence and relative abundance.

Notes:
ARU = Autonomous Recording Units; RIC = Resources Inventory Committee

Habitat Suitability

Mapping wildlife habitat identifies areas that contain suitable habitat for a wildlife species, provides a basis to evaluate and quantify the effects of development on wildlife habitat, and allows for the potential loss or alteration of these habitats to be framed into a local and regional context. As defined by provincial standards (Resources Inventory Committee [RIC] 1999a), suitability models and maps identify areas that, in their current condition, provide effective habitat (moderate to high-suitability habitat as described by suitability habitat modelling) for a particular species. Suitable habitat generally means that the physical attributes (e.g., elevation, slope, aspect, and geographical location) and the biological components (e.g., vegetation species composition, structure, and age) of an area are likely appropriate for the species in question.

Habitat suitability modelling was completed using remote-sensing and field-based studies to identify habitats with suitable physical and biological attributes while also highlighting important habitat features

(e.g., mineral licks and thermal cover) for several species. The development of species accounts and suitability ratings followed BC RIC standards (RIC 1999a). The 2020 and 2021 baseline field survey data contributed to the identification of suitable species habitat and validation of habitat suitability modelling.

HSMs were developed for kedā (moose), isbā (mountain goat), khoh (grizzly bear; *Ursus arctos*), naghā (wolverine, *Gulo gulo*), nust'ihe (marten; *Martes americana*), tse'des (fisher; *Pekania pennanti*), and dediye[4] (hoary marmot; *Marmota caligata*) within the LAA and RAA, in conjunction with ecosystem mapping. Habitat suitability modelling was not completed for bats or western toad (*Anaxyrus boreas*) because habitats for these species are micro-site dependent and more easily identified during field surveys rather than by mapping. Further details on the methods and results of the HSMs are presented in Appendix 19-3, Wildlife Habitat Suitability Baseline).

19.4.1.2 Other Data Sources

In addition to Project-specific wildlife baseline studies and habitat suitability modelling, information from historical studies, federal and provincial databases and reports, and published literature was compiled and reviewed. A list of key data sources used in this chapter are described in Table 19.4-2.

Table 19.4-2: Data Sources Used to Establish the Existing Condition for Wildlife and Wildlife Habitat

Source	Description
The historical Eskay Mine Development Certificate	Project-specific baseline wildlife survey in support of a historical mine project within the RAA, including surveys for moose, mountain goat, and upland birds (Prime Resources Group Inc. 1993).
Tom MacKay Waste Rock and Tailings Environmental Assessment	Project-specific baseline wildlife survey in support of a mine rock and tailings infrastructure project within the RAA, including surveys for various focal and species of conservation concern (Homestake Canada Inc. 2000).
Iskut Road Environmental Assessment	Project-specific baseline wildlife survey in support of an access road project within the RAA, including surveys for moose, mountain goat, and waterbird species (Klohn 1991).
Volcano Creek Road Environmental Assessment	Project-specific baseline wildlife survey in support of an access road project within the RAA, including surveys for moose, mountain goat, upland birds, and waterbirds (Keystone Wildlife Research 1993).
Galore Creek Mining Corporation's Galore Creek Mine Project (Galore Creek) Environmental Assessment	Project-specific baseline wildlife survey in support of a mine project within the RAA, including surveys for moose, mountain goat, and bat species (Rescan 2006).
KSM Environmental Assessment	Project-specific baseline wildlife survey in support of a mine project within the RAA, including surveys for moose, mountain goat, hoary marmot, bats, raptors, waterbirds, upland birds, and amphibians (Rescan 2010a).
Newcrest Mining's Brucejack Project (Brucejack) Environmental Assessment	Project-specific baseline wildlife survey in support of a mine project within the RAA, including surveys for moose, mountain goat, hoary marmot, raptors, waterbirds, and upland birds (Rescan 2013a).
Identified Wildlife Management Strategies	Management strategies to minimize the effects of forestry practices on identified wildlife which may include the designation of WHA or UWRs (MWLAP 2004c).

[4] From "Tāłtān Dictionary" (TCG 2024)

Source	Description
CIS LRMP	A sub-regional land use plan for the Cassiar Iskut-Stikine area that directs the management of public lands and resources outside of protected areas (BC ILMB 2000).
Ecological Reports Catalogue	A catalogue of ecological reports, maps, datasets, and published inventories conducted within BC maintained by the MOE (2023).
BC Species and Ecosystems Explorer	An source for authoritative conservation information on approximately 6,000 plants and animals and almost 600 ecological communities (ecosystems) in BC (BC CDC 1994 and 2005).
iMapBC	A spatial information tool used to assess the presence and locations of wildlife in an area through occurrence reports and telemetry locations, while also identifying important wildlife habitat, such as UWRs and WHAs (BC CDC 2023b).
WARS	A data source on incidents of wildlife–vehicle collisions along provincial highways in BC published by BC Ministry of Transportation and Infrastructure. Due to the opportunistic reporting of collisions, it is estimated that the recorded mortalities represent 25% to 35% of the total actual incidents. Additionally, the detection of vehicle-related small wildlife mortalities is likely low (Sielecki 2010).
Quantifying Wildlife Vehicle Collision Underreporting on Northern British Columbia Highways	An examination of vehicle-wildlife collision data from 2004 to 2013 from multiple data sources to develop unbiased reporting estimates of vehicle-wildlife collisions along Highway 37 between Meziadin Junction to the Burrage Creek bridge (176 km). Data sources included the BC Ministry of Transportation and Infrastructure's WARS, the Insurance Corporation of BC, the BC Conservation Officer Service, and the Royal Canadian Mounted Police (Hesse and Rae 2016).
SARA Public Registry	An online database containing the status of species assessed and listed under the federal *SARA* and by COSEWIC, and associated documentation including assessment and status reports, recovery strategies and critical habitat designations, and management strategies (Government of Canada 2024).
British Columbia Big Game Harvest Statistics for WMUs 6-16 and 6-21 from 1976 to 2021	An online database containing the annual harvest of big game species by both resident and non-resident hunters for each WMU from 1976 to 2021 (MFLNRO 2023). WMU's 6-16 and 6-21 overlap the RAA.

Notes:

BC = British Columbia; CDC = Conservation Data Centre; CIS LRMP = Cassiar Iskut-Stikine Land and Resource Management Plan; COSEWIC = the Committee on the Status of Endangered Wildlife in Canada; ILMB = Integrated Land Management Bureau; KSM = Kerr-Sulphurets-Mitchell Project; MFLNRO = Ministry of Forests, Lands, and Natural Resource Operations; MOE = Ministry of Environment; MWLAP = Ministry of Water, Land and Air Protection, RAA = Regional Assessment Area; Rescan = Rescan Environmental Services Ltd; SARA = Species at Risk Act*; UWR = Ungulate Winter Range; WARS = Wildlife Accident Reporting System; WHAs = Wildlife Habitat Areas; WMU = Wildlife Management Unit*

% = Percent; km = kilometre

19.4.1.3 Indigenous Knowledge

As outlined in the Hybrid AIR (EAO 2023b), Indigenous Knowledge was considered in the development of this Application for an Environmental Assessment Certificate / Impact Statement (EAC Application). Specifically, for Tahltan, TSKLH, and MNBC, relevant public literature sources were identified and submitted to the Engaged Indigenous Nations to secure approval for their use. In some instances, further information

was received from these groups and used to support this EAC Application, based on specific permission to do so. These sources included:

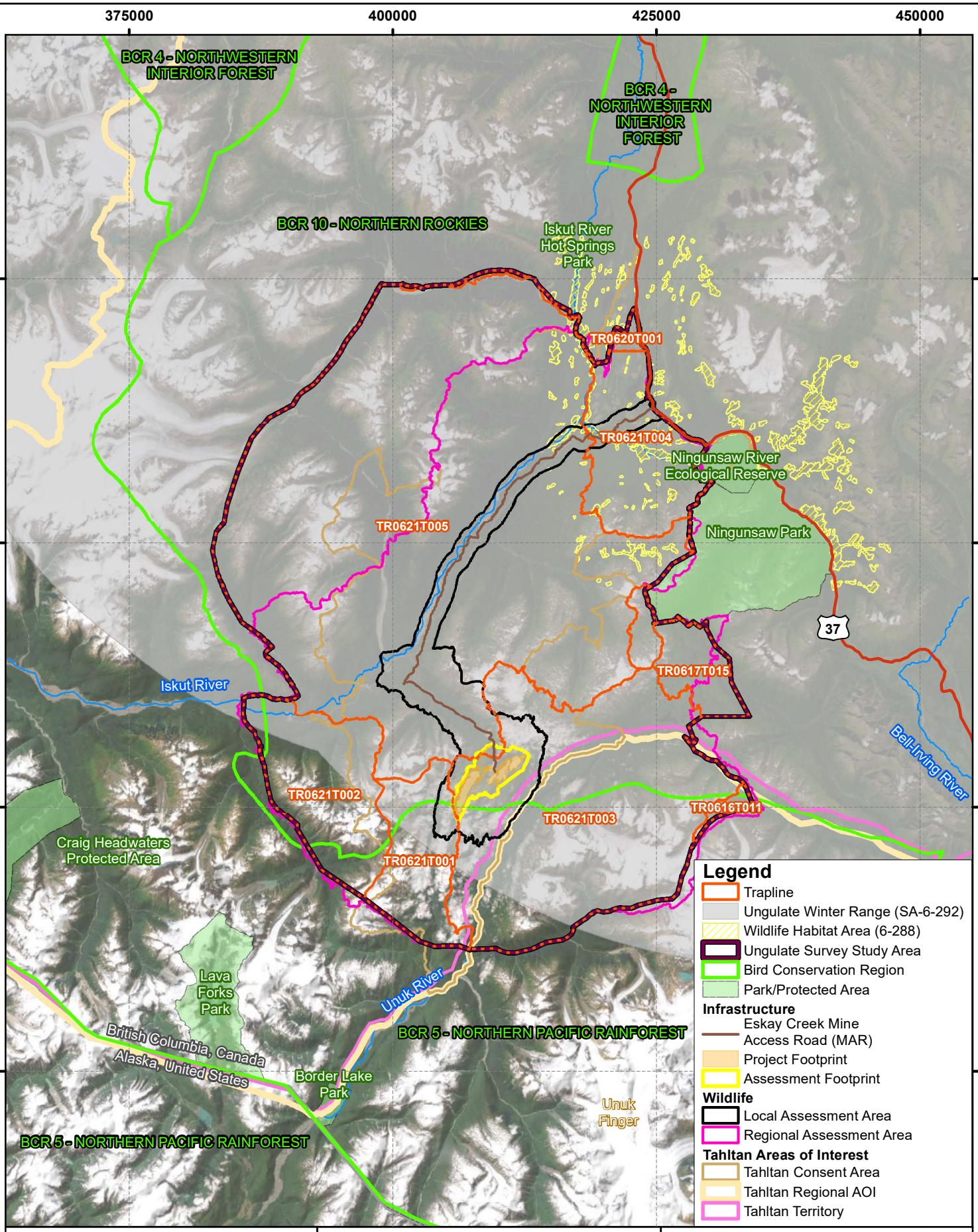
- Ethnographic and academic sources, including some Tahltan-authored graduate theses;
- The TCG's official website, online dictionary (TCG 2024), and newsletters;
- Indigenous Knowledge contributed by the TCG to the Hybrid AIR (EAO 2023b) and received in the context of a joint Indigenous Knowledge workshop presented by THREAT and Skeena Resources on 12 April 2024 (THREAT 2024);
- Policy and governance materials produced by the TCG and its predecessor organizations;
- Correspondence and supporting documentation, including the 2021 report "Tsetsaut Skii km Lax Ha: Review of Ethnographic and Historical Sources" (Ministry of Attorney General 2021) by the BC Attorney General's office, received from TSKLH;
- Correspondence received from MNBC; and
- Previous environmental assessment applications, which, in addition to synthesizing some of the above sources, also include publicly released information from non-public studies (e.g., country food studies in advance of previous projects) that inform the current work.

Gitanyow is working directly with Skeena Resources to apply the Wilp Sustainability Assessment Process to the Project. For this reason, Gitanyow Indigenous Knowledge is not incorporated into this environmental assessment; instead, key materials and outcomes developed during the Wilp Sustainability Assessment Plan (including the Wilp Sustainability Assessment Report) will be provided to the EAO.

For the Nisga'a Nation, environmental, economic, social, and cultural assessments consistent with the requirements of Chapter 10, Valued Component Effects Assessment Methods, paragraphs 8(e) and 8(f) of the "Nisga'a Final Agreement" (1999) have been carried out and are provided in Chapter 5, Nisga'a Nation. Associated Indigenous Knowledge for the Nisga'a Nation has been drawn from these assessments and can be consulted in relation to the paragraph 8(e) and 8(f) assessments in that chapter.

19.4.2 Regional and Historical Overview

The RAA is situated in the Northern Skeena Mountains and Southern Boundary Ranges ecosections (Figure 19.4-1). Ecologically, the RAA is divided into two distinct climatic regions. The western and southern portions are in moist coastal ecosystems represented by the biogeoclimatic (BGC) ecosystem classification (BEC) units of Coastal Western Hemlock – Wet Maritime, Mountain Hemlock – Leeward Moist Maritime, and Coastal Mountain-heather Alpine – Undifferentiated Parkland. The northern and eastern portions of the RAA encompass a transitional zone from coastal to interior ecosystems that is comprised of the BEC units Engelmann Spruce – Subalpine Fir – Undifferentiated, Boreal Altai Fescue Alpine – Undifferentiated, and Interior Cedar Hemlock – Wet Cold. There are four provincial parks within the RAA: Ningunsaw Provincial Park, Iskut River Hot Springs Provincial Park, Border Lake Provincial Park, and Lava Forks Provincial Park.



Skeena Resources Ltd.
Date: 24-Jul-2024
Figure: 19.4-1
Author: Jennifer.D.Thompson
Filename: ESK-23-070c

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-1:
Wildlife Areas and Traplines in the Regional Assessment Area
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:475,000
Coord. System: NAD 1983 UTM Zone 9N
0 5 10 15 20
Kilometres
N

The RAA is characterized by tall coastal range valleys and rivers, including the Unuk and Iskut rivers, with elevations ranging from approximately 240 m at the confluence of Sulphurets Creek and the Unuk River, to over 2,300 m at the peak of the Unuk Finger. Habitat types are diverse, with mature forests and wetlands at lower elevations, and shrubs, stunted trees, and drier sparsely vegetated subalpine and alpine habitat at higher elevations. Due to the large variation in elevation and habitat type, wildlife communities vary considerably throughout the RAA, including those containing species of conservation concern (Section 19.4.2.2, Species of Conservation Concern). The combination of wetlands, riparian corridors, and mature forests provides forage habitat for moose and grizzly bear. The large tracts of low-elevation mature forests within all watersheds support wolverine, marten, and fisher, as these habitats contain the forest structure that support prey populations during the winter. Wetland and riparian areas, including along the Iskut and Unuk rivers, provide habitat for breeding waterbirds, nesting raptors, and foraging bats. Additionally, the RAA also contains substantial alpine habitat for mountain goat and hoary marmot.

Important wildlife habitats and features are identified in sustainable resource management plans (SRMPs) or land and resource management plans (LRMPs) that may have associated management objectives. These management areas include WHAs, and UWRs, both of which are present within the RAA. WHA 6-288 is located predominantly along the Iskut River within the LAA in the eastern portion of the RAA and is focused on providing habitat requirements for grizzly bear (typically in small patches along rivers and drainages and not mapped). The RAA also falls within the SA-6-292 ungulate special area which designates regulations for debēhe (thinhorn sheep, *Ovis dalli*) disease prevention across a wide swath of the Skeena Natural Resource Region (Figure 19.3-2). Lastly, the RAA contains portions of UWR U-6-002, which designates important mountain goat winter range through the Nass Timber Supply Area and Upper portion of the Ningunsaw and Unuk Watersheds. Additionally, areas of particular importance to grizzly bear are salmon-bearing streams and rivers. Salmon-bearing waterbodies within the RAA, as identified by iMapBC, include the Iskut and Unuk rivers, and Teigen Creek. It is likely that the tributaries of the Unuk, Iskut, and Bell-Irving rivers occurring within the RAA are also salmon-bearing and important for grizzly bear within the region.

Bird Conservation Regions are ecologically distinct regions that share similar bird community composition, habitats, and management issues that are reviewed by the North American Bird Conservation Initiative (Bird Studies Canada and North American Bird Conservation Initiative 2014). The RAA falls along near the border of two broad Bird Conservation Regions: the Northern Pacific Rainforest and the Northern Rockies. The Northern Pacific Rainforest region supports approximately 293 species of birds, of which 64 are considered to be at risk either provincially or federally (Environment Canada 2013a). The region also supports 139 birds of priority, which includes 62% of waterfowl species in the region and 56% of waterbirds species. The Northern Rockies region supports approximately 230 bird species of which approximately 32 are considered to be at risk provincially or federally (Environment Canada 2013b). The region also supports a total of 77 priority birds of which 65% are land birds. There are no important bird areas within the RAA (BirdLife International 2023).

Anthropogenic disturbances in the RAA are predominantly related to natural resource extraction, including forestry and mineral mining operations. Due to the remote location of the region and the relatively poor production of the forests, there has been limited forestry harvest primarily along the Iskut River and Eskay Creek Mine Road. Mining operations in the RAA are limited to the existing Eskay Creek Mine and the KSM Project. Several natural disturbances occur within the RAA, which influence both wildlife and their habitat, including localized disturbances such as windthrow (trees uprooted by wind) and avalanches. Large-scale disturbances include wildfires that occur infrequently (BC Ministy of Forests [MOF] 1995). There are no known

wildlife habitat enhancement projects within the RAA. The remote location has potentially limited the ability for introduced and invasive wildlife species to inhabit the area; however, there is the potential for widespread invasive and introduced species, including European starling (*Sturnus vulgaris*) or rock pigeon (*Columba livia*).

The RAA supports recreational activities, including non-consumptive recreation such as backcountry helicopter skiing, snowmobiling, backcountry hiking and skiing, and river boating. The RAA also supports consumptive activities, including hunting by non-resident, resident, and Indigenous hunters, along with Indigenous and non-Indigenous fishing, fur trapping, and plant harvesting. Most of the RAA falls within WMU 6-21, with a small portion falling within WMU 6-16. The RAA overlaps with four guide outfitting tenures and six traplines (Section 22.4.3.6, Hunting, Guiding, and Trapping in Chapter 22, Non-traditional Land and Resource Use Effects Assessment). Correspondence from TSKLH confirms that TR0617T015 belongs to a TSKLH member.

19.4.2.1 Historical Overview

Wildlife has historically been, and continues to be, key to Indigenous people's sustenance and culture in the region. Wildlife has historically been a key source of food for Tahltan and TSKLH. The principal source of food for TSKLH was marmot, although mountain goat, bear, dech'uwe[5] (porcupine), and other species were also consumed (Boas 1895; Duff 1981). Parts of animals (particularly skins and bones) were also used for (1) materials, including thread, blankets, and ornamentation, for Tahltan (Emmons 1911), and (2) clothing, tools and utensils, blankets, and sails, for TSKLH (Boas 1895).

Indigenous people have historically hunted and trapped wildlife throughout the region through various methods, including Tahltan's use of snares, deadfalls, spears, bows and arrows, and assorted techniques for influencing wildlife movement into areas where these tools were used (Friesen 1986). Indigenous people practised, and continue to practice, wildlife population management to ensure healthy and sustainable population levels and habitats. For example, when Tahltan would notice that game started to become scarce in particular areas, they would let the area rest and the game population recover, while arranging hunting access to alternative areas with neighbouring Indigenous people (EAO 2023b; BC Environmental Stewardship Division 2003). Similarly, TSKLH members would move traplines and hunting areas to avoid over-harvesting or disrupting reproductive activities (Rescan 2013b). Tahltan have also historically practised controlled burning to promote moose habitat and have managed predator populations to ensure the health and availability of prey populations (BC Environmental Stewardship Division 2003).

Long-term changes in species availability have also been closely tracked by the region's Indigenous people, who have adapted their sustenance strategies accordingly. Most notably, an increase in moose populations starting in the 19th century is described in multiple sources, which also note that it increasingly became the focus of large ungulate hunting, even as hodzih[6] (caribou) populations have decreased across the region (e.g., Emmons 1911; McIlwraith 2007; Rescan 2009a).

[5] From "Tāłtān Dictionary" (TCG 2024)

[6] From "Tāłtān Dictionary" (TCG 2024)

For Tahltan members, these practices are guided by strong cultural values of reciprocity, respect, and avoidance of waste, which were often described in stories and mythology (McIlwraith 2007). As noted in Section 19.1.1, Wildlife and Wildlife Habitat Tahltan Value, one of these stories is that of Atsentmā:

> *All animals were originally born of a woman called Atsentmā', meaning 'meat mother' or 'game mother' (Teit 1919, 231–32). This woman assigned each animal with its own appropriate habit and food source. The Meat-Mother was thought to live far in the north. Showing disrespect to animals or failing to make full use of them as food, would cause the Meat-Mother to call her children 'home.' While the punishment lasted, there would be a scarcity of game* (EAO 2023b, 37).

For Tahltan and TSKLH, various wildlife species appear in these traditional stories and cultural traditions. Mountain goat and marmot play prominent roles in traditional stories told as part of cultures in the Athapaskan linguistic group, including Tahltan, with these stories also including themes of humans transforming into animals (and vice versa), as well as the connection between animals and the weather (Rescan 2013c).

The introduction of the wage economy and development of transportation infrastructure significantly influenced hunting and trapping practices over the 19th and 20th centuries, influencing species distribution and population levels, access to hunting areas, and time to participate in these activities in variable ways (McClellan 1981). However, Indigenous people in the region, including Tahltan, still consider wildlife (and related hunting and trapping activities) to be key to their culture, livelihood, and well-being (Appendix 21-3, Tahltan Country Foods Baseline Report). As such, the effects assessed in this chapter cannot be understood fully outside of the context of both this historical context, as well as the potential effects on the Current and Future Use of Land and Resources for Traditional Purposes VC, as assessed in Chapter 26, Current and Future Use of Land and Resources for Traditional Purposes Effects Assessment.

19.4.2.2 Species of Conservation Concern

The provincial and federal conservation status of vertebrate wildlife species with the potential to occur in the RAA are summarized in Table 19.4-3. For the purposes of this chapter, species of conservation concern are:

- Species or populations on the provincial Red and Blue lists and/or provincially ranked as S1 (critically imperilled), S2 (imperilled), and S3 (special concern, vulnerable to extirpation or extinction; BC CDC 2024); and
- Species listed on Schedule 1 of the *Species at Risk Act* (*SARA*; SC 2002, c 29) and/or species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as endangered, threatened, or of special concern (Government of Canada 2024).

There are a total of 44 species of conservation concern with the potential to occur in the RAA: 35 birds, 8 mammals, and 1 amphibian (Table 19.4-3). A total of 14 species of conservation concern have been confirmed in the RAA: 9 birds, 4 mammals, and 1 amphibian.

Table 19.4-3: Vertebrate Species of Conservation Concern with Potential to Occur in the Regional Assessment Area

Common Name (and Tahltan Name, if Applicable)	Scientific Name	Provincial Status		Federal Status		Project RAA[5]
		BC Rank[1]	BC List[2]	COSEWIC[3]	*SARA*[4]	
Amphibians						
Western toad	*Anaxyrus boreas*	S4	Yellow	SC	SC	Yes
Birds						
American bittern	*Botaurus lentiginosus*	S3B, SNRN	Blue	ND	ND	No
American golden-plover	*Pluvialis dominica*	S3S4B	Blue	ND	ND	No
Bank swallow	*Riparia riparia*	S4?B	Yellow	T	T	No
Barn swallow	*Hirundo rustica*	S4B	Yellow	SC	T	Yes
Black scoter	*Melanitta americana*	S3S4N	Blue	ND	ND	No
Black swift	*Cypseloides niger*	S2S4B	Blue	E	E	No
Brant	*Branta bernicla*	S3M	Blue	ND	ND	No
Caspian tern	*Sterna caspia*	S3B	Blue	NAR	ND	No
Common nighthawk	*Chordeiles minor*	S3S5B	Blue	SC	SC	Yes
Double-crested cormorant	*Nannopterum auritum*	S3S4	Blue	NAR	ND	No
Evening grosbeak	*Coccothraustes vespertinus*	S5	Yellow	SC	SC	No
Great blue heron, *fannini* ssp.	*Ardea herodias fannini*	S3B, S4N	Blue	NA	SC	No
Gyrfalcon	*Falco rusticolus*	S3S4B, SNRN	Blue	NAR	ND	No
Harlequin duck	*Histrionicus histrionicus*	S4B, S3N	Yellow	ND	ND	Yes
Horned grebe	*Podiceps auritus*	S4B, SNRN	Yellow	SC	SC	No
Killdeer	*Charadrius vociferus*	S3S5B	Blue	ND	ND	Yes
Lesser yellowlegs	*Tringa flavipes*	S3S4B	Blue	T	ND	No
Long-tailed duck	*Clangula hyemalis*	S2S3B, S4N	Blue	ND	ND	Yes
Northern goshawk, *laingi* ssp.	*Accipiter gentilis laingi*	S2	Red	T	T	No
Olive-sided flycatcher	*Contopus cooperi*	S4B	Yellow	SC	SC	Yes
Peregrine falcon, *anatum* ssp.	*Falco peregrinus anatum*	S2?	Red	Non-active	ND	No
Peregrine falcon, *pealei* ssp.	*Falco peregrinus pealei*	S3S4	Blue	SC	SC	No
Red-necked phalarope	*Phalaropus lobatus*	S3B, SNRM	Blue	SC	SC	Yes
Rough-legged hawk	*Buteo lagopus*	S3N	Blue	NAR	ND	Yes
Rusty blackbird	*Euphagus carolinus*	S3S4B	Blue	SC	SC	No

Common Name (and Tahltan Name, if Applicable)	Scientific Name	Provincial Status		Federal Status		Project RAA[5]
		BC Rank[1]	BC List[2]	COSEWIC[3]	*SARA*[4]	
Short-billed dowitcher	*Limnodromus griseus*	S1S2B, S2S3M	Red	ND	ND	No
Short-eared owl	*Asio flammeus*	S3B, S1N	Blue	T	SC	No
Surf scoter	*Melanitta perspicillata*	S3B, S4N	Blue	ND	ND	Yes
Swainson's hawk	*Buteo swainsoni*	S2B	Red	ND	ND	Yes
Tundra swan	*Cygnus columbianus*	S3N	Blue	ND	ND	No
Upland sandpiper	*Bartramia longicauda*	S2B	Red	ND	ND	No
Wandering tattler	*Tringa incana*	S3B	Blue	ND	ND	No
Western grebe	*Aechmophorus occidentalis*	S1S2B, S2N	Red	Non-active	SC	No
Western screech-owl	*Megascops kennicottii*	S2S3	Blue	T	T	No
Yellow-billed loon	*Gavia adamsii*	S2S3N	Blue	NAR	ND	No
Mammals						
American water shrew	*Sorex palustris*	S2S4	Blue	ND	ND	No
Fisher	*Pekania pennanti*	S3	Blue	ND	ND	No
Grizzly bear (khoh)	*Ursus arctos*	S3?	Blue	SC	SC	Yes
Hoary bat	*Lasiurus cinereus*	S3S4	Blue	E	-	No
Little brown myotis	*Myotis lucifugus*	S3S4	Blue	E	E	Yes
Mountain goat (isbā)	*Oreamnos americanus*	S3	Blue	-	-	Yes
Northern myotis	*Myotis septentrionalis*	S2S3	Blue	E	E	Yes
Silver-haired bat	*Lasionycteris noctivagans*	S4S5	Yellow	E	ND	Yes
Stone's sheep (debēhe)	*Ovis dalli stonei*	S3S4	Blue	ND	ND	No
Wolverine, *luscus* spp. (naghā)	*Gulo gulo luscus*	S3	Blue	SC	SC	Yes
Yuma myotis	*Myotis yumanensis*	S3	Blue	ND	ND	No

Notes:

BC = British Columbia; CDC = Conservation Data Centre; COSEWIC = Committee on the Status of Endangered Wildlife in Canada; ND = no data; SARA = Species at Risk Act*; RAA = Regional Assessment Area.*

[1] BC Provincial Status: S1 = critically imperilled, S2 = imperilled, S3 = special concern, vulnerable to extirpation or extinction, S4 = apparently secure, S5 = demonstrably widespread, abundant, and secure, NA = not applicable, NR = unranked, SU = unrankable, ? = inexact or uncertain numeric rank (BC CDC 2024).

[2] BC List Status: Red = extirpated, endangered, or threatened; Blue = special concern; Yellow = not at risk (BC CDC 2024).

[3] COSEWIC Assessment Status: E = endangered; T = threatened; SC = special concern; NAR = not at risk; NA = non-active; DD = data deficient (Government of Canada 2024).

[4] Schedule 1 of SARA listing: E = endangered; T = threatened; SC = special concern (Government of Canada 2024).

[5] Confirmed species detection during baseline studies 2020-2021 (Appendix 19-3, Wildlife Habitat Suitability Baseline).

19.4.2.3 Wildlife Health

At this time, no studies have evaluated or modelled the potential effects of contaminants of potential concern (COPCs) on Sub-VCs within the RAA. Samples collected by TCG from harvested wildlife over a period of 4 years showed that moose samples were healthy, with mineral levels within the norm, and very low heavy metal levels (TCG 2020a).

19.4.2.4 Additional Species of Importance to Indigenous People

Multiple species of cultural and/or subsistence importance to the region's Indigenous people are discussed in Sections 19.4.3, Moose, to 19.4.10, Amphibians, below. However, several additional species that are not considered in depth in this assessment have been noted as species of contemporary importance and use to Tahltan and TSKLH. Existing conditions, as described by Indigenous people, are briefly summarized in this section in acknowledgement of this importance and use; however, the assessment focuses on the Sub-VCs and representative species identified in the Hybrid AIR (EAO 2023b; Chapter 9, Valued Component Selection).

Caribou

Hodzih[7] (caribou, *Rangifer tarandus*) are a key species of importance to Tahltan, with a 2021 Fish and Wildlife Newsletter noting that there are seven herds of importance to the Nation for traditional uses, food security, and sustenance needs (TCG 2021a). Caribou are currently managed under the Caribou Stewardship Project operated under the Tahltan Stewardship Initiative to protect and increase caribou populations (TCG 2021a). Efforts to support caribou populations in continuity with Tahltan history are also made through the Tahltan Predator Management Policy, as discussed in by a TCG Predator Management Technician in a 2022 TCG newsletter:

> *I am excited to be a part of a team working to help restore the moose and caribou populations in the territory back to, or close to, the numbers that my Elders have spoken to me about in the stories of what they used to see when they went out on the land.* (TCG 2022c, 11)

Beaver

Tsa'[8] (beaver, *Castor canadensis*) is mentioned frequently as a culturally and economically important species in both historic and contemporary sources of Indigenous Knowledge reviewed for this assessment. As of a 2007 Census of Tahltan members, a small percentage (<5%) of respondents reported eating beaver at least once a week (Pretium Resources 2014a); however, beaver was noted as a nominal source of income among other trapped species (Pretium Resources 2014b). TSKLH members have reported trapping beaver for consumption and for their pelts and that they are preferably trapped in wetland areas (IDM Mining 2017a). Beaver was reportedly abundant on TR0617T015 as of 2013, which is held by a TSKLH member (Rescan 2013b). TSKLH members have also reported trapping along the Highway 37 corridor (Rescan 2013b).

Wolves

Ch'iyōne (wolves) are important species of note to Tahltan because of their significance as predators to other wildlife species, particularly caribou. The 2021 Tahltan Nation Social Community conducted for the Tahltan Socio-economic Baseline Report (Appendix 21-2) found that decreased trapping/hunting of wolves

[7] From "Tāłtān Dictionary" (TCG 2024)

[8] From "Tāłtān Dictionary" (TCG 2024)

(among other predators) was reported to be contributing to declining ability to access hunting and trapping areas. As such, wolves are a focus of the Tahltan Predator Management Policy, as described by a Tahltan Predator Management Technician in a 2023 TCG newsletter:

> *We take tremendous pride in our hunting, trapping, and fishing skills, and utilizing the land's resources for our traditional harvests.... I strongly agree in managing our wildlife's ecosystems for our future generations. Having balance in our ecosystem will not only keep our wildlife thriving but ensure the wolves, bears, and many other predators are not the reason moose and caribou populations eventually diminish. We have seen the White-tailed deer drastically decline over the years and have noted that the Stone's sheep [*debēhe*] population has decreased as well.* (TCG 2023b)

TSKLH members also report trapping wolves for their pelts and to control predation on other species of importance to members (IDM Mining 2017a).

19.4.2.5 Regional and Local Climate Projections

An evaluation of changing environmental and climactic conditions with the potential to interact with the Project is outlined in Chapter 30, Effects of the Environment on the Project. The following is a summary of the climate change that has the potential to affect wildlife and wildlife habitat over time.

Local and regional modelling suggests that the projected future climate at the Project will be both hotter and wetter than the existing condition (Okane Consultants [Okane] 2024).

Three Environment and Climate Change Canada (ECCC) weather stations are situated near the Project, including one in the town of Stewart in the District of Stewart, BC, that operated from 1981 to 2010, a second on the Unuk River and Eskay Creek that operated from 1991 to 2009, and a third at Eskay Creek MAR kilometre marker (KM) 55.5, which operated from 2020 to 2021 (for more information on ECCC weather stations, see Section 18.4.2.3, Regional and Local Climate Projections). The mean annual temperature and precipitation data is presented in Table 18.4-9 in Section 18.4. Analysis of ECCC data from these three stations indicated that over the last 100 years, minimum temperatures have increased on average 3°C but maximum temperatures have remained stable; this has resulted in an average temperature increase of approximately 1°C (Knight Piésold 2023). During the same time period, total precipitation rates have remained stable, with slight increases in snowfall and overall precipitation (Knight Piésold 2023).

Future regional climate projections were developed for change in median and mean annual air temperature and total annual precipitation between the 1981 to 2010 climate baseline and the end of the 21st century (2081 to 2100; Okane 2024). Projections suggest increased air temperature with median air temperatures varying between 2.8°C and 7.8°C, depending on the scenario considered by the end of the century (Okane 2024). Similarly, all projections suggest that annual precipitation values will increase with median values of 10.2% to 24.0% in annual precipitation by the end of the century (Okane 2024).

Future local climate projections were also compiled under different scenarios (ClimateData 2022). Local climate projections compared baseline climate data to 2071 to 2100 projections. Like regional climate projections, the local climate projections show increases in both average monthly temperatures and monthly precipitation for all projections (Okane 2024). Increases in average monthly temperatures is expected to range between 1.8°C and 2.9°C and is dependent on the scenario (Okane 2024). Monthly precipitation is projected to increase from 6.6% to 16.2%, depending on the scenario (Okane 2024).

Potential Effect of Climate Change on Wildlife and Wildlife Habitat

The composition of vegetation communities is, in part, influenced by local and regional climate conditions, including temperature and precipitation. Both regional and local climate models predict that the Project will become hotter and wetter due to climatic changes throughout the 21st century (Okane 2024). Changes in these climactic variables will result in changes in vegetation community composition over time (Feely et al. 2020). Changes in vegetation communities will alter wildlife habitat and, ultimately, the wildlife communities using the habitat. Changes to wildlife and wildlife habitat may be directly related to changes in vegetation communities such as spatial changes in cover or food resources, and nesting or denning features. These changes may adversely affect some species, especially specialist species, while positively influencing generalist and possibly invasive species (Clavel et al. 2011).

Changes in wildlife habitat may contribute to altered wildlife migrations and movements. Wildlife migrations typically occur as individuals are moving to better access food resources, avoid unfavourable conditions, or reproduce (Shaw 2016; Heape 1931). Changes in vegetation community composition will influence spatial and temporal variations in the accessibility of resources. Therefore, both elevational and landscape-level migrations will likely change in length, location, intensity, and timing in response to resource availability, and changes in environmental variables including temperature and precipitation (Shaw 2016). These changes may also adversely affect migrating species by causing migration timing to misalign with food availability (Inouye et al. 2000), or cause populations to stop migrating which may lead to increased infection risk to populations (Satterfield et al. 2015), and could ultimately lead to population declines (Bolger et al. 2008).

Variation in vegetation and wildlife communities in response to climate change may have an adverse effect on wildlife mortality risk by altering competition and predator–prey dynamics in the ecosystem. Increasing temperatures can allow for the expansion of predator species into new areas and can cause predation of previously non-prey species (Latham et al. 2011). Additionally, the ranges of prey species may increase with climate change by either increasing favourable conditions for their survival or increasing favourable conditions for habitats which they rely on. Predators may similarly expand their ranges following previously predated-on species, which may cause increased predation on existing species. Therefore, changes in predator–prey dynamics due to climate change may result in adverse effects of mortality risk on wildlife.

The expansion of species ranges into new geographical areas may also influence the transmission of pathogens or disease. The effects of climate change have a diverse range of effects on pathogens and their hosts and, therefore, it is difficult to understand broadly how climate change will influence pathogens (Gallana et al. 2013). Although changes in environmental variables due to climate change appear to produce varied effects on pathogens, it is likely that these changes act cumulatively with other stressors and environmental factors (Gallana et al. 2013). Expansion of species ranges may also introduce new vectors and hosts for pathogens and parasites to enter ecosystems that were previously devoid of their presence (Patz et al. 2000). This introduction of new pathogens and parasites may have adverse effects on wildlife populations. Although it is difficult to determine how climate change may affect wildlife health, it is likely that climate change will affect pathogen transmission over time.

Overall, the effects of climate change on wildlife and wildlife habitat are of concern to the region's Indigenous people, both in relation to the role of potentially affected species in sustenance and from the standpoint of their culturally established role as stewards. In particular, the TCG has noted that conserving, documenting, and monitoring natural areas and the associated wildlife is an important measure in understanding and managing climate change (e.g., TCG 2021b); its efforts to study caribou decline and

identify potential causal factors, including climate change, reflect the TCG's concern with establishing a resilient response (e.g., TCG 2020a).

19.4.3 Moose

Moose is provincially Yellow-listed (secure) and is ranked as S5, suggesting that moose is widespread, abundant, and secure in BC (BC CDC 2024). Moose has not been assessed by COSEWIC and is not listed on Schedule 1 of *SARA* (Government of Canada 2024). Moose is also assessed under the BC Cumulative Effects Framework. Population assessments under the framework consider the population trend, hunting vulnerability, female survival rate, and calf recruitment rate as indicators of moose populations (Government of BC 2018). Moose use a variety of terrestrial and aquatic habitats including forests, flood plains, wetlands, valley bottoms, alpine meadows, tundra, and subalpine shrub habitats (Rea and Child 2007). As a result, moose can be found in many of the BEC zones throughout BC. In 2019, the provincial population estimate for moose was between 110,000 and 185,000 individuals, with between 25,000 and 45,000 moose in the Skeena region (Blood 2000a). Moose is an important component of the regional biodiversity and are harvested by Indigenous people (Rescan 2013b; NovaGold Canada Inc. 2006b; Rescan 2012a) and hunted by resident and non-resident hunters. TSKLH has emphasized the importance of moose as a contemporary and historically harvested species, reporting moose as the primary species hunted by members, and one of the two most utilized animals by members next to salmon (Rescan 2013b). As of 2013, TSKLH members have been consuming moose two to three times per week, with all parts of the moose utilized and preserved for future consumption, including moose dew claws (or hooves) used for regalia, aprons, and leggings (Rescan 2013b; ERM Rescan 2014). Both Alaskan and Northwestern subspecies of moose are found in Tahltan Territory and are a primary food source in the Tahltan diet, with three-quarters of Tahltan reporting that they have eaten moose meat at least once weekly, as of the 2007 Tahltan Census (Pretium Resources 2014a; Rescan 2012a; Appendix 21-3, Tahltan Country Foods Baseline Report).

Additionally, moose has been identified as an important species requiring increased management consideration by the CIS LRMP (BC ILMB 2000). The Project and associated RAA overlap with two WMUs within Skeena Region 6: WMU 6-21 and a small portion of WMU 6-16. TSKLH harvesters typically focus hunting of moose in the RAA within WMU 6-21 (Seabridge Gold Inc. 2013c). Indicators that assess moose populations under the cumulative effects framework include the direction of population trend, the hunting vulnerability of the population (determined by early serial vegetation and road density in the management unit), the adult female survival rate (<85% is considered low), and juvenile recruitment rate (<30% is considered low; Provincial Moose Technical Working Group 2017). Other inputs to the moose population assessment included the number of hunter days, the population estimate, harvest estimates, wolf density, the amount of early seral habitat, and road density (Government of BC 2018). Since 2021, the TCG has been implementing moose management planning, which includes community knowledge gathering in developing a Moose Stewardship Plan (MSP) consistent with moose management direction from Tahltan land use plans and conservation and Klappan Decision-Making and Management Board (TCG 2020b; TCG 2023b). The Klappan (MSP) planning began in 2020 but was delayed due to COVID-19. It is currently supported through the 3Nations Society – British Columbia Collaborative Stewardship Forum (3NBC-CSF) and will be delivered through the Tahltan – BC Fish and Wildlife Working Group (TCG 2023a). The MSP is mandated to be a co-management plan that will enforce and recommend appropriate regulatory changes; monitor health, habitat, and harvesters; and ensure that Tahltan members can freely practise traditions and culture related to building and nurturing a spiritual connection to the land (TCG 2022c).

Environmental variables such as the distribution of foraging material and snow depth can cause moose to undertake seasonal migrations between higher and lower elevations (Bowyer et al. 2003). Moose frequent valley bottoms in the winter and spring, and move upslope to higher elevations (up to 2,600 m) in the summer and fall (Cowan and Guiget 1978; Stevens 1995). TSKLH members have reported harvesting moose in river valleys, Moose are browsers that feed on new growths of trees and shrubs when available but switch to foraging on stems and twigs during the winter months (Bowyer et al. 2003). Tahltan members have reported the challenges and cultural significance of hunting moose in uncertain terrains and climates. A Tahltan member's experience hunting moose is described in a 2020 TCG newsletter:

> *Hunting was a cornerstone of [his] time in the Tahltan Territory. He says he remembers how hard it would be to hunt moose when it was mid-winter. The moose would always stay near sloughs, making them very hard to hunt, especially in March when the snow would get hard and turn to ice. Though [he] was able to walk on the hardened snow, the moose were faster and able to make quick getaways. Even with this adversity, his family taught him the necessary skills to hunt successfully* (TCG 2020a).

One TSKLH member described his family's moose habitat management practices as including controlled burning around Meziadin Lake to encourage growth of blueberry patches and create habitat for moose. However, controlled wildfires have since been discontinued (IDM Mining 2017a). This practice was also reported by a TSKLH member in a study for the EAC Application for the Brucejack Project:

> *My people started the forest on fire when there was hot weather and a good wind. When the fire burned out, about two years later, the blueberry bushes would come up and we would harvest lots of berries. Also the willow and alder bush would start to grow and the moose would come into the country. Heavy timber no good for berries and moose.* (ERM Rescan 2014, 4–22)

Snow depth is the primary factor influencing migration between winter and non-winter ranges. Moose typically respond to increasing snowpack by moving to lower elevations where snow depths are shallower, seldomly using habitats higher than 1,300 m in the winter. Migratory movements often follow traditional routes, using the same migration corridor annually, but patterns can vary from year to year, depending on extent and duration of snowfall (Bowyer et al. 2003). Valleys near the Project, such as the Unuk River, Iskut River, and Volcano Creek, likely act as important movement corridors for moose. Moose is notably harvested by Métis and TSKLH in both the Unuk and Bell-Irving watersheds (Seabridge Gold Inc. 2013b) in river valleys, and along banks of creeks and rivers (ERM Rescan 2014; Pretium Resources 2014a). TSKLH has also reported harvesting moose along the Highway 37 and 37A corridor and Meziadin Lake (Rescan 2009b; IDM Mining 2017b; Pretium Resources 2014a). Historically, the majority of Tahltan harvesting occurred in the Iskut River and Klappan River drainages (Pretium Resources 2014b; Albright 1984). From August into the fall, Iskut people hunt moose in the Tla'bane (Klappan River) and at the headwaters of the Spatsizi River (McIlwraith 2007).

Baseline Studies

In 2020, baseline surveys for moose were completed across 12 moose survey units (SUs) that were stratified across the RAA following provincial standards (RIC 2002). Additionally, surveys were completed in 2021 and 2022 for important moose features such as mineral licks and ungulate wallows, but none were identified. One moose wallow was incidentally detected in 2023 outside of the Assessment Footprint along Ketchum Creek (Appendix 19-3, Wildlife Habitat Suitability Baseline). Ten of the SUs were previously surveyed as part of monitoring programs completed in 2005 or 2009 for the nearby KSM Project (three SUs) and Galore Creek Project (seven SUs).

A total of 36 moose were detected, and of the 32 that were classified by age and/or sex, 19 were bulls (59%), 8 were cows (25%), and 3 were calves (9%). After correcting for unclassified animals (RIC 2002), the sex ratio of observed moose was 238 bulls per 100 cows, and productivity from observed moose was 60 calves per 100 cows. Moose density was an average of <0.1 moose per square kilometre (km^2) of the SU's total area. The 2020 surveys did not observe any moose within the Assessment Footprint (Figure 19.4-2), and moose were most frequently observed near the Bob Quinn Lake area and along the Iskut River. There were 65% less moose observed in 2020, as compared to previous surveys (78 moose across 10 SUs in earlier surveys, compared to 27 moose in the 2020 survey). The decrease in the observed number of moose in the SUs may represent a population decline, or differences in sightability of animals between surveys because of poor weather, observers, equipment, or a combination of factors. TSKLH members have reported declines in the abundance of moose in the region despite decreased hunting activity, with groups of moose smaller than they used to be (Rescan 2013b).

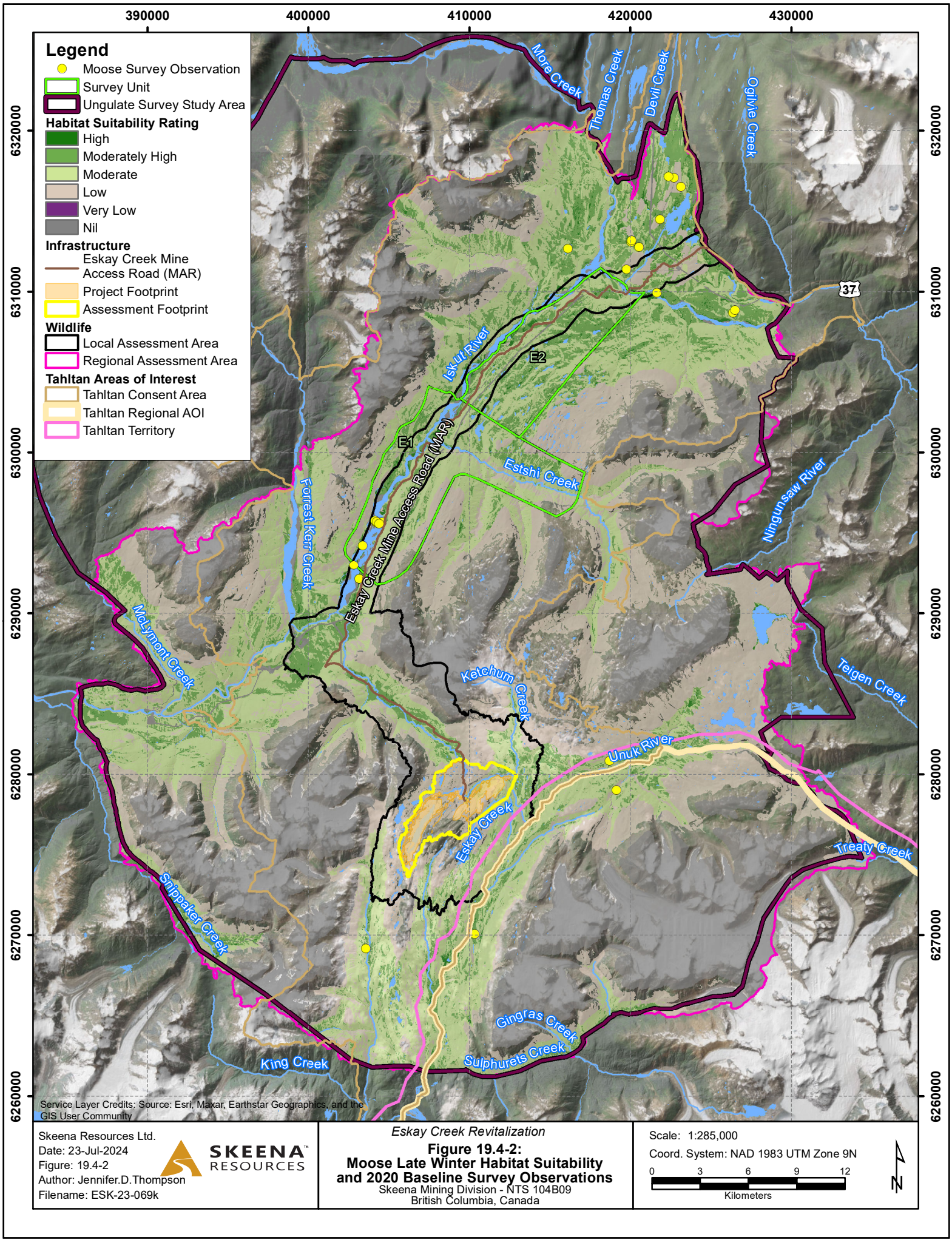
Habitat Suitability Modelling

Three HSMs were developed to identify the suitability and distribution of moose habitat during the growing season, early winter, and late winter (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the moose is distributed as follows:

- Late winter: 11,092.4 ha within the LAA and 65,058.1 ha within the RAA (Figure 19.4-2). Late winter effective habitat within the RAA shared a similar distribution to early winter habitat due to similar limiting factors (e.g., snow depth and forage availability). Within the LAA, the distribution of effective habitat was similar to early winter, with noticeable losses at higher elevations.
- Early winter: 11,719.8 ha within the LAA and 68,148.9 ha within the RAA (Figure 19.4-3). Effective early winter habitat in the RAA is located in a similar valley and riparian areas as growing season habitat; however, it generally occurs at lower elevations and at lower suitability classes. The LAA contains limited effective habitat along the Eskay Creek MAR and on the eastern boundaries. Generally, the Project does not contain abundant early winter habitat because of the mid-elevation location.
- Growing season: 17,386.8 ha within the LAA and 111,008.4 ha within the RAA (Figure 19.4-4). Effective moose growing season habitat is predominantly located along river valleys, wetlands, and waterways throughout the RAA, particularly along the Unuk and Iskut rivers. Effective moose growing season habitat in the LAA also occurs primarily along waterways throughout the LAA, including along the Volcano Creek and Iskut River valleys adjacent to the existing MAR.

Wildlife Mortality

From 1988 to 2007, there was a total of 560 wildlife-related accidents across the 725 km of Highway 37, and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Across the entire District 10, which includes Highway 37 and 37A, there was a total of 1,022 moose-related accidents, making up 38% of wildlife-related accidents in the district. In 2012, there was an estimated annual average of 0.02 ungulate-related vehicle collisions per km on Highway 37, including an estimated 12 collisions involving moose annually (Sielecki 2013). Similarly, there were 42 reported vehicle collisions with moose along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013, which is 0.03 vehicle-moose collisions per km per year (Heese and Rea 2016). Hunter harvest data from 1976 to 2021 for WMUs 6-16 and 6-21, which overlap with the RAA, indicate that 2,328 moose were legally harvested by resident and non-resident hunters, including 917 between 2001 and 2021 (MFLNRO 2023).



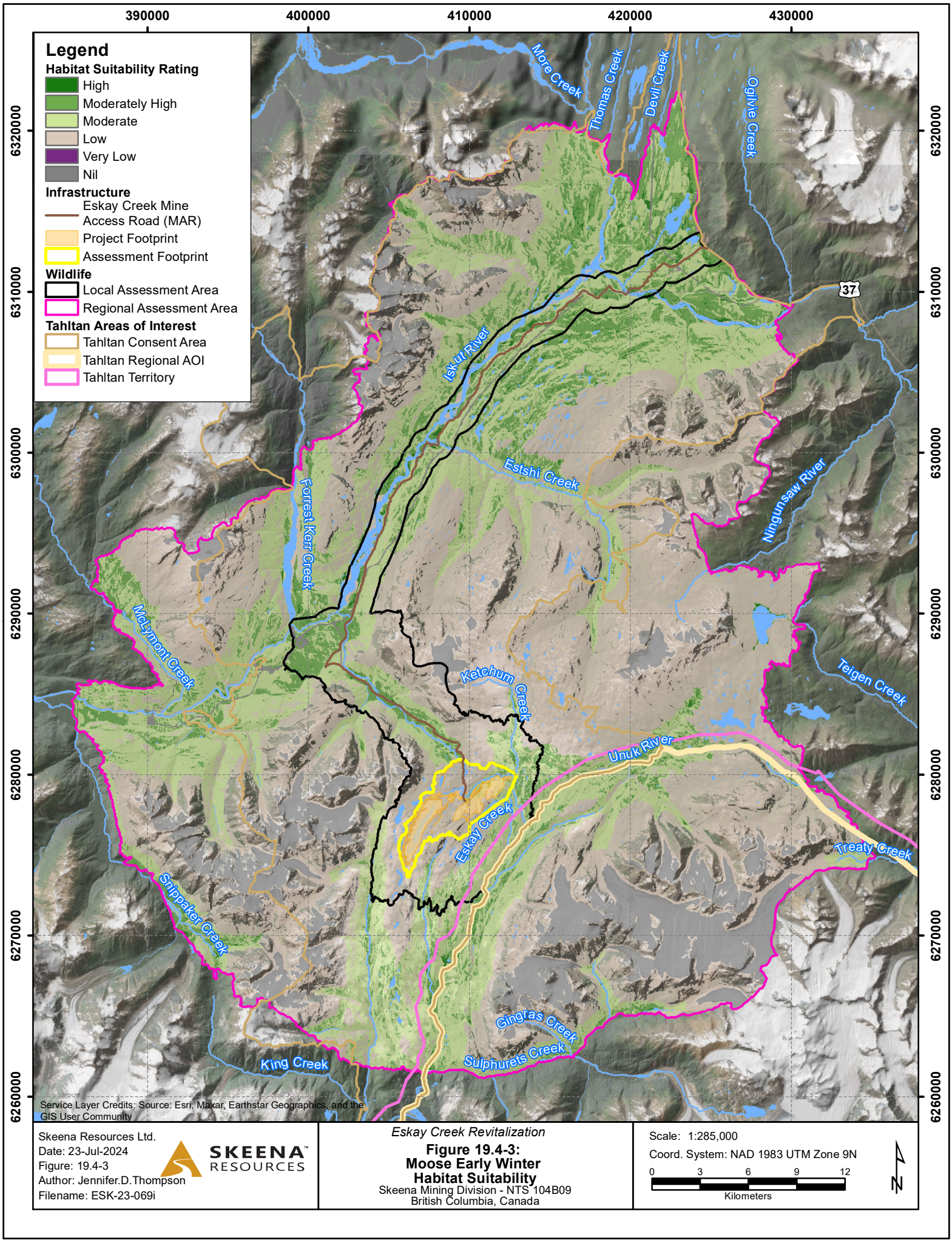
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-2
Author: Jennifer.D.Thompson
Filename: ESK-23-069k

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-2:
Moose Late Winter Habitat Suitability and 2020 Baseline Survey Observations
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



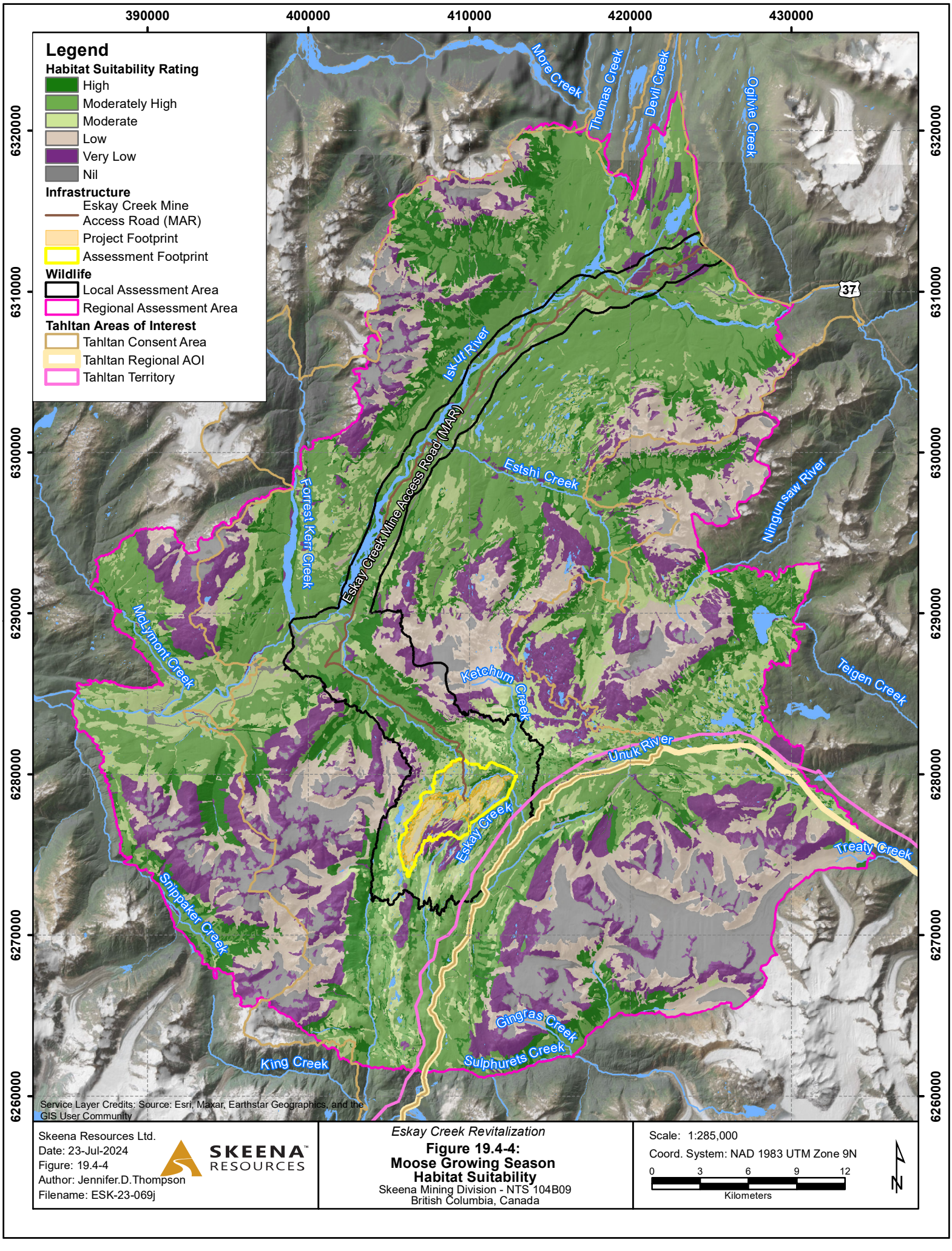
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-3
Author: Jennifer.D.Thompson
Filename: ESK-23-069i

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-3:
Moose Early Winter Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-4
Author: Jennifer.D.Thompson
Filename: ESK-23-069j

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-4:
Moose Growing Season Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

19.4.4 Mountain Goat

Mountain goat is provincially Blue-listed (special concern) and ranked as S3, suggesting it is vulnerable to extirpation or extinction in BC (BC CDC 2024). Mountain goat has not been assessed by COSEWIC and is not listed on Schedule 1 of *SARA* (Government of Canada 2024). Mountain goat is widely distributed throughout the province and can be found in most major mountain ranges, but the majority of the population resides in northern BC (Blood 2000b). The mountain goat population in BC was estimated at approximately 50,000 individuals in the early 2000s (Blood 2000b; Côté and Festa-Bianchet 2003), of which approximately 16,000 to 35,000 were estimated to occur within the Skeena region (BC ILMB 2012). Mountain goat plays a prominent role in TSKLH cultural stores, and TSKLH historically relied on goat as a food source, and used the skins and bones as materials (for clothing, blankets, utensils, etc.; Boas 1895; Rescan 2013b). Mountain goat also holds cultural value to Tahltan for both its meat and fur, the latter of which was used historically for spinning yarn and making robes, bedding, and rugs (Rescan 2012a; Pretium Resources 2014a; Albright 1982; Dawson 1889; Teit 1906)

Due to the importance of mountain goat for historic and contemporary harvest by TSKLH members and other Indigenous people (Seabridge Gold Inc. 2013b; Pretium Resources 2014b) and recreational harvest by resident and non-resident hunters, mountain goat receives conservation attention from the Government of BC. Mountain goat is protected under BC's *Wildlife Act*, whereby harvesting activities by non-Indigenous people are only permitted under a hunting licence. Ungulate Winter Range U-6-002 overlaps with the LAA along the Unuk River (MOE 2008). There are additional proposed UWR polygons that are currently under government review and may expand the UWR in the future.

Mountain goat primarily inhabit alpine and subalpine habitats associated with escape terrain, which is critical for predator avoidance, and individuals rarely venture less than 500 m from escape terrain. The escape terrain includes steep (greater than [>]80%) cliffs, rocky outcrops, and talus slopes where mountain goat can escape from predators. High-suitability mountain goat habitat is typically classified as escape terrain that also provides forage availability (MOE 2010). A mountain goat will typically spend the summer at higher elevation, above tree line, and spend the winter near or below tree line. Winter is generally an important season for mountain goat as there is limited availability of habitats that provide a combination of escape terrain, forage, and cover during this critical period. In the summer, the availability of high-suitability summer forage next to escape terrain is necessary to support kidding and allow local herds to achieve the fitness necessary for winter survival.

The mountains to the west and south of the Project provide high-suitability mountain goat habitat and have been confirmed to contain a high proportion of the regional population. Mountain goat are generally present on the lower McLymont slopes, on the west side of McLymont canyon, and on the east side of Jennifer Creek (in the winter; AltaGas Renewable Energy Inc. 2011a). Iskut people hunt for various game including mountain goat in the valley of the Klappan River and at the headwaters of the Spatsizi River (McIlwraith 2007); the cultural significance of the relationship between the Iskut connection to mountain goat and their habitat region is illustrated by Tahltan naming of the region:

> *The mountain sides are home to a protected species of debehe 'sheep' (Ovis dalli stonei) and isba 'mountain goat' (Oreamnos americanus columbiae). The penchant of these white goats for rolling in the red mineral rich sands of the Spatsizi Plateau has given the area its name: Spatsizi is a contraction of the Tahltan words isba 'goat' and detsTdzi 'red'.* (McIlwraith 2007)

No known mountain goat movement corridors occur near the LAA due to the limited understanding of movement pattern of the species. Generally, the mid-elevation of the Project is too low to support high-suitability mountain goat habitat, even in winter.

Baseline Studies

Baseline surveys for mountain goat were completed in 10 SUs during winter 2020 and nine SUs in summer 2020 following provincial standards (Appendix 19-1, Wildlife Cumulative Baseline Report 2020-2021; RIC 2002). Additionally, surveys were completed for important mountain goat features such as mineral licks and ungulate wallows in 2021 and 2022, but none were identified. Of the 11 mountain goat SUs that were stratified across the RAA, 8 were previously delineated as part of monitoring programs completed in 2004 or 2009 for the nearby KSM Project (five SUs) and Galore Creek Project (three SUs).

In total, 223 mountain goats in 51 groups were observed during the winter surveys (Figure 19.4-5), while 180 mountain goats in 51 groups were observed during the summer surveys (Figure 19.4-6). There was an average of 24 kids per 100 adults observed in summer and 20 kids per 100 adults in winter. The number of individuals detected in each survey unit varied but individual SUs had consistent observations in both winter and summer. The average mountain goat density calculated against the total survey unit areas was 0.17 mountain goats per km^2 in both summer and winter. Across both survey periods, three observations occurred within the LAA. Mountain goat observations were most frequent in four broad regions: the mountains west of the Project, the unnamed mountains between the Project and Iskut River, the region south of the Project (31% of observations in SUs K23 and K24 south of the Project), and near the Unuk River on Johns Peak and the Unuk Finger. Baseline surveys indicate that the LAA contains limited habitat for mountain goat, with winter observations occurring in the closest provincially designated UWR polygons along the Unuk River, east of the Project (Figure 19.4-5).

There were three times as many mountain goats observed in winter 2020 compared to previous surveys (38 mountain goats across five SUs included in earlier surveys compared to 115 mountain goats in the 2020 survey). The differences in mountain goats in the SUs previously surveyed may represent a population increase, and differences in sightability of animals between surveys because of weather, observers, equipment, or a combination of factors.

Habitat Suitability Modelling

Two HSMs were developed to identify the suitability and distribution of mountain goat habitat during the growing season and winter (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the mountain goat is distributed as follows:

- Growing season: 12,237.3 ha within the LAA and 131,804.8 ha within the RAA (Figure 19.4-6). Effective mountain goat habitat is widely distributed along steep slopes throughout the RAA. Within the LAA effective habitat is abundant, especially on the steep slopes beside the Eskay Creek MAR and Volcano Creek.
- Winter: 6,061.0 ha within the LAA and 72,418.3 ha within the RAA (Figure 19.4-5). Effective mountain goat habitat is almost half as abundant in both the RAA and LAA when compared to growing season habitat. Winter effective habitat is generally limited to southern-facing slopes or sheltered valley slopes and is not as abundant on north-facing slopes. Effective habitat is generally more isolated in the winter with lower elevation areas becoming unsuitable for mountain goat.

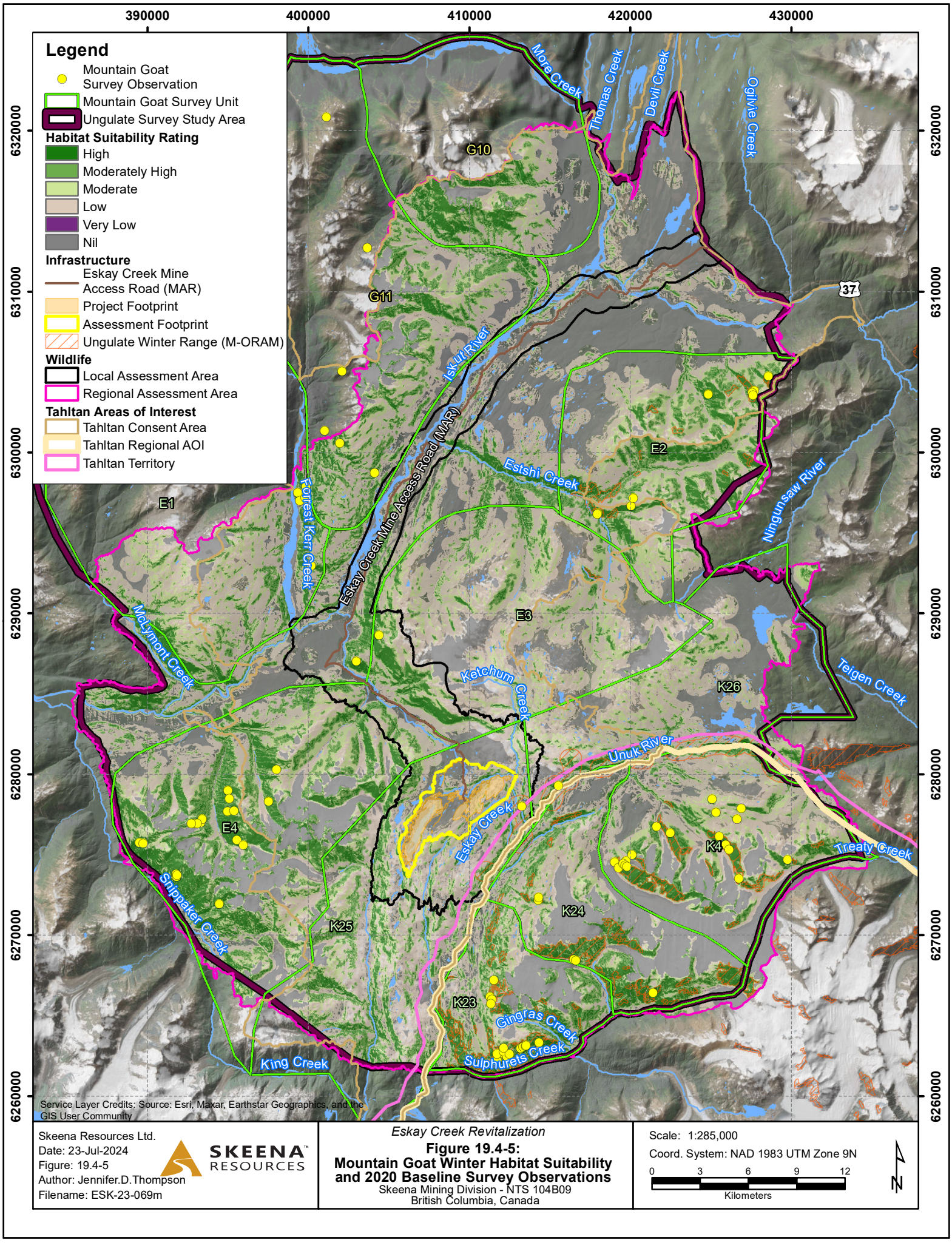


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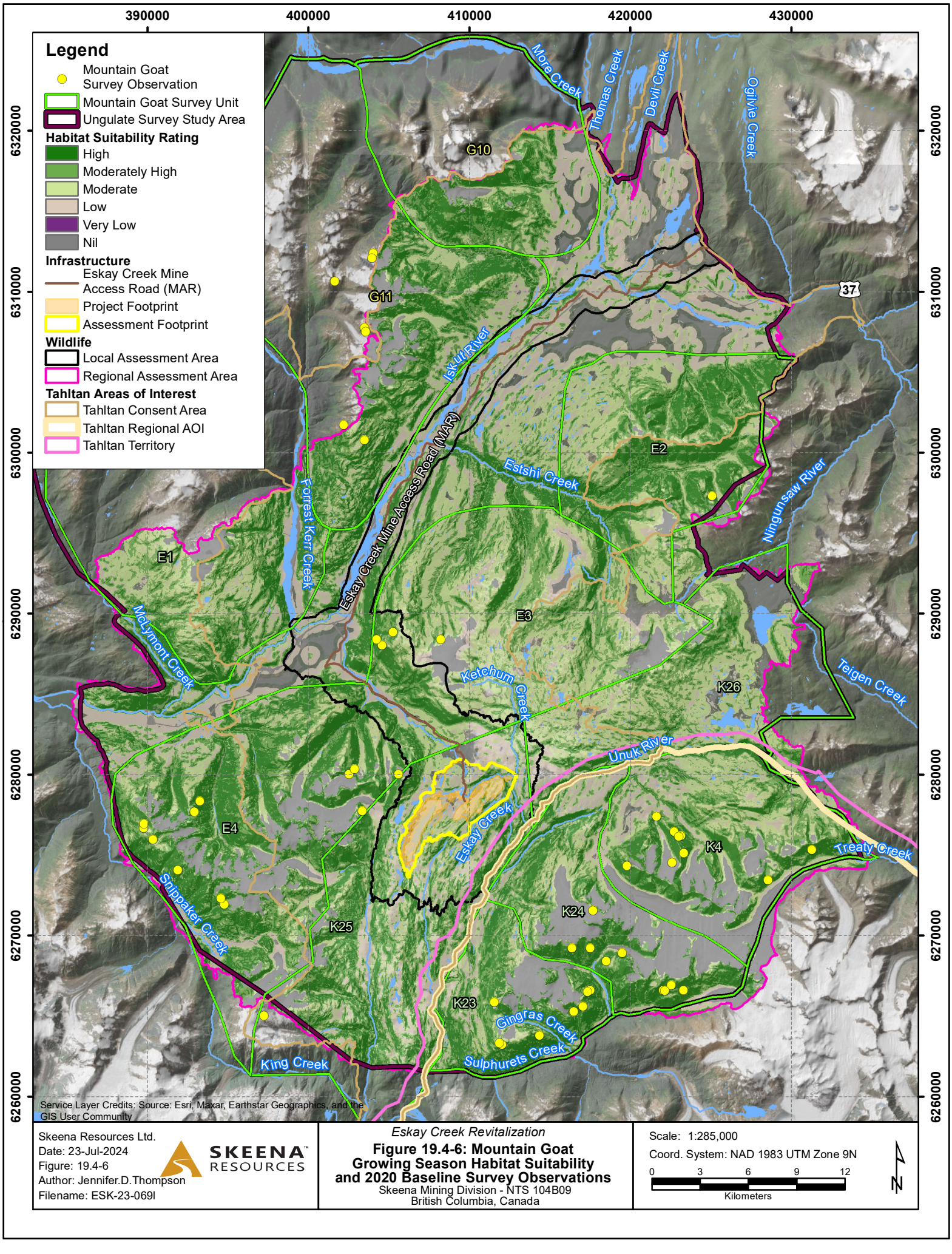
Figure: 19.4-5
Author: Jennifer.D.Thompson
Filename: ESK-23-069m

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-5:
Mountain Goat Winter Habitat Suitability and 2020 Baseline Survey Observations
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



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SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-6: Mountain Goat Growing Season Habitat Suitability and 2020 Baseline Survey Observations

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37, and 78 wildlife-related accidents across 66 km of Highway 37A, with no reported accidents involving mountain goat in the entire District 10 region (Sielecki 2010). There was an estimated annual average of 0.02 ungulate-related vehicle collisions per km on Highway 37 and 37A in 2012, including no reported mountain goat accidents (Sielecki 2013). Similarly, there were no reported vehicle collisions with mountain goat along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Heese and Rea 2016). Hunter harvest data from 1976 to 2021 for WMUs 6-16 and 6-21, which overlap with the RAA, indicate that 1,089 mountain goats were legally harvested by resident and non-resident hunters including 390 between 2001 and 2021 (MFLNRO 2023).

19.4.5 Furbearers

The RAA supports a diverse group of furbearing species including grizzly bear, wolverine (*Gulo gulo*), marten, fisher, and hoary marmot, which are focal furbearers species included in baseline studies for the Project. Furbearers are species that have traditionally and frequently been harvested for their fur, and, as a result, are a valuable economic and cultural resource. Approximately 35% of the total provincial furbearer harvest is generated from the Skeena region, second to the 43% harvested from the Omineca-Peace Region (Hatler and Beal 2003). Furbearer species are most sensitive to disturbance at their dens, when they are raising young through the late winter and spring. The CIS LRMP emphasizes initiatives for managing furbearer populations as a sustainable resource (BC ILMB 2000). Grizzly bear, wolverine, and fisher are Blue-listed (special concern) in BC and grizzly bear and wolverine are federally assessed as species of special concern by COSEWIC and listed on Schedule 1 of *SARA* (BC CDC 2023; Government of Canada 2024). Additionally, wolverine and fisher are Class 2 furbearers, meaning they are sensitive to harvest and are managed by provincial regulations. The Nass South SRMP recommends management consideration for these two species (BC ILMB 2012).

19.4.5.1 Grizzly Bear

Grizzly bear is provincially Blue-listed (special concern) and is ranked S3, suggesting it is vulnerable to extirpation or extinction in BC (BC CDC 2024). Grizzly bear have been assessed as a species of special concern by COSEWIC and is listed as special concern under Schedule 1 of *SARA* (COSEWIC 2012b; Government of Canada 2024). The Identified Wildlife Management Strategy also lists the grizzly bear as an Identified Wildlife Element which means that the species requires special conservation measures within BC (BC MWLAP 2004b). Grizzly bear is also assessed under the BC Cumulative Effects Framework and was found to be important to three major conservation goals, including (1) global efforts for species and ecosystem conservation, (2) preventing species and ecosystem function from becoming at risk, and (3) maintaining the diversity of native species and ecosystems. Within the cumulative effects framework, grizzly bears are assessed by both population components and habitat components. Population components are population rank, mortality rate, number of individuals, road density, core security, front country, and hunter-day density. Additionally, they are assessed by habitat components which are the quality of food, poor forage potential, and habitat protection (Government of BC 2020a). The grizzly bear is also identified as a species of importance in the CIS LRMP (BC ILMB 2000), and WHA 6-288 falls within the RAA (Figure 19.3-2) and designates critical grizzly bear habitat which contains habitat features considered limiting to grizzly bear populations within the region. Grizzly bear has historically and contemporarily been harvested by TSKLH members, with grizzly bears also appearing in cultural stories (Boas 1895; Rescan 2013c). They are also

identified as culturally significant to Tahltan, as they are currently harvested as a subsistence source and are used as source of seasonal food and materials for traditional implements (Rescan 2009a; Rescan 2012a; Seabridge Gold Inc. 2013c; AltaGas Renewable Energy Inc. 2011b).

Historically grizzly bear was a hunted game species in BC until the activity was banned by the provincial government in 2017. Indigenous hunters may still harvest grizzly bear for food, social, or ceremonial purposes, which maintains the grizzly bear's cultural value to Indigenous people. Métis harvesters have contemporarily harvested grizzly bear in both the Bell-Irving and Unuk River watersheds (Seabridge Gold Inc. 2013b), while TSKLH harvesters have typically focused on hunting grizzly bear within WMU 6-16 and 6-17 (Seabridge Gold Inc. 2013b). Tahltan have harvested bears in the Stikine Plateau since the turn of the 20th century and still utilize the area for trophy hunting and guide outfitting as a means of livelihood (Albright 1982; TCG 2020c; 2022c). The cultural significance and importance of grizzly bear for Tahltan livelihood are underpinned in the following account by a Tlēgōhīn (Telegraph Creek) resident:

> *By the end of August, then, people will already be in their camps working on meat. They will also be working on grease which they have acquired from groundhog and gopher. The skins of these animals they will dry and use as blankets. They will also hunt for grizzly bear – the grease from which they will later eat with dried fish. That is how people live. By the end of 'mentenchedlah'.* (Adlam 1985)

The TCG Wildlife Department has created the Tahltan Predator Management Framework to support ungulate populations by managing predators such as grizzly bear, sas[9] (black bear, *Ursus americanus),* and wolf; the TCG has emphasized the importance of Tahltan members abiding by Aboriginal law in harvesting and trapping practices to ensure this program's success (TCG 2021c). Additionally, grizzly bear has been identified as an umbrella wildlife species because of the species' broad home ranges and habitat requirements that may help protect species with smaller home ranges and life requisites (Roberge and Angelstam 2004).

Grizzly bear has an omnivorous and opportunistic diet that shows diverse seasonal variation in its composition. In the spring, grizzly bear diets are predominantly emerging vegetation, neo-natal ungulates, and carrion (Munro et al. 2006; Pasitschniak-Arts 1993). During the fall, grizzly bear diets are composed of high-calorie food items including berries, small mammals, and salmon, where available (Munro et al. 2006; Pasitschniak-Arts 1993). During the winter season, grizzly bear undergo torpor (deep sleep state) within excavated dens (Pigeon et al. 2016). Den locations are primarily found on high-elevation slopes in locations with soils that stay frozen through the winter (Bunnell and McCann 1993). These dens are also often located on north-facing slopes where heavy snow accumulation acts as insulation through the winter months (Vroom et al. 1977). Females give birth to their young in the den between the months of January and March (Pasitschniak-Arts 1993). Cubs will stay with their mother for approximately 2.5 years before dispersing on their own (Pasitschniak-Arts 1993). The age of sexual reproduction in females is approximately 6 years and females generally do not ovulate annually and instead ovulate in 2- to 4-year cycles (Pasitschniak-Arts 1993). Due to low reproductive rates, late sexual maturity, and long periods between ovulations, grizzly bear populations are not able to compensate for high mortality rates from anthropogenic or environmental threats (Craighead et al. 1976).

[9] From "Tāɬtān Dictionary" (TCG 2024)

Grizzly bear occurs throughout BC, except for Vancouver Island, Haida Gwaii, and various smaller coastal islands. The grizzly bear is a habitat generalist and, as such, is distributed throughout all BEC zones with the exception of the Coastal Douglas-fir zone (Cowan and Guiguet 1965; Hatler et al. 2008). Additionally, grizzly bear occurs from low-elevation coastal areas and river valleys to high-elevation alpine areas and seasonally traverse these areas to fulfill life requisites (COSEWIC 2002; Cowan and Guiget 1978; Galore 2006; KSM 2009; Stevens 1995). Specific to this Project, grizzly bear will seasonally move between inland areas and coastal rivers including the Unuk and Iskut rivers to fish for salmon (Galore 2006; KSM 2009). Conservation thresholds for grizzly bear within the cumulative effects framework which flag management units as higher risk include populations where female mortality is greater than 1.33%, bear density is <10 bears per 1,000 km^2, road density (considered low up to 0.3 km/km^2, <60% core habitat (within landscape unit), >20% front country (within landscape unit), and hunter day density (grizzly bears are no longer hunted within BC; Government of BC 2020a). The Canadian grizzly bear population size is estimated to be 25,000 individuals (McLellan et al. 2017), with an estimated 14,925 occurring in BC as of 2018 (Mowat 2020). The management of grizzly bears in BC is divided into 55 regional GBPUs. The majority of the RAA is located within the Edziza-Lower Stikine GBPU, which supports an estimated 398 individuals as of 2018 (Morgan et al. 2020). The RAA also slightly overlaps with the Stewart GBPU which supports a total of 358 individuals (Morgan et al. 2020). Both the Edziza-Lower Stikine and Stewart GBPUs identify grizzly bear as of very low conservation concern (Environmental Reporting BC 2020). The portion of the TCAA that occurs south of the junction of Highway 37 and 37A is within the Cranberry GBPU, in which grizzly bear has been identified as of low conservation concern.

The Tahltan Nation has identified the Unuk and Iskut rivers as important rivers for grizzly bear to feed on salmon (Prime Resources Group 1993). The saddle between the Unuk River and Treaty Creek was also identified as an important movement corridor between coastal and inland river systems. The Volcano Creek valley which connects the Unuk and Iskut rivers likely act similarly as an important movement path for grizzly bear in the fall. Both the RAA and LAA maintain suitable grizzly bear habitat for at least seasonal, if not annual, use by individuals.

Habitat Suitability Modelling

The HSMs were developed to identify the suitability and distribution of grizzly bear habitat during the spring, summer, and fall (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the grizzly bear is distributed as follows:

- Spring: 9,319.4 ha within the LAA and 49,684.1 ha within the RAA (Figure 19.4-7). Spring effective habitat within the RAA was generally limited to river valleys and riparian areas especially those associated with the Iskut and Unuk rivers. Within the LAA effective habitat was located along the northern portion of Volcano Creek and near the Iskut River as well as the eastern side along the Unuk River and Ketchum Creek.
- Summer: 11,171.5 ha within the LAA and 74,906.6 ha within the RAA (Figure 19.4-8). Summer effective habitat was generally distributed similarly to spring habitat with increased presence in higher elevation drainages. Effective habitat was still found throughout the RAA and was no longer limited to riparian and river valley habitats.
- Fall: 16,378.4 ha within the LAA and 113,375.0 ha within the RAA (Figure 19.4-9). Fall effective habitat was distributed RAA-wide, except for extreme elevations. Effective habitat was still found in proximity to both riparian and valley areas but had substantially expanded upwards in elevation, compared to spring and summer models. The LAA largely consisted of effective habitat with highly suitable habitat located all along Volcano Creek.

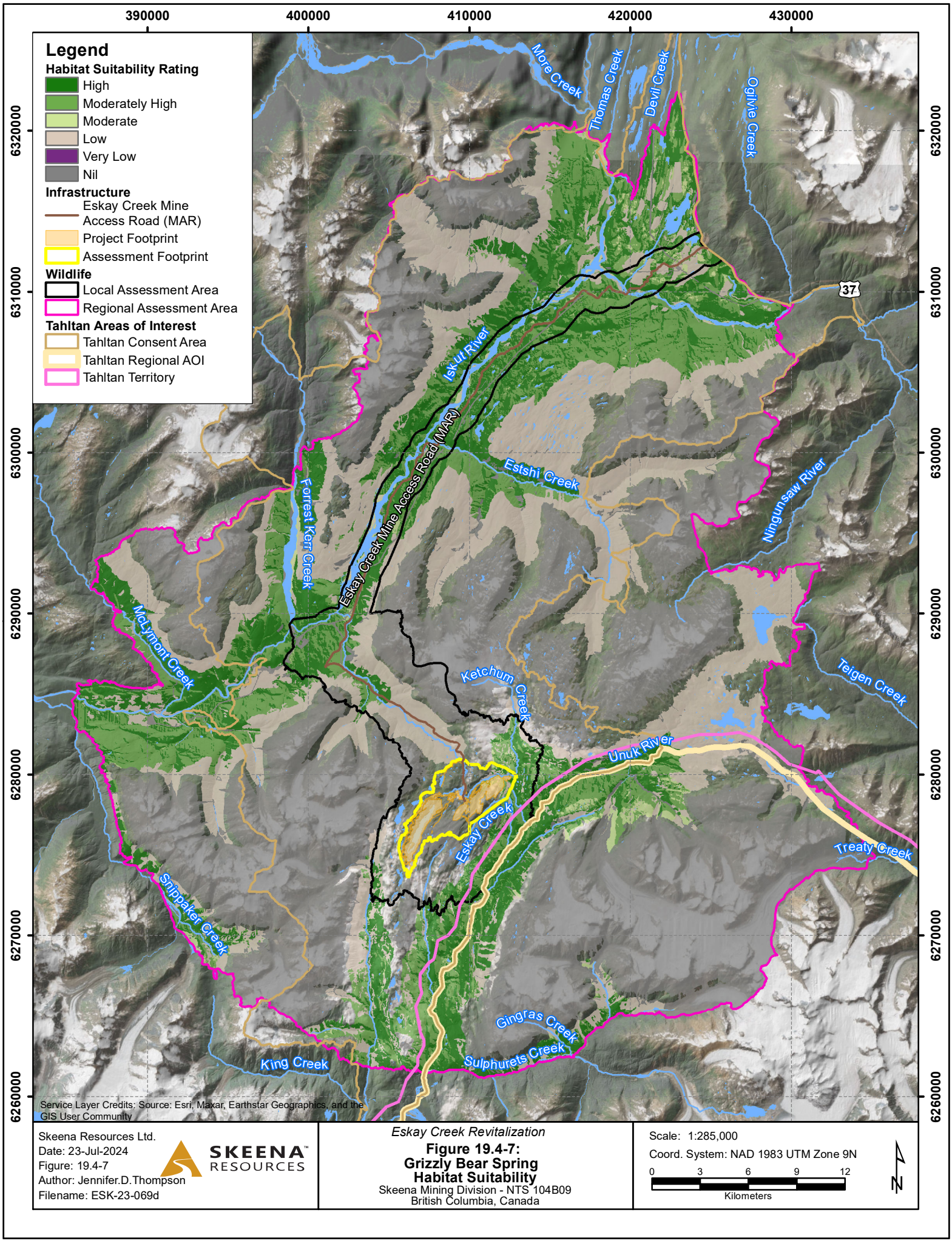

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Figure: 19.4-7
Author: Jennifer.D.Thompson
Filename: ESK-23-069d

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Eskay Creek Revitalization

Figure 19.4-7:
Grizzly Bear Spring Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

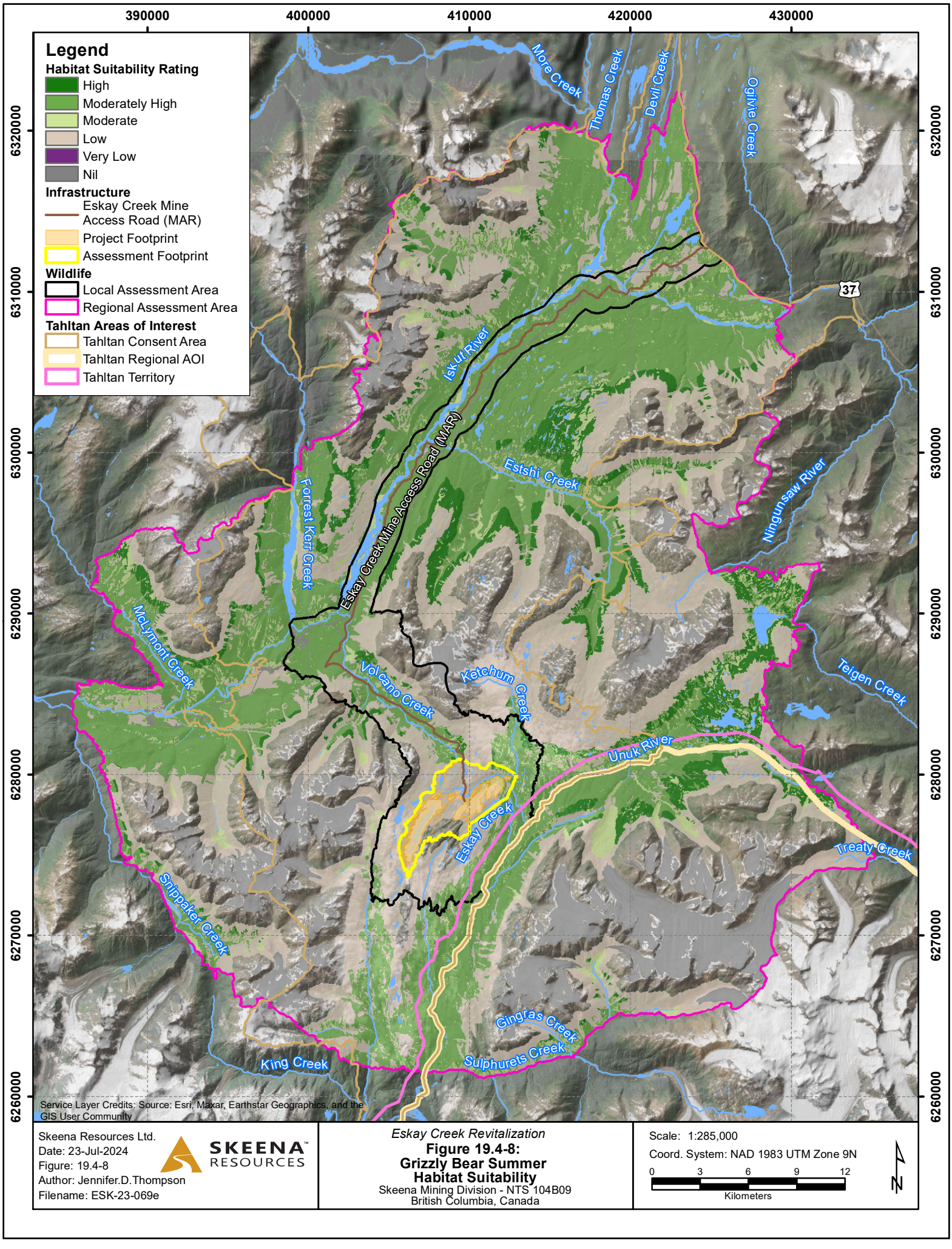

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Figure: 19.4-8
Author: Jennifer.D.Thompson
Filename: ESK-23-069e

SKEENA RESOURCES

Eskay Creek Revitalization

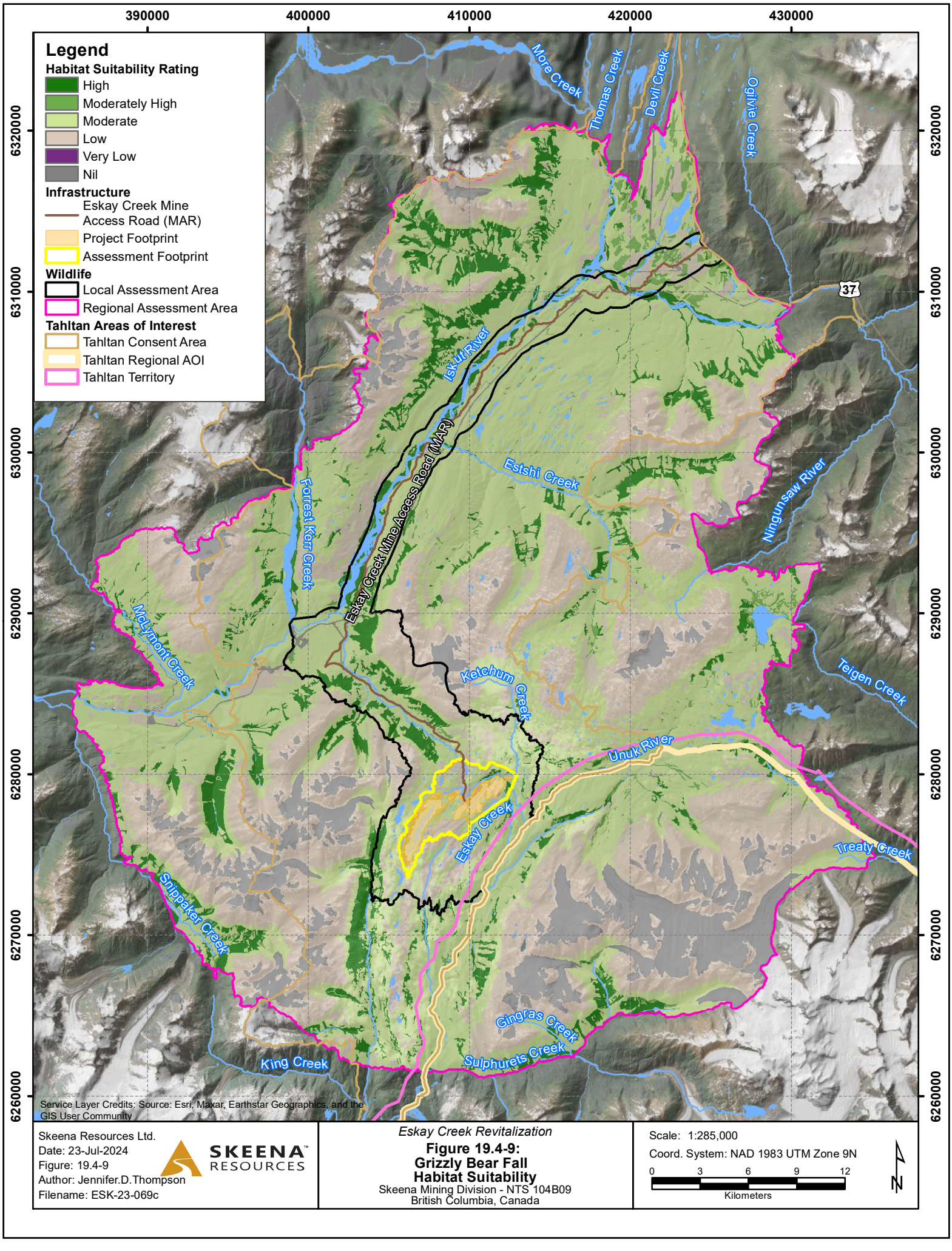
Figure 19.4-8:
Grizzly Bear Summer Habitat Suitability

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N



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Date: 23-Jul-2024
Figure: 19.4-9
Author: Jennifer.D.Thompson
Filename: ESK-23-069c

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Eskay Creek Revitalization

Figure 19.4-9:
Grizzly Bear Fall Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

The Assessment Footprint and LAA are predominantly characterized by subdued slopes and bedrock-dominated surficial material (Chapter 17, Terrain and Soils; Section 17.4.3.2, Terrain Existing Conditions) that are both expected to limit denning opportunities for grizzly bear. While microsites within the Assessment Footprint may provide denning opportunities for grizzly bear, these sites are expected to be uncommon, and the existing disturbance is expected to have further deterred individuals from denning near the Project and no denning bears have been documented to date.

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37, and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Across the entire District 10, which includes Highway 37 and 37A, there were 248 reported bear–vehicle collisions making up 9% of wildlife-related accidents in the District which include the more common black bear species (Sielecki 2013). There were 47 reported vehicle collisions with bears (including both grizzly bear and black bear) along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013, which is 0.03 vehicle-bear collisions per km per year (Heese and Rea 2016). Hunter harvest data from 1976 to 2017 in WMUs 6-16 and 6-21, which overlap with the RAA, indicate that 423 grizzly bears were legally harvested by resident and non-resident hunters including 147 between 2001 and 2017 (MFLNRO 2023). Grizzly bear hunting was closed by the Government of BC after the 2017 season.

19.4.5.2 Black Bear

Black bear is provincially Yellow-listed (secure) and is ranked as S5, suggesting it is widespread, abundant, and secure in BC (BC CDC 2024). Black bear has been assessed as a species not at risk by COSEWIC and is not listed on Schedule 1 of *SARA* (Government of Canada 2024). Black bear is a commonly harvested game species for both their fur and meat by Indigenous people, resident hunters, and non-resident hunters. TSKLH members have historically and contemporarily harvested black bear, with the meat consumed fresh in the spring and processed into sausage for consumption in the fall and winter (Rescan 2013b; Seabridge Gold Inc. 2013b). Tahltan regularly harvest black bear as a subsistence source and identify it as a culturally and spiritually significant wildlife species (Higgins 1982; Rescan 2012a; Pretium Resources 2014a; Rescan 2009a; NovaGold Canada Inc. 2006b; TCG 2021b); like grizzly bears and wolves, black bears are one of the predatory species which, under the Tahltan Predator Management Framework, are harvested by Tahltan members in order to support the region's ungulate populations (TCG 2021c). Available sources have noted that bears are only consumed when their diet consists entirely of vegetation (EAO 2023b).

Black bear is the most widely distributed mammal in BC and is a habitat generalist that occurs across the province and a range of ecozones (ecologically and geographically defined areas). Despite the wide distribution, the species occurs less frequently in alpine, grassland, and heavily settled landscapes. Although black bear is not closely associated with an individual habitat type, adequate denning habitat for torpor during the winter season is required. There can be a large degree of variation in individual den locations, but the species is generally associated with standing or fallen trees and may be found in tree cavities or in hollows below the tree in question (Lariviere 2001). Black bear is also commonly found throughout Tahltan Territory. The Stikine Plateau area is specifically known to support rich populations of large game including bears, the harvesting of which for trophy hunting is an important means of livelihood for Tahltan members (Rescan 2012a; Albright 1982). Offspring are born in the den in either January or February. Dens may be reused year to year depending on the availability of denning habitat; however, coastal BC black bear exhibit relatively high den reuse rates (Davis et al. 2012). The black bear is an

opportunistic omnivore and exhibit seasonal variations in its diet, which includes grasses, roots, berries, ungulates, small mammals, and carrion. The Provincial black bear population estimate is around 120,000 to 160,000 individuals, which is approximately one-quarter of the national black bear population in Canada.

Previous surveys completed for the nearby KSM and Brucejack projects identified suitable denning habitat occurring along riparian areas and more specifically adjacent to creeks and rivers including the Unuk River (Rescan 2010b). Although these sites occur outside of the RAA, it is likely that similarly suitable habitat is located along creeks and rivers within the RAA, especially along the Unuk and Iskut rivers. Métis harvesters have contemporarily harvested black bear in both the Bell-Irving and Unuk River watersheds while TSKLH harvesters have typically focused on hunting grizzly bear within WMU 6-16 (Seabridge Gold Inc. 2013b).

Wildlife Mortality

From 1988 to 2007, there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Across the entire District 10 which includes Highway 37 and 37A there were 248 reported bear–vehicle collisions (including grizzly bear) making up 9% of wildlife-related accidents in the District (Sielecki 2013). There were 47 reported vehicle collisions with bears (including both grizzly bear and black bear) along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013, which is 0.03 vehicle-bear collisions per km per year (Heese and Rea 2016). Hunter harvest data from 1976 to 2021 for WMUs 6-16 and 6-21, which overlap with the RAA, indicate that 930 black bears were legally harvested by resident and non-resident hunters including 366 between 2001 and 2021 (MFLNRO 2023).

19.4.5.3 Wolverine

Wolverine is provincially Blue-listed (special concern) and is ranked S3, suggesting it is vulnerable to extirpation or extinction in BC (BC CDC 2024). Wolverine has been assessed as a species of special concern by COSEWIC and is listed under Schedule 1 of *SARA* (COSEWIC 2014; Government of Canada 2024). Wolverine has been assigned a high priority rating for the goal of "preventing species and ecosystem function from becoming at risk" under the BC Cumulative Effects Framework. The conservation of wolverine and wolverine habitat has been increasingly of concern because of their importance as a high value furbearer and their sensitivity to human activities and disturbances (Krebs et al. 2007; May et al. 2006). Additionally, wolverine is of importance as a historically and contemporarily harvested species to TSKLH and Tahltan (IDM Mining 2017a; Pretium Resources 2014a). Wolverines have historically been held in high spiritual regard by Tahltan and continue to hold strong cultural value (Rescan 2012a; Rescan 2009a).

There are two subspecies of wolverine in BC, *Gulo gulo vancouverensis* which is limited to Vancouver Island, and *Gulo gulo luscus* which occurs throughout the rest of the species' range, including the RAA. The distribution of wolverine in BC is largely limited to boreal forest, tundra, and mountainous regions where the species occurs in low densities. Wolverine occurs across elevational ranges in BC ranging from coastal areas and river valleys to subalpine and alpine regions. The Sub-Boreal Interior and the Coast and Mountains ecoprovinces (a subdivision of an ecozone containing one or more ecoregions [areas where ecosystems are generally similar]) are important for wolverine as they provide abundant food resources, high-elevation habitat, and forested habitats (BC CDC 2023).

The wolverine is an opportunistic carnivore feeding primarily on scavenged carrion but may also predate on various mammals from voles to large ungulates (Pasitschniak-Arts and Lariviere 1995) . Wolverine can occur

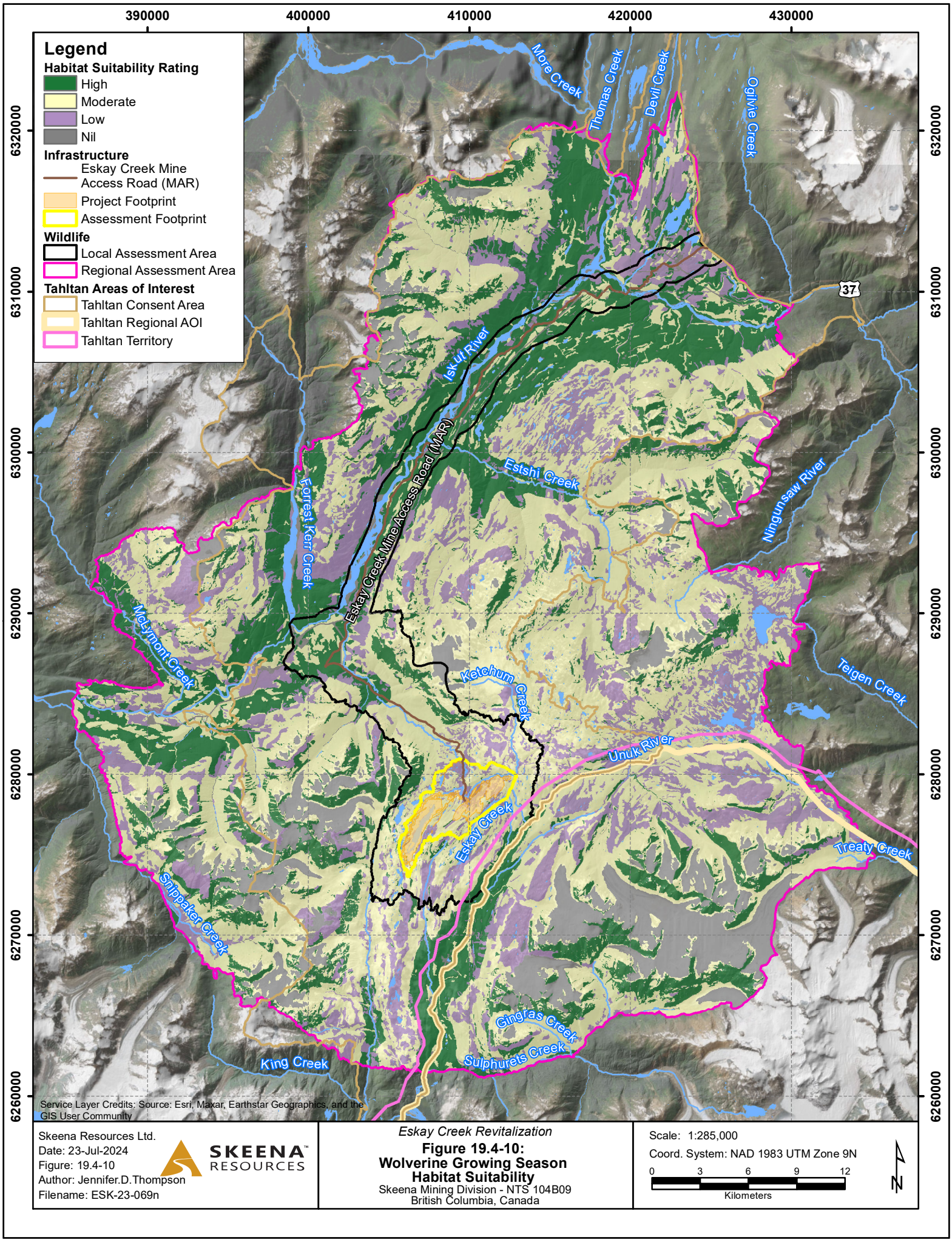
over a wide array of habitats and therefore their occurrence and distribution are more likely defined by food availability than individual habitat characteristics (Hornocker and Hash 1981; Krott 1959). TSKLH members have indicated that wetlands are preferred trapping sites for wolverine (ERM Rescan 2014; Rescan 2013b). Additionally, habitat selection for wolverine occurs at a landscape scale due to individuals' extensive home ranges (76 km^2 to 269 km^2 for females and 209 km^2 to 269 km^2 for males; Banci and Harestead 1990) and therefore estimating stand scale habitat selection may not be effective. Despite the lack of specific habitat requirements of wolverine, natal and maternal den sites are important features that support reproduction. Natal dens are where female wolverine give birth to offspring from January to April (Myrberget and Sorumgard 1979; Pulliainen 1968). Females later move offspring to a maternal den where the offspring are raised until dispersal in November (McCracken 1985; Rausch and Pearson 1972). Both natal and maternal dens are created underneath snow-covered coarse woody debris and are associated with high elevations (Krebs and Lewis 2000; Lofroth 2001). Low reproduction rate, low population densities, and large home ranges are currently limiting wolverine populations (Banci and Proulx 1999). However, in 2014, TSKLH knowledge holders reported observing a recent increase in wolverine populations (ERM Rescan 2014).

The western Canadian sub-population estimate is 15,688 to 23,830 individuals (COSEWIC 2014). Provincially, the BC wolverine population estimate is 2,700 to 4,760 individuals (Krebs and Lewis 2000; Lofroth 2001 This estimate was created using density information from two regions of BC and a lack of density information from other regions introduces increased error into the estimate (Lofroth and Krebs 2007). The overall provincial population trend of wolverine in BC is unknown; however, populations have been reported to generally be stable or declining regionally (Lofroth and Krebs 2007). The RAA is intersected by the wolverine Population Unit 13 (Lower Stikine) which contains an estimated 9 to 21 individuals and is in a state of decline (Lofroth and Ott 2010).

Habitat Suitability Modelling

The HSMs were developed to identify the suitability and distribution of wolverine habitat during the growing and winter seasons (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the wolverine is distributed as follows:

- Growing Season: 15,410.1 ha within the LAA and 129,950.1 ha within the RAA. Growing season effective habitat was predominantly limited to wooded landscapes with structural stages between 5-7. These occurred throughout the RAA and especially along the Iskut River. Within the LAA effective habitat was scattered throughout, with a particular concentration occurring along the Eskay Creek MAR and Volcano Creek (Figure 19.4-10).
- Winter: 2,535.9 ha within the LAA and 22,704.6 ha within the RAA. Winter effective habitat was substantially lower within the RAA and LAA when compared to the growing season. Small, isolated patches of effective habitat remained predominantly on southern and western-facing slopes. Winter effective habitat for wolverine is thought to be strongly tied to landscapes with 5-7 structural stages and high-suitability ungulate habitats (Figure 19.4-11).



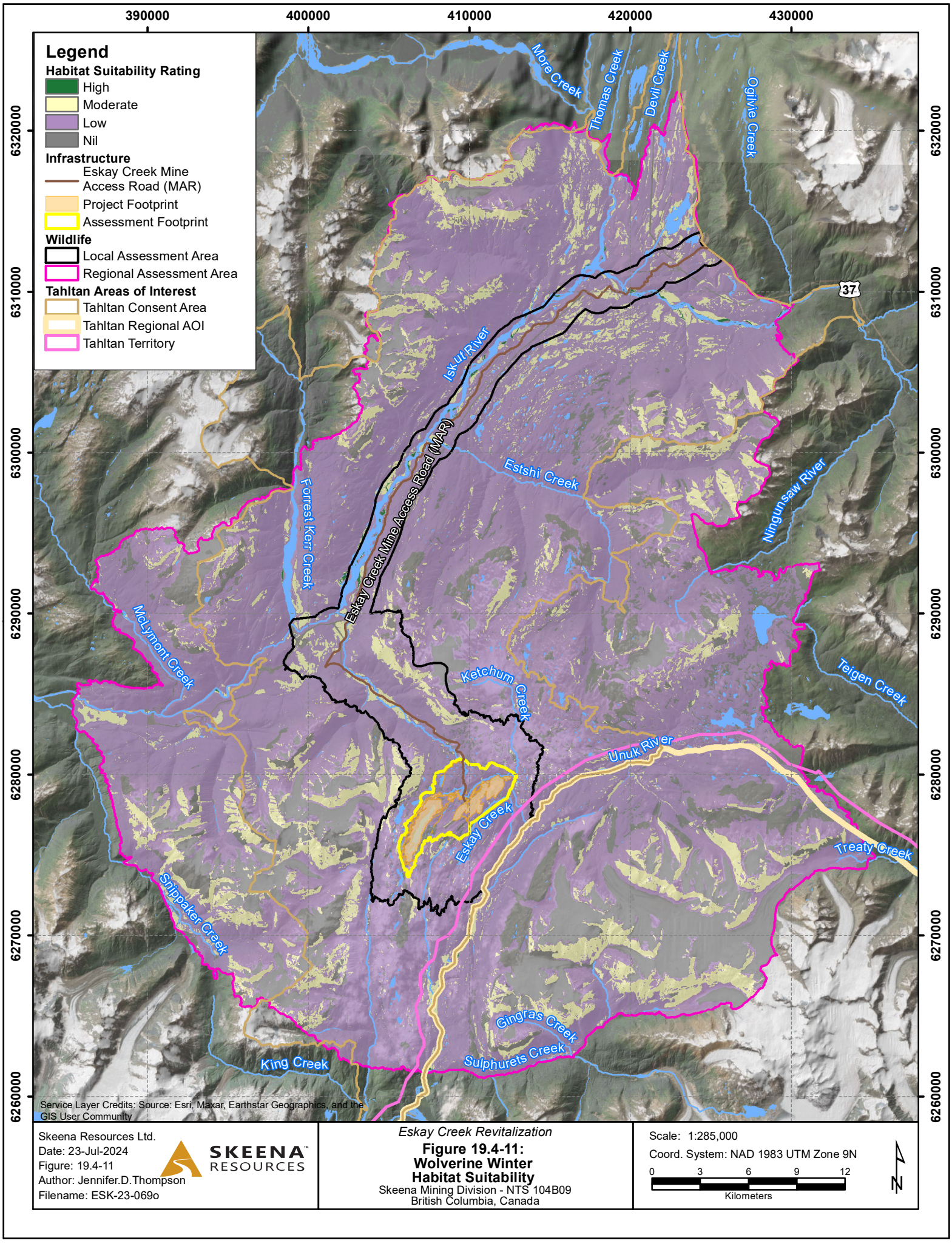
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-10
Author: Jennifer.D.Thompson
Filename: ESK-23-069n

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-10:
Wolverine Growing Season Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-11
Author: Jennifer.D.Thompson
Filename: ESK-23-069o

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-11:
Wolverine Winter Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Across the entire District 10 which includes Highway 37 and 37A there were no wolverine related vehicle collisions (Sielecki 2013). Similarly, there were no reported vehicle collisions with wolverine along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Heese and Rea 2016). Wolverine harvest data for WMUs 6-16 and 6-21 is not available (MFLNRO 2023). TSKLH harvesters have been known to trap wolverine along the Highway 37 corridor, although current levels of trapping are uncertain (ERM Rescan 2014; Rescan 2009b).

19.4.5.4 Marten

Marten is provincially Yellow-listed (secure) and is ranked as S5, suggesting it is widespread, abundant, and secure in BC (BC CDC 2024). Marten has not been assessed by COSEWIC and is not listed in Schedule 1 of *SARA* (Government of Canada 2024). Due to the importance of marten as a harvested furbearer species, commonly trapped by both TSKLH and Tahltan (Seabridge Gold Inc. 2013b; AltaGas Renewable Energy Inc. 2011b; Pretium Resources 2014a), there have been initiatives within the CIS LRMP (BC ILMB 2000) that outline and highlight efforts for managing populations along with other furbearer populations as a sustainable resource.

Marten is one of the most commonly harvested furbearer species in BC and make up 58% of total harvested animals by licenced trappers in the Skeena region (BC Stats 2005). The marten is classified as a Class 1 species which means trappers can manage marten on an individual trapline basis due to their small home ranges. Average harvest rates of marten in 2000 was approximately 20,000 individuals with almost 22% of marten harvested between 1985 and 2000 coming from the Skeena region (Hatler et al. 2003). TSKLH has reported that they have trapped up to 160 martens in 1 year on one trapline, with the pelts of harvested marten and other furbearers often able to cover the cost of trapping trips (Seabridge Gold Inc. 2013b). Marten trapping also provides significant economic value to both Tahltan and non-Tahltan residents of the area, with the Tahltan Socio-economic Baseline Report (Appendix 21-2) noting that there is over 70 traplines across Tahltan Territory as of 2022. Due to their high trapping rates and high fur value, the marten is an economically valuable species for trappers both within the region and more generally throughout BC. In addition to its economic value, marten holds cultural significance to Tahltan as a seasonal source of food and materials for traditional implements as well as historically being believed to hold superstitious power (Rescan 2009a; NovaGold Canada Inc. 2006b; Seabridge Gold Inc. 2013c; Emmons 1911).

The economic and cultural significance of marten to Tahltan is further illustrated by the following account from a Telegraph Creek resident:

> *By the end of August, then, people will already be in their camps working on meat. They will also be working on grease which they have acquired from groundhog and gopher. The skins of these animals they will dry and use as blankets. They will also hunt for grizzly bear -- the grease from which they will later eat with dried fish. That is how people live. By the end of 'mentenchedlah' -- September they quit. Now they head for villages such as Tahltan, Sheslay and Taguun. It is like they are moving to their homes. They do this when it gets cold -- when winter comes. Now in October, only the men will go out. The women will stay at home in the village. The men will go trapping for martin using a wooden trap. Everything else they can catch using traps acquired from Europeans.*

> *The skins from these animals are what we use to stay alive -- it is how we make our money. That's gauugathe'. Now 'sajusaleehe' they quit trapping. They come home to their families.* (Adlam 1985)

The seasonality of marten hunting as well as its traditional and livelihood importance to Tahltan members are evident in this account.

Marten is an arboreal and subnivean predators generally preying on smaller mammal species including voles, mice, destsedze[10] (squirrels), and hare; however, individuals may also feed on berries and carrion when abundant (BC CDC 1994). The marten is strongly associated with late-successional coniferous forests which provide them with abundant prey species and also appropriate denning habitat (Burnett 1981; Ruggiero et al. 1998; Strickland et al. 1982). Denning features can include cavities in mature trees, excavations below downed trees, or in piles of coarse woody debris (Ruggiero et al. 1998; Strickland et al. 1982). Female marten give birth to young in a natal den around mid-March to late April (Strickland et al. 1982) and subsequently move young to a maternal den where the offspring are raised. Offspring start to disperse from the natal range (Francis and Stephenson 1972). The limiting factor for marten is the amount of overhead cover provided by both vegetation and coarse woody debris (Buskirk and Ruggiero 1994; Strickland and Douglas 1987; Thompson and Harested 1994).

Marten is distributed throughout forested landscapes across Canada and the United States. Within BC, marten can be found across a wide variety of forested BGC zones between sea level to subalpine elevations; however, individuals are mostly found below the tree line (Buskirk and Ruggiero 1994; Lofroth 1993; Stevens 1995). Within the RAA, marten is known to occur in all available BGC zones and may be found throughout the RAA. Small mammals, such as marten, have been harvested by TSKLH members in the lower and upper Bell-Irving watersheds and the Unuk River watershed (Seabridge Gold Inc. 2013b; IDM Mining 2017b). TSKLH members have reported trapping marten along the west side of Highway 37 in the recent past, although trapping in general by TSKLH members has been limited since 2009 (ERM Rescan 2014; Seabridge Gold Inc. 2013b). However, in a 2014 Traditional Knowledge/Traditional Use Report, members indicated that they anticipated using their traplines again in the future (Pretium Resources 2014b). Marten is also commonly found along the trails of the Tahltan traverse mountain passes, the floors of which are generally 600 feet (183 m) wide and 4 to 5 miles (6.4 to 8 km) long, largely consisting of swamp, muskeg, and beaver lakes (Higgins 1982). Population estimates for federal, provincial, and regional scales are unavailable for marten; however, the species is relatively common and widespread, occurring across the province (BC CDC 1994).

Habitat Suitability Modelling

The HSMs were developed to identify the suitability and distribution of marten habitat during the spring, summer, and fall (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the marten is distributed as follows:

- Growing Season: 9,475.7 ha within the LAA and 65,798.7 ha within the RAA (Figure 19.4-12). Effective marten habitat was located throughout lower elevation and riparian areas of the RAA. Effective habitat within the LAA was primarily located in proximity to the riparian areas of Volcano Creek, Ketchum Creek, Eskay Creek, and the Unuk River.

[10] From "Tāłtān Dictionary" (TCG 2024)

- Winter: 9,475.7 ha within the LAA and 65,798.7 ha within the RAA (Figure 19.4-13). Marten occupies relatively static home ranges year-round and therefore the location of home range in the growing season is largely based off of the presence of suitable winter habitat. The distribution of winter habitat is the same as growing season habitat.

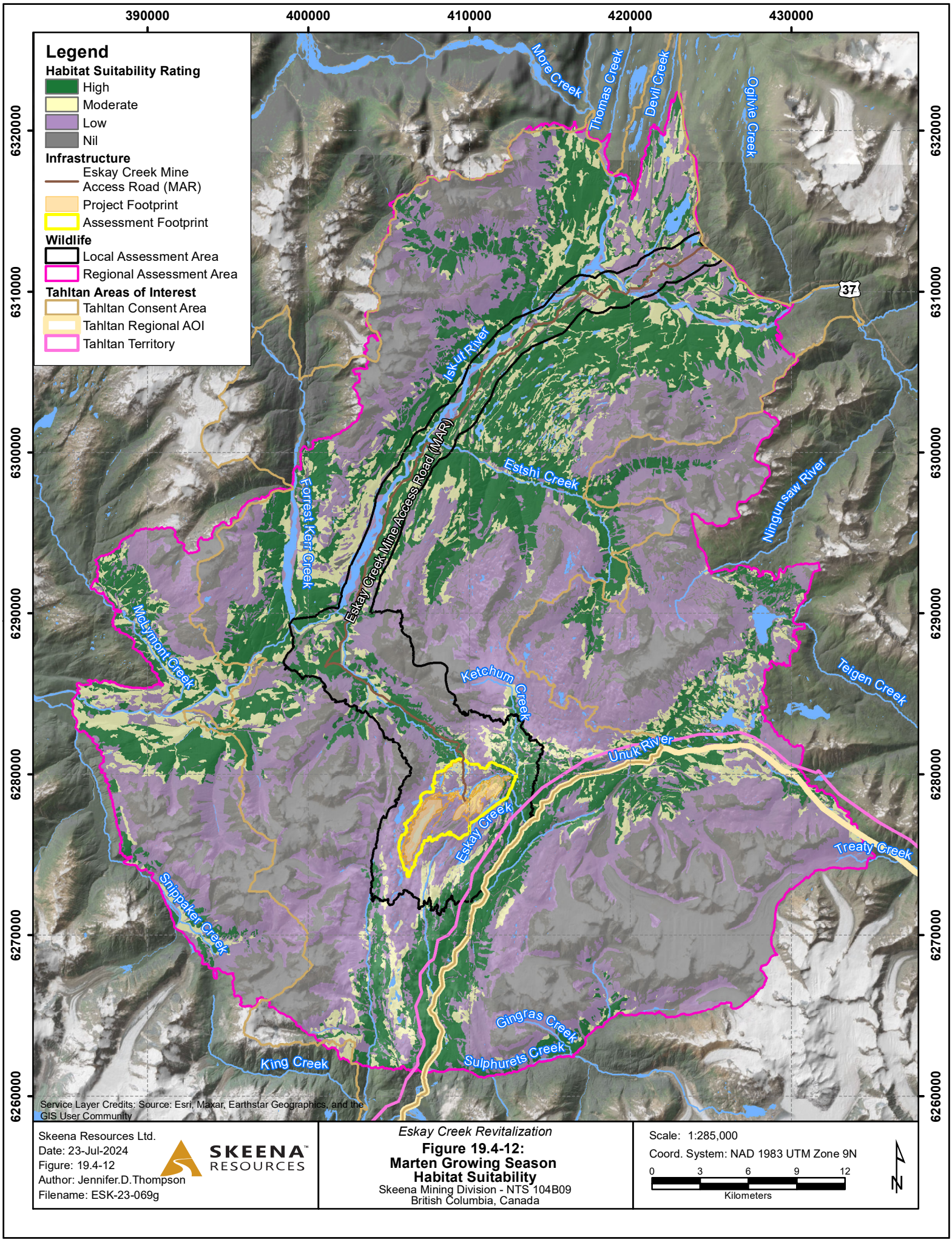
Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Within District 10, which includes Highway 37 and 37A, there was a total of three marten related accidents making up less than 0.1% of wildlife-related accidents in the District (Sielecki 2013). There were no reported vehicle collisions with marten along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Heese and Rea 2016). Vehicle-related mortality of small mammals are likely underreported due to lack of detection, but mortalities of small mammals due to vehicle collisions are expected to occasionally occur along Highway 37 (Sielecki 2013). Marten harvest data for WMUs 6-16 and 6-21 is not available (MFLNRO 2023). TSKLH harvesters have been known to trap marten along the Highway 37 corridor, although current levels of trapping are uncertain (Rescan 2009b; Seabridge Gold Inc. 2013c).

19.4.5.5 Fisher

Fisher is provincially Blue-listed (special concern) and is ranked as S3, suggesting it is vulnerable to extirpation or extinction in BC (BC CDC 2024). Fisher has not been assessed by COSEWIC and is not listed on Schedule 1 of *SARA* (Government of Canada 2024). Fisher has historically been trapped across their range in BC and is still actively trapped where healthy populations exist. Available information on TSKLH practices indicate that fisher has been trapped by TSKLH members historically, although current trapping levels of fisher are not avaialbe (Rescan 2013b). Available sources on Tahltan practices indicate that fishers were historically trapped for their furs, with the meat consumed only in times of necessity. Although recent sources indicate that fishers are still harvested regularly by Tahltan, current levels of trapping are not available (Emmons 1911; Pretium Resources 2014a; Albright 1982). The average annual harvest of fisher by trappers (Indigenous and non-Indigenous) in BC between the years 1996 and 2003 was 276 individuals (Weir 2003).

Fisher is a generalist carnivore predominantly preying on small-to-medium-sized mammals, birds, and scavenging carrion (Coulter 1966; DeVos 1952; Powell 1977; Powell 1978). Fisher avoids using open areas and is instead closely associated with dense and continuous canopy in lowland or spruce-fir forests (Coulter 1966; Powell 1977; Powell 1978). Fisher is also commonly found in the trails of the Tahltan traverse mountain passes, which consist of swamps, muskeg, and beaver lakes (Higgins 1982). Summer hunting and winter resting sites are both associated with large coarse woody debris. Female fishers give birth to young in a natal den generally from mid-March to mid-April (Fontana et al. 1999; Hall 1942; Weir 2000). Kits become mobile at approximately 10 to 12 weeks and disperse from the natal range in the first fall (Arthur et al. 1993; Paragi 1990).



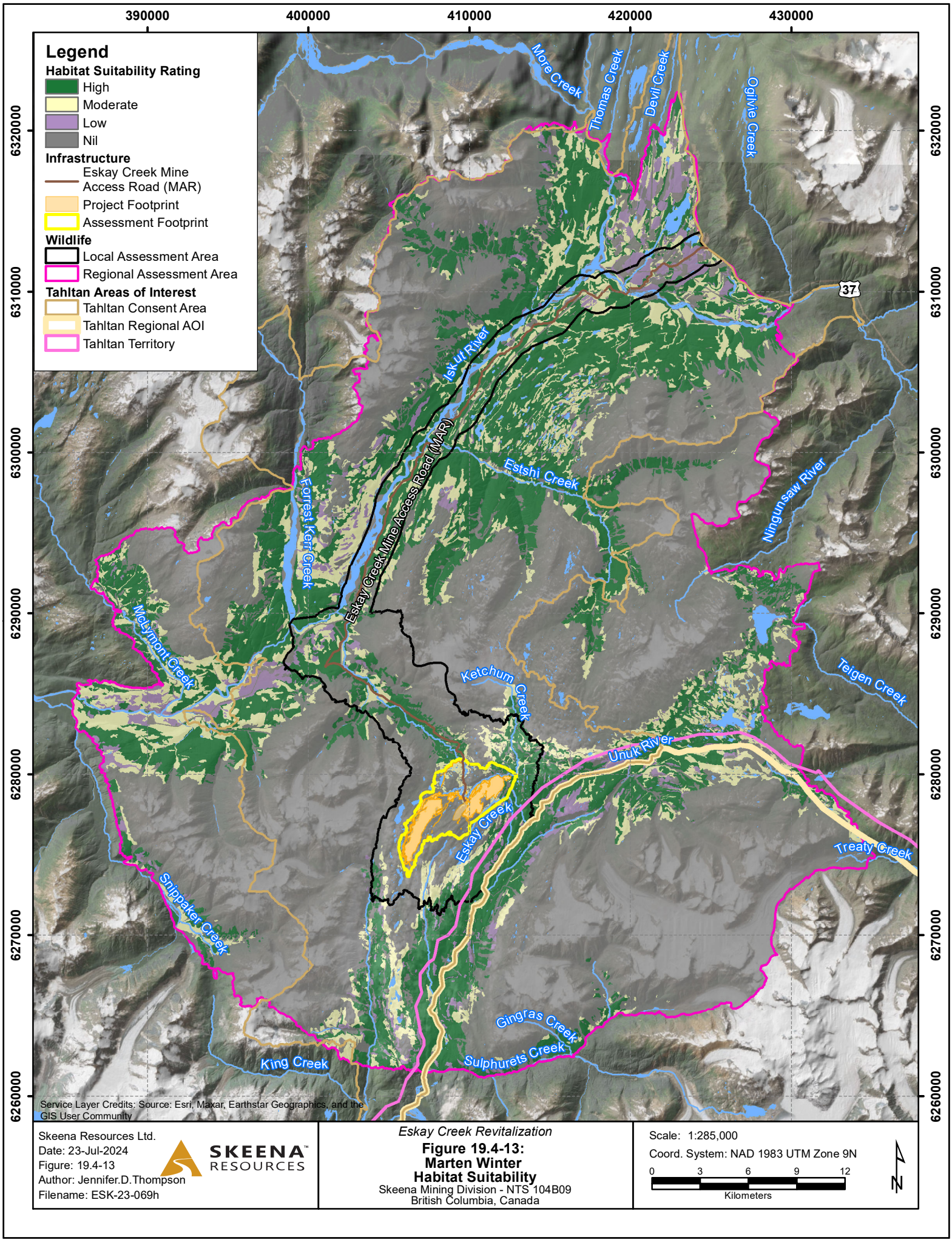
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-12
Author: Jennifer.D.Thompson
Filename: ESK-23-069g

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-12:
Marten Growing Season Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-13
Author: Jennifer.D.Thompson
Filename: ESK-23-069h

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-13:
Marten Winter
Habitat Suitability

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N

Fisher has a Canadian distribution including all provinces and territories except for Newfoundland and Labrador, and Prince Edward Island. Their distribution has been substantially reduced since European contact as fisher is affected by forest harvest, hydroelectric developments, and land clearing which reduces the amount of late-successional forest. Within BC, fisher is found across the province except for Vancouver Island and other coastal islands (Badry 2004). Fisher habitat is generally composed of Boreal Plains, Sub-Boreal Interior, Central Interior, and Taiga Plains ecoprovinces. Fisher can also be found less frequently in some regions of the Coast and Mountains, Southern Interior Mountains, Southern Interior, and Northern Boreal Mountains ecoprovinces. Within the RAA fisher is expected to occur within the low-elevation river valleys and all related BGC zones, except for the Boreal Altai Fescue Alpine and Coastal Mountain-heather Alpine. Population estimates are not available at the federal, provincial, or regional scales due to the patchy distribution and secretive nature of fisher (Badry 2004).

Habitat Suitability Modelling

The HSMs were developed to identify the suitability and distribution of fisher habitat during the growing season and winter (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the fisher is distributed as follows:

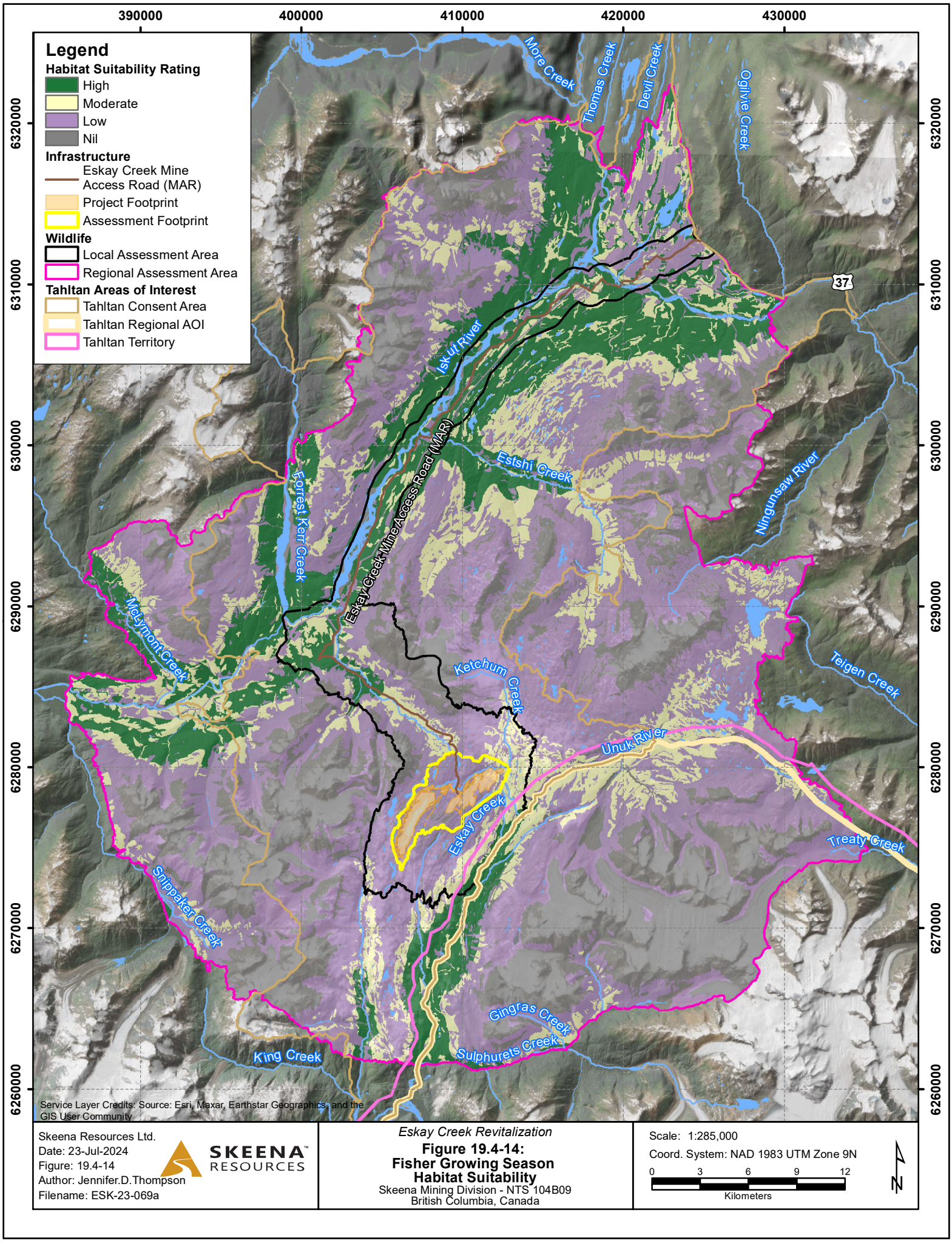
- Growing Season: 8,642.8 ha within the LAA and 55,766.5 ha within the RAA (Figure 19.4-14). Effective habitat in the growing season for fisher was located throughout riparian lower elevation areas of the RAA, especially those surrounding the Iskut and Unuk rivers, as well as McLymont Creek and Estishi Creek. Effective habitat within the LAA was limited and isolated to Volcano Creek and the Unuk River riparian areas (Figure 19.4-14).
- Winter: 8,350.3 ha within the LAA and 55,226.5 ha within the RAA (Figure 19.4-15). Fisher has a largely static year-round home ranges, meaning that the distribution of growing season and winter effective habitat is largely distributed the same throughout the LAA and RAA.

Wildlife Mortality

From 1988 to 2007, there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Table 19.4-2, Stielecki 2010). Across the entire District 10 which includes Highways 37 and 37A, there were no reported fisher-related accidents (Sielecki 2013). Similarly, there were no reported vehicle collisions with fisher along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Heese and Rea 2016). Vehicle-related mortality of small mammals is likely underreported due to lack of detection, but mortalities of small mammals due to vehicle collisions are expected to occasionally occur along Highway 37. Fisher harvest data for WMUs 6-16 and 6-21 is not available (MFLNRO 2023).

19.4.5.6 Hoary Marmot

Hoary marmot is provincially Yellow-listed (secure) and is ranked as S5, suggesting it is widespread, abundant, and secure in BC (BC CDC 2024). Hoary marmot has not been assessed by COSEWIC and is not listed in Schedule 1 of *SARA* (Government of Canada 2024). Although not at risk federally or provincially, hoary marmot has been identified as a species of cultural significance by TSKLH members as they were historically a staple food and materials source (including for regalia), play prominent roles in cultural stories, and are contemporarily harvested for skins and fur (Boas 1895; Rescan 2012b; Rescan 2013b; ERM Rescan 2014). At the time of the 2007 Tahltan Census), hoary marmot was still consumed on a weekly basis as a traditional food by Tahltan, and the trapping of hoary marmot for its fur was economically significant for Tahltan families as a nominal source of income (Pretium Resources 2014a). Hoary marmot is also an ecologically valuable prey item for numerous regional predators including grizzly bear.



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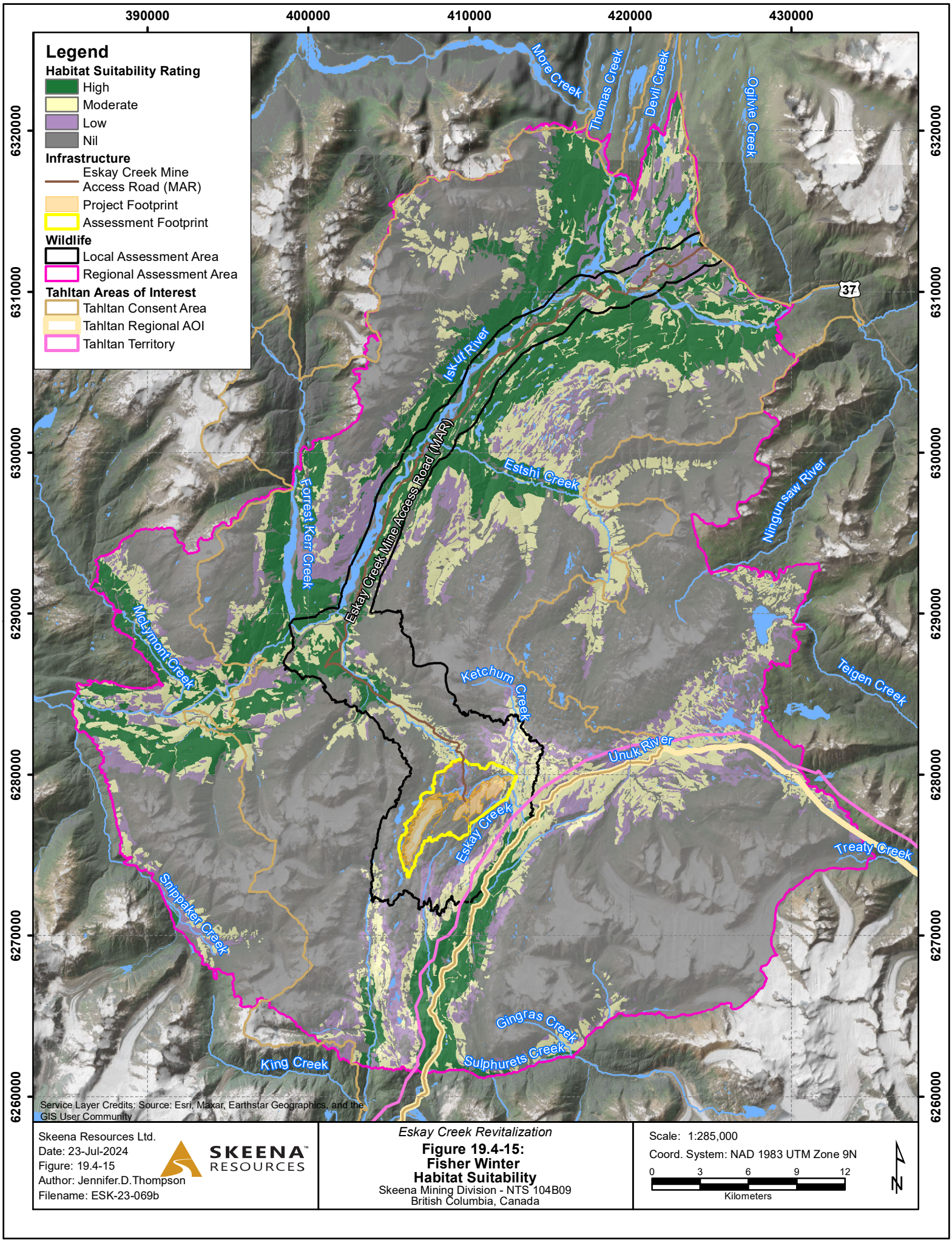
Date: 23-Jul-2024
Figure: 19.4-14
Author: Jennifer.D.Thompson
Filename: ESK-23-069a

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-14:
Fisher Growing Season Habitat Suitability
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-15
Author: Jennifer.D.Thompson
Filename: ESK-23-069b

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-15:
Fisher Winter
Habitat Suitability

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N

The hoary marmot diet has slight annual variation with the early summer diet consisting primarily of herbaceous plant leaves, before transitioning mid-summer to plant flowers, and finally herbs and forbs in fall (Barash 1989; Taulman 1975; Taulman 1990a). Hoary marmot live in colonies and create burrows at these colony sites which are used year-round (Nagorsen 2005). These burrows are used for predator evasion, sleep, and hibernation (Braun et al. 2011). Hoary marmot hibernation period may vary slightly with latitude however generally occurs from mid-September to mid-May (Barash 1989; Gray 1967; Hock and Cottini 1966; Holmes 1984). Females give birth to offspring underground in early May to mid-June (Bailey 1918; Barash 1989), and these young remain with the colony for approximately 2 years (Barash 1989; Blumstein and Armitage 1997; Holmes 1984).

Within Canada, hoary marmot occurs in higher-elevation and mountainous areas across BC and the Yukon territory, with some limited distribution in Alberta and the Northwest Territories. Within BC, hoary marmot can be found across the majority of the mainland, except for the extreme northeast and low elevations of the dry interior (Nagorsen 2005). Hoary marmot can be found between treeline and alpine elevations and are generally sedentary staying near their colony (Nagorsen 2005). The Teigen-Snowbank-Ningunsaw corridor has specifically been identified in previous studies regarding its significance to the Tahltan for trapping hoary marmot (Pretium Resources 2014b). The Tahltan Nation has also previously raised concerns in other regional projects regarding hoary marmot distribution in the area as a determining factor for grizzly bear habitat (Seabridge Gold Inc. 2013c). The Spādetsizi (Spatsizi Plateau) and Tla'bane (Klappan) areas have also been identified as regions that are abundant in small game, including hoary marmot and actively used for hunting by Tahltan (Albright 1982; Appendix 21-2, Tahltan Socio-economic Baseline Report). Population estimates for hoary marmot are not available at federal, provincial, or regional scales. Hoary marmot populations are considered secure; however, drastic declines in a northern Washington population have been attributed to decreased snowpack (Johnston et al. 2021). These drastic declines suggest that although overall populations are secure, regional populations may be vulnerable to environmental changes.

Baseline Studies

Baseline surveys were completed for hoary marmot in 2021 and included both aerial and ground-based surveys (Appendix 19-1, Wildlife Cumulative Baseline Report). Aerial surveys during summer are recommended in provincial surveying standards to assess hoary marmot presence and relative abundance (RIC 1998a). Six SUs were surveyed via helicopter, and these SUs were spatially concentrated near the Project and exploration roads (Figure 19.4-16). Ground surveys were then completed on a subset of colonies identified by aerial surveys to determine whether they were occupied or not. A portion of the 2021 surveyed areas is overlapped by surveyed areas from the KSM Project baseline studies in 2009.

Aerial surveys located 108 colonies across the 6 SUs ranging from 3 to 34 colonies per unit (Figure 19.4-16). Colony density for the SUs ranged from 0.3 to 5.2 colonies per km^2 with an average of 1.4 colonies per km^2. Observed colonies were located primarily on steep slopes (>80%). Approximately 75% of colonies were on southeast-facing aspects, 84% on fine-to-coarse soil, and 61% on medium-to-wet soils. The most common ground cover located at colonies included herbaceous (93%), barren (85%), and tree/shrub (80%). Ground surveys were completed on seven of the 108 colonies identified by aerial surveys. A total of 6 of the 7 sites were actively occupied by hoary marmot. There was a high similarity between habitat and colony characteristics recorded from aerial and ground surveys for the 7 ground surveyed sites.

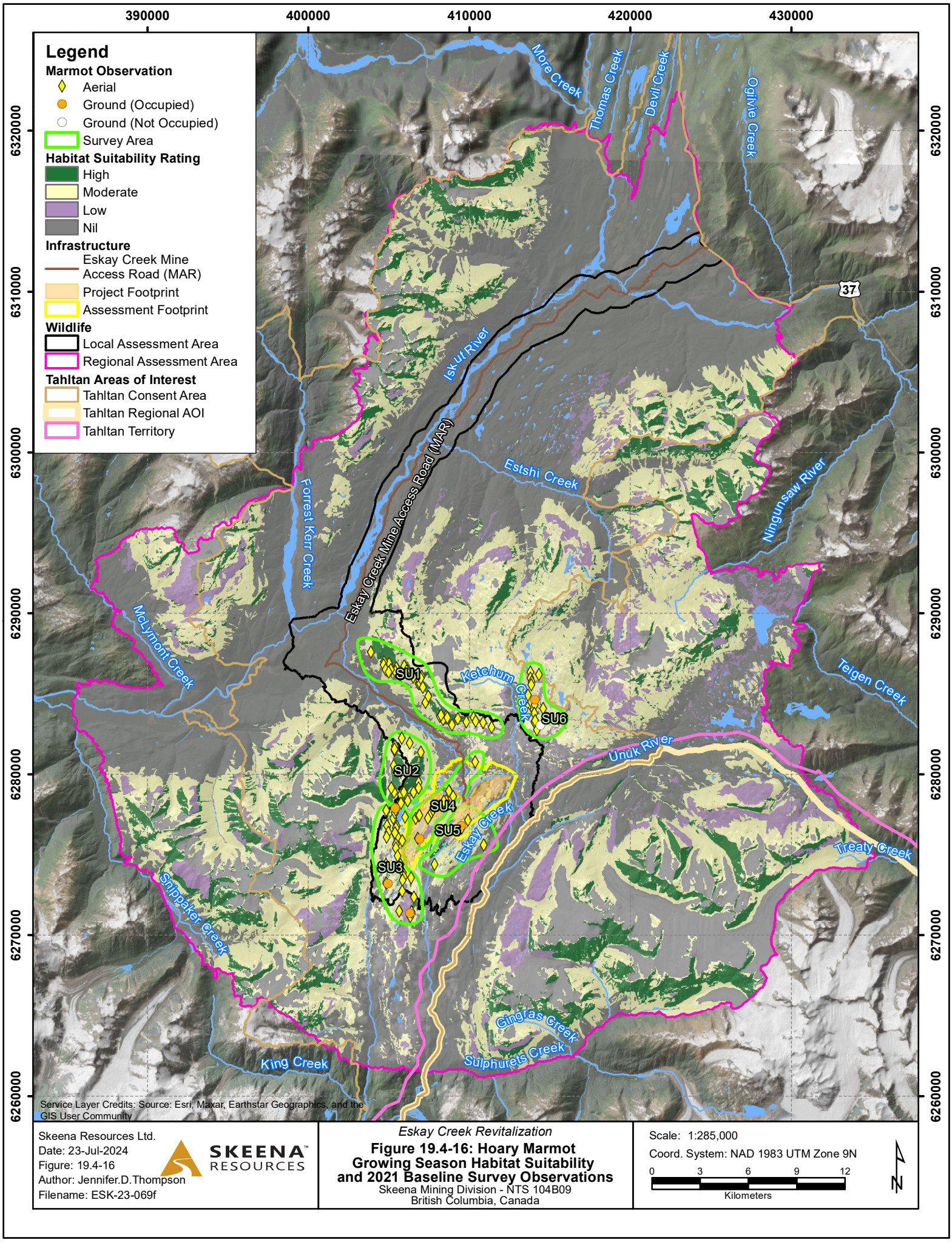


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Figure: 19.4-16
Author: Jennifer.D.Thompson
Filename: ESK-23-069f

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-16: Hoary Marmot Growing Season Habitat Suitability and 2021 Baseline Survey Observations

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N

Hoary marmot were present in high-elevation habitats within the LAA, typically near the Tom MacKay Storage Facility (TMSF). A portion of the survey area overlapped with the KSM Project baseline studies completed in 2009, and it was noted that the density of colonies in this common area increased in 2020. The 2009 KSM baseline studies identified a colony density of 0.4 compared to 2.4 in the 2020 Eskay baseline, representing an increase of 515% in 11 years. It is known that hoary marmot populations fluctuate over time (Taulman 1990b) and due to the small colony sizes found within the Eskay RAA, it is possible that the population increase is more moderate. With colonies typically containing five or fewer burrows, a lack of available habitat may be limiting colony size. Hoary marmot tends to occupy areas with south or southwest aspects with abundant forage and substrate suitable for den building. A total of 9 hoary marmot dens were detected in 2023 adjacent to Tom MacKay Creek during pre-clearing surveys in support of permitted mining activities (Appendix 19-2, 2023 Overall Fieldwork Report).

Habitat Suitability Modelling

The HSM was developed to identify the suitability and distribution of hoary marmot habitat during the growing season (Appendix 19-3, Wildlife Habitat Suitability Baseline). Effective habitat (i.e., habitats with moderate-to-high suitability) for the hoary marmot is distributed as follows:

- Growing season: 6,680.2 ha within the LAA and 73,866.4 ha within the RAA (Figure 19.4-16). Effective growing season habitat for hoary marmot was limited to high-elevation areas throughout the RAA. Within the LAA, effective habitat was located in the high-elevation areas north and south of the slopes of Volcano Creek with scattered habitat in the southeast portion of the LAA.

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Across the entire District 10, which includes Highways 37 and 37A, there was a total of two marmot related accidents making up less than 0.1% of wildlife-related accidents in the district (Sielecki 2013). There were no reported vehicle collisions with hoary marmot along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Heese and Rea 2016). Vehicle-related mortality of small mammals is likely underreported due to lack of detection, but mortalities of small mammals due to vehicle collisions are expected to occasionally occur along Highway 37. Hoary marmot harvest data for WMUs 6-16 and 6-21 is not available (MFLNRO 2023).

19.4.6 Bats

Bats are aerial insectivore mammals that inhabit a variety of habitats; however, data regarding habitat use and species distribution is limited, particularly as it relates to maternity roosts and overwintering hibernacula (Craig and Holroyd 2004) . The habitats bats use may vary depending on the season and their behaviour (e.g., foraging, roosting, hibernating). Generally, bats use old-growth forest and riparian areas to forage for aerial insects (Bachen et al. 2019; Barclay and Solick 2006; Chruszcz and Barclay 2002). Roosting habitats vary by species and life stage requirement (e.g., day roost, maternity roost) and include dead or live trees with appropriate features (i.e., cavities, peeling bark), various geological formations, and anthropogenic structures such as buildings and bridges (MOE 2016). Hibernacula require key features such as stable temperature and relatively high humidity, but bats may use a variety of micro-habitats to hibernate including caves, crevices, sinkholes, root wads, and anthropogenic structures (MOE 2016). Low-elevation riparian areas, wetlands, and open water which may support abundant prey populations are present within the RAA

and LAA. Riparian areas along the Unuk and Iskut rivers contain mature cottonwood, spruce, and fir stands which may also support maternal roosts and day roosts for various bat species.

Nine bat species have been recorded within the Skeena region: big brown bat (*Eptesicus fuscus*), Californian myotis (*Myotis californicus*), hoary bat (*Lasiurus cinereus*), little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis;* including the species formally known as Keen's long-eared myotis), long-legged myotis (*Myotis volans*), northern myotis (*Myotis septentrionalis*), silver-haired bat (*Lasionycteris noctivagans*), and Yuma myotis (*Myotis yumanensis;* Community Bat Projects of BC 2024). Silver-haired bat is considered important in the RAA due to concerns regarding their maternal roosts occurring in tree cavities (British Columbia Timber Sales 2008) and little brown myotis, northern myotis, hoary bat, silver-haired bat, and Yuma myotis are species of provincial and federal conservation concern (Nagorson and Brigham 1993; Government of Canada 2024; Community Bat Projects of BC 2024). Bats have not been raised as key species of importance by Tahltan, TSKLH, or MNBC in any secondary sources reviewed for this assessment. In an ethnographic study of Tahltan, James Teit noted that bats and other small-bodied rodents were not used for food or skins by Tahltan due to their "small size, the nature of their diets, their foul odour, or bad habits", with exceptions made during times of extreme stress (Teit 1956).

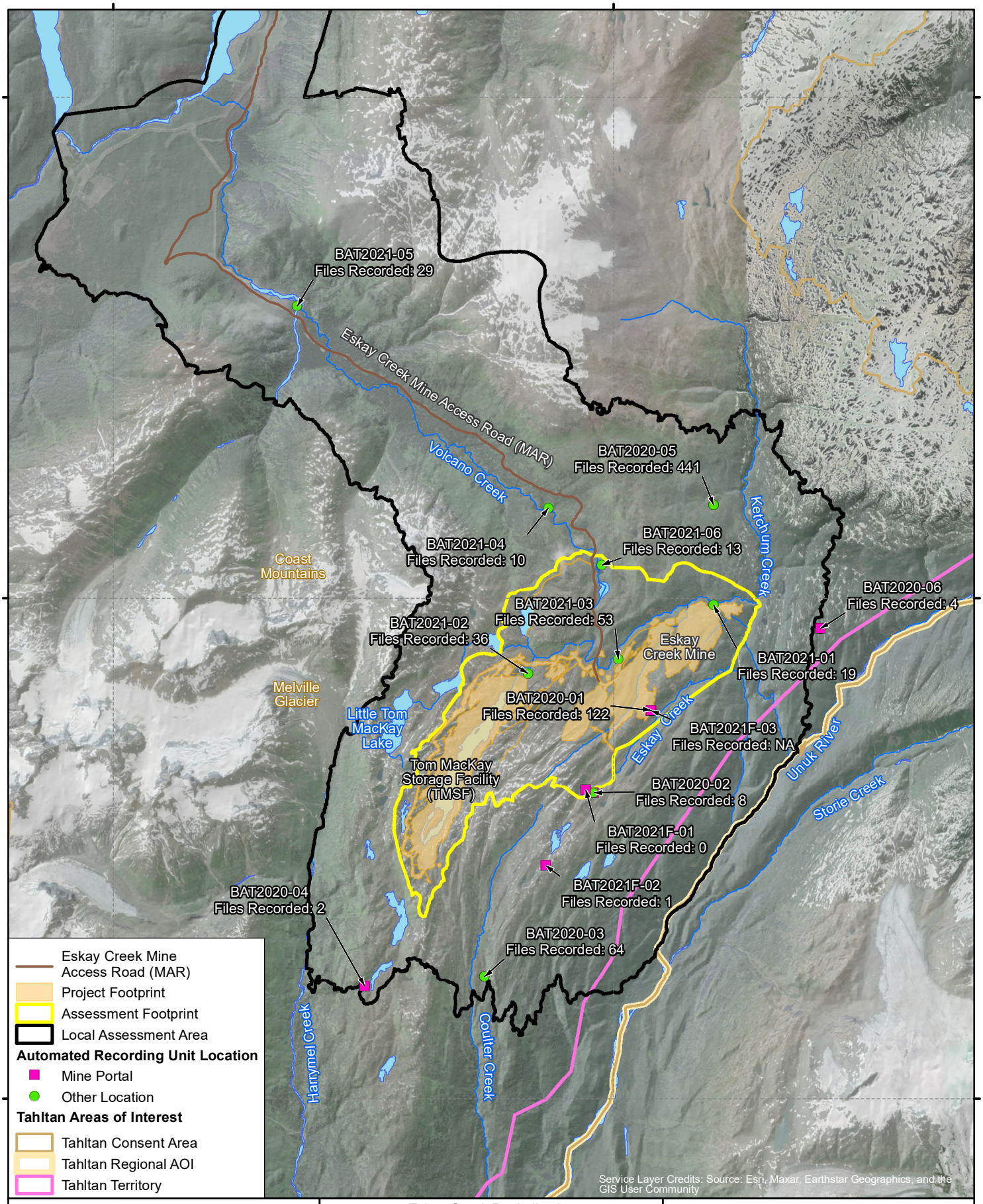
A primary threat to bat populations in North America is white-nose syndrome, a fungal disease that affects hibernating bats. The federal endangered listing of little brown myotis, a species recorded within the LAA, is due to population declines in eastern Canada as a direct result of white-nose syndrome (ECCC 2018). White-nose syndrome was recently documented for the first time provincially in Grand Forks, BC (CBC 2023).

Baseline Studies

Acoustic surveys are recommended in provincial surveying standards to assess bat presence and relative abundance (RIC 1998b). Acoustic surveys were completed in late-summer 2020 and 2021 in potential foraging habitat within the LAA, using Autonomous Recording Units (ARUs) across 14 sites specifically designed for capturing bat echolocation (Appendix 19-1, Wildlife Cumulative Baseline Report 2020-2021). The majority of the LAA is too high in elevation to provide suitable maternity roost habitat; however, decommissioned mine entrances were also surveyed in 2021 due to their potential for housing maternity roosts.

Two species were detected with high confidence in the LAA, little brown myotis and long-eared myotis, and four species were detected with moderate confidence, long-legged myotis, northern myotis, silver-haired bat, and big brown bat. Bat activity was recorded by all the ARUs in 2020 and 2021 (Figure 19.4-17) and was considered low throughout most of the LAA, except for the northeast portion which had high bat activity at sites associated with fens in forested areas. The Unuk River runs within this portion of the LAA which likely contributes to a higher abundance of bats due to the presence of low-lying wetlands and mature forest stands essential for foraging and maternity roosts. Four of the nine bat species possibly occurring within the RAA are known to overwinter in hibernacula commonly associated with karst landscapes; however, these landscapes are not present in the LAA. Abandoned mine shafts and buildings may support bat hibernacula for species detected within the LAA (ECCC 2018), but no potential hibernacula sites were suspected that would warrant deployment of ARUs. This diversity of the bat community within the RAA is considered high given that five of a possible nine species with the potential to occur in the RAA have been detected.

The two bridges over Volcano Creek along the Eskay Creek MAR were surveyed in 2023 to evaluate use of these anthropogenic structures by bats, but no evidence of use (e.g., individuals or guano) was detected (Appendix 19-2, 2023 Overall Fieldwork Report).



Skeena Resources Ltd.
Date: 22-Jul-2024
Figure: 19.4-17
Author: Jennifer.D.Thompson
Filename: ESK-23-070d

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-17:
Bat Automated Recording Unit Locations for Call Surveys, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:100,000
Coord. System: NAD 1983 UTM Zone 9N
0 1 2 3
Kilometres
N

Wildlife Mortality

From 1988 to 2007, there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and an additional 78 accidents were recorded on 66 km of Highway 37A (Sielecki 2010). Across the entire District 10, which includes Highway 37, there were no reported bat-related accidents (Sielecki 2013). Due to their small size and nocturnal activity, vehicle-related mortalities of bats were not detected and recorded in this total, but mortalities of bats due to vehicle collisions are expected to occasionally occur along Highway 37.

19.4.7 Raptors

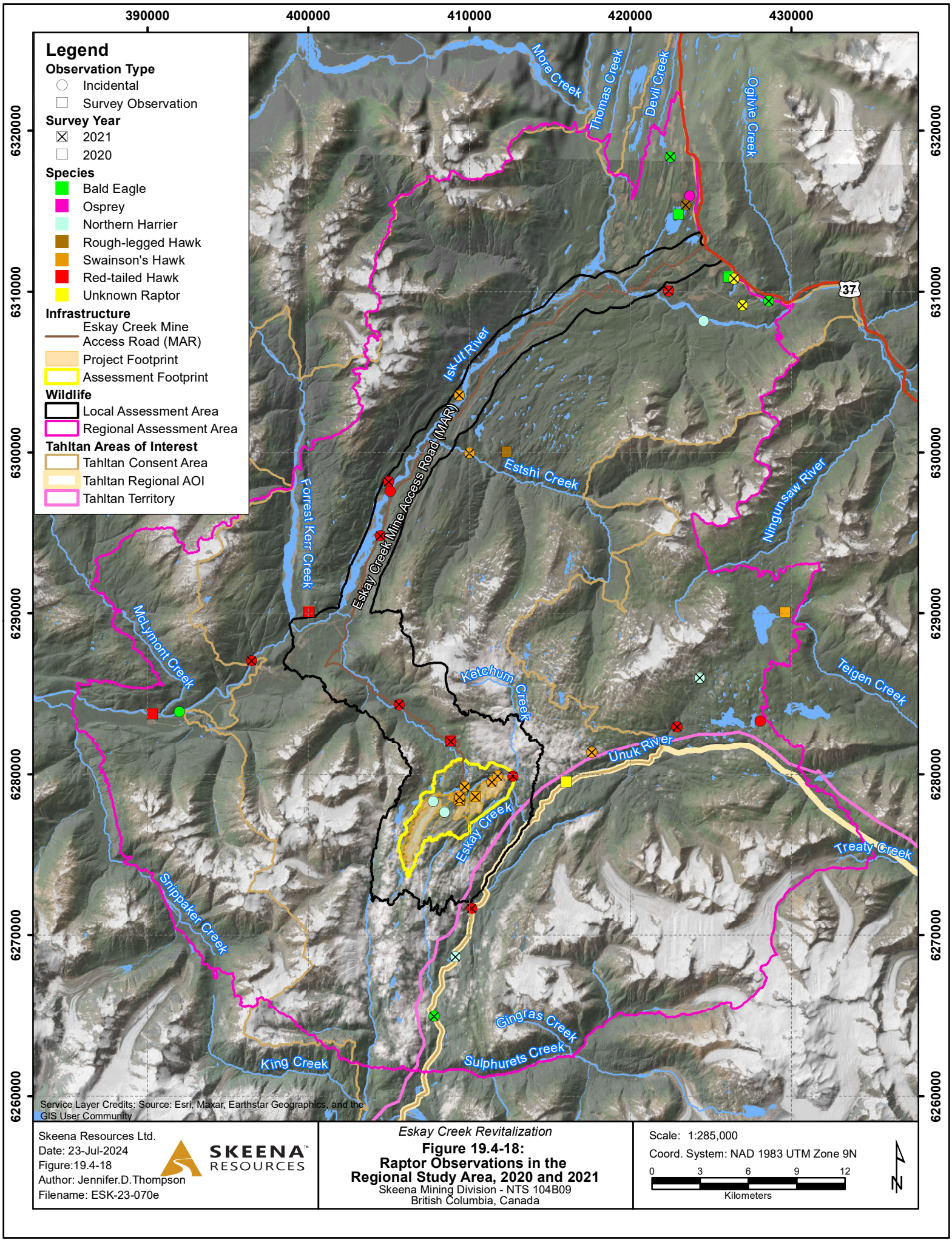
Raptors are predatory bird species that includes falcons, ūzē (hawks), eagles, and mesdzi[11] (owls), all of which have the possibility of occurring in the RAA. Raptors are high trophic level species that require large home ranges and use a variety of habitats.

There are 15 raptor species that have the potential to occur within the RAA: American kestrel (*Falco sparverius*), tuhdā (bald eagle, *Haliaeetus leucoephalis*), īdā (golden eagle, *Aquila chrysaetos*), gyrfalcon (*Falco resticolus*), merlin (*Falco columbarius*), northern goshawk (*Accipiter gentiles laingi* or *atricapillus* subspecies), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), peregrine falcon (*Falco peregrinus anatum* or *pealei*), red-tailed hawk (*Accipiter stratus*), sharp-shinned hawk (*Accipiter striatus*), rough-legged hawk (*Buteo lagopus*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), and western screech-owl (Rescan 2010a; 2013a; RTEC 2006, 2007). Of these, seven are of conservation concern and some may nest within the RAA (Table 19.4-3). Raptor species that are considered culturally important to Tahltan include bald and golden eagles and northern goshawk (Rescan 2009a; AltaGas Renewable Energy Inc. 2011a). Nesting habitat for raptors is abundant within the RAA including steep hillsides for cliff-nesting raptors and also stands of late-stage forest containing mature trees to support tree-nesting raptor species.

Baseline Studies

Baseline raptor surveys were completed in 2020 and 2021 across the RAA and LAA (Appendix 19-1, Wildlife Cumulative Baseline Report 2020-2021). Surveys included early summer aerial stick nest surveys focused primarily in proximity to wetlands and riparian as well as call playback surveys for northern goshawk, both of which followed RIC standards (RIC 2001). A total of 6 species of raptor and 40 individuals were reported either during stick nest surveys or incidentally in 2020 and 2021 (Figure 19.4-18). The species observed from most common to least common was red-tailed hawk, Swainson's hawk, bald eagle, northern harrier, rough-legged hawk, and osprey. In 2020, one raptor nest was observed along the upper Unuk River and appeared to be built by a rough-legged hawk; however, when the nest was later revisited in 2021 it was occupied by an incubating red-tailed hawk. A second nest was discovered in 2021 along the Iskut River on a cliff side and appeared to be active but was not confirmed as occupied in 2021. Northern goshawk was not detected during the 2020 and 2021 baseline surveys, but a single adult red-tailed hawk was recorded responding to northern goshawk call playbacks in 2021. Although several raptor species were not detected in the 2020 or 2021 surveys, there is still potential for their occurrence due to both abundant nesting habitat and being documented historically. There is a variety of nesting potential within the RAA including low-lying riparian areas surrounding the Iskut and Unuk rivers and cliff habitat on the western side of the Iskut River. In 2023, raptor nest surveys did not identify any active raptor nests but an active Swainson's hawk nest was incidentally detected along the Eskay Creek MAR (Appendix 19-2, 2023 Overall Fieldwork Report).

[11] From "Tāłtān Dictionary" (TCG 2024)



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure:19.4-18
Author: Jennifer.D.Thompson
Filename: ESK-23-070e

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-18:
Raptor Observations in the Regional Study Area, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 (Sielecki 2010). Vehicle-related mortalities of raptors were not recorded in this total but mortalities of raptors due to vehicle collisions are expected to occasionally occur along Highway 37. Raptors are not a harvested species and therefore no harvest data is available.

19.4.8 Waterbirds

Waterbirds include all birds that primarily use aquatic habitats for foraging, breeding, or staging during the year. This grouping includes both dabbling and diving tūdi[12] (ducks), tū'tsey (loons), ghanje (geese), dagay (swans), and shorebirds. Most waterbirds make seasonal migrations and need to have suitable staging habitat throughout their migratory route to travel between wintering and nesting ranges. Waterbirds birds are protected under the *Migratory Bird Convention Act* (SC 1994, c 22) and BC's *Wildlife Act* (RSBC 1996, c 488) with some species also being afforded protection under *SARA* (SC 2002, c 29). Waterbirds include species groups, such as ducks and geese, which are an important aspect of traditional and contemporary hunting activities for Indigenous people in the region (Rescan 2013b; Rescan 2009a). Tahltan members may potentially harvest Canada goose (*Branta canadensis)*, harlequin duck (*Histronicus histronicus*), tūdi chō[13] (mallard, *Anas platyrhynchos*), and ring-necked duck (*Aythya collaris*) in Tahltan Territory (Appendix 21-3, Tahltan Country Foods Baseline Report). TSKLH members have reported harvesting ducks and Canada geese for occasional consumption (Rescan 2013b). A total of eight waterbird species of conservation concern have the potential to occur within the RAA (Table 19.4-3).

Historical Surveys

Waterbird surveys completed for both the KSM and Brucejack projects overlapped portions of the Project's RAA and were completed in 2008 and 2012, respectively. Species observed in these prior surveys were green-winged teal (*Anas carolinensis*), Arctic tern (*Sterna paradisaea*), Barrow's goldeneye (*Bucephala islandica*), Bonaparte's gull (*Chroicocephalus philadelphia*), Canada goose, common loon (*Gavia immer*), common merganser (*Mergus merganser*), harlequin duck, mallard, and white-winged scoter (*Melanitta deglandi*). Historically, three species of conservation concern have been observed in the Skeena region, namely harlequin duck, surf scoter (*Melanitta perspicillata*), and great blue heron (*Ardea Herodias fannini*; BC CDC 2023b; Rescan 2010a, 2013a; RTEC 2007).

Baseline Surveys

Baseline surveys were completed in three separate seasons: the spring pairing (May to June), summer brooding (July to August), and fall migration (September) seasons during 2020 and 2021 (Appendix 19-1, Wildlife Cumulative Baseline Report 2020–2021). Aerial surveys were completed following RIC protocols (RIC 1998c; 1998d; 1999b) and were comprised of two biologists for the spring and fall surveys and three biologists for the summer brood surveys.

Baseline surveys identified a total of 36 species from seven waterbird groups, including dabbling ducks (n = 7), diving and sea ducks (n = 10), geese and swans (n = 2), gulls (n = 3), loons and grebes (n = 4), riverine birds (n = 2), shorebirds (n = 4) and unknown (n = 4) for a total of 3,326 individuals. Five species of conservation

[12] From "Tāłtān Dictionary" (TCG 2024)

[13] From "Tāłtān Dictionary" (TCG 2024)

concern were detected, namely the harlequin duck, surf scoter, killdeer, red-necked phalarope, and long-tailed duck (*Clangula hyemalis*; Figure 19.4-19). The most commonly observed species in both years included the Barrow's goldeneye, Canada goose, lesser scaup (*Aythya affinis*), and mallard. Notably, the common merganser was abundant in the 2020 (n = 282) surveys but mostly absent in the 2021 surveys (n = 2).

Spring pair surveys identified a total of 1,471 individual waterbirds from 30 species. The distribution of spring observations varied across the RAA; however, areas of particularly high density occur near Highway 37, the Iskut and Unuk rivers, and wetland areas in proximity to these rivers (Figure 19.4-20). Summer brood surveys identified a total of 1,171 individuals from 20 species. The distribution of observations was throughout the RAA with particular concentrations in wetlands between Estshi Creek and the Iskut River, in proximity to Tom MacKay Lake, and along the Unuk River on the eastern portion of the RAA (Figure 19.4-21). Fall staging surveys identified a total of 705 individuals from 22 species. The distribution of observations occurs throughout the RAA but observations were concentrated in wetlands between Estshi Creek and the Iskut River, in proximity to Tom MacKay Lake, and along the Unuk River on the eastern portion of the RAA (Figure 19.4-22). Concurrently, waterbirds have historically and contemporarily been hunted by Métis harvesters in both the Bell-Irving and the Unuk watersheds (Seabridge Gold Inc. 2013b; IDM Mining 2017b).

A total of 64 broods from 8 species were recorded in 2020 and 37 broods of 6 species in 2021, all broods observed were ducks, loons, or geese (Figure 19.4-21). The area around the proposed TMSF has a variety of mid-elevation ponds that support breeding waterbirds; however, the highest abundance of waterbirds was recorded in low-elevation waterbodies south of Bob Quinn Lake (Figure 19.4-21). The region surrounding the LAA contains small waterbodies that may be used for breeding by waterbirds; however, there is an overall more abundant use of low-elevation waterbodies by waterbirds. The LAA contains little seasonally available staging habitat and can not accommodate large flocks of waterbirds.

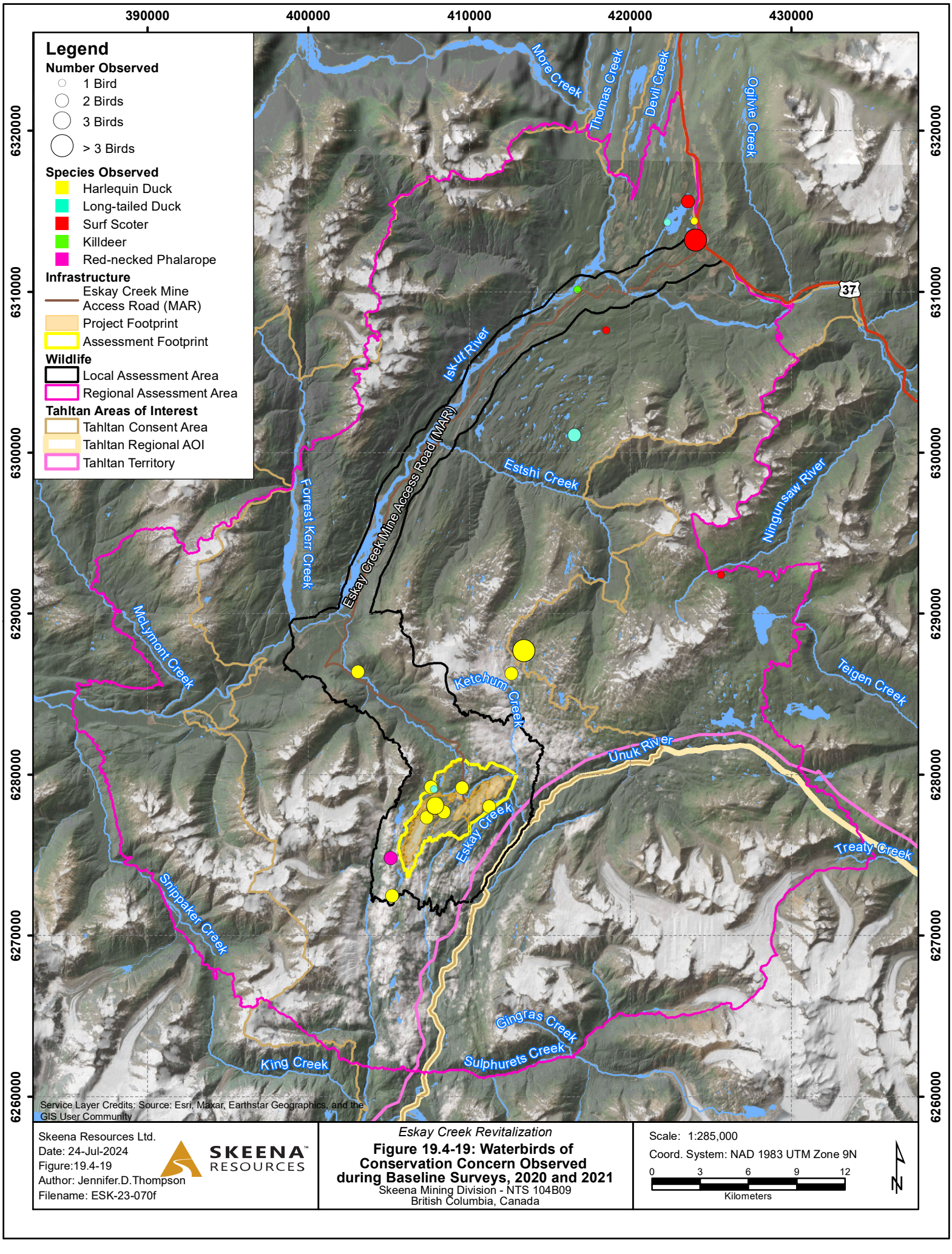
Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Vehicle-related mortalities of waterbirds were not recorded in this total but mortalities of waterbirds due to vehicle collisions are expected to occasionally occur along Highway 37. Hunter harvest data for waterbirds is not available.

19.4.9 Upland Breeding Birds

Upland birds are all birds that are not waterbirds or raptors and are primarily migratory passerine species. Upland birds are a diverse group of species and are protected under the *Migratory Birds Convention Act* (SC 1994, c 22) and BC's *Wildlife Act* (RSBC 1996, c 488), with some species also being afforded protection under the federal *SARA*. A total of nine upland bird species of conservation concern have the potential to occur within the RAA (Table 19.4-3). Upland breeding birds include species groups, such as dih chō[14] (grouse), which are an important aspect of traditional and contemporary hunting activities for Indigenous people (IDM Mining 2017a). TSKLH members have reported historic and contemporary harvesting of grouse, with members reporting occasional consumption of grouse in a 2013 survey (Rescan 2013b).

[14] From "Tāłtān Dictionary" (TCG 2024)



Skeena Resources Ltd.
Date: 24-Jul-2024
Figure:19.4-19
Author: Jennifer.D.Thompson
Filename: ESK-23-070f

SKEENA RESOURCES

Eskay Creek Revitalization

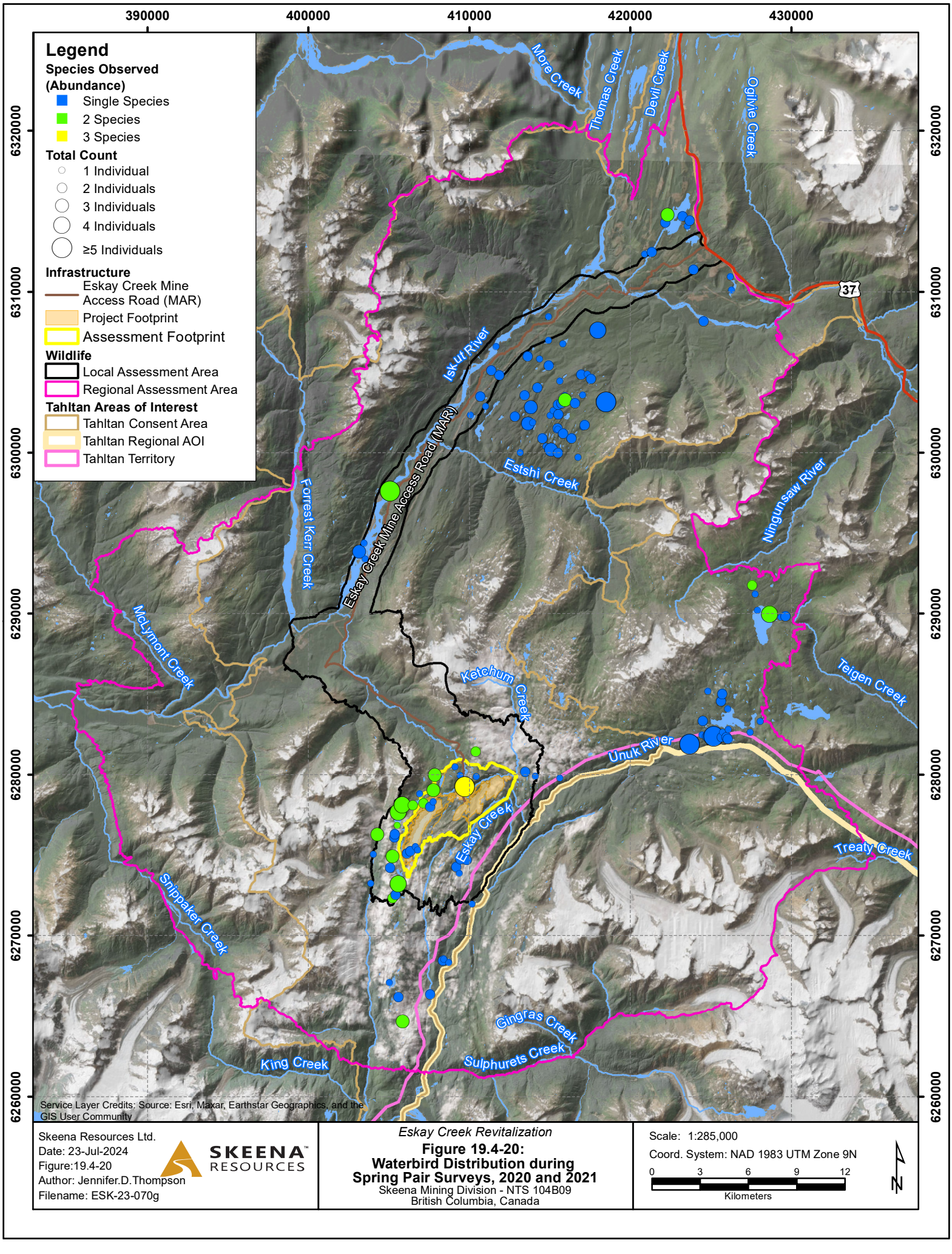
Figure 19.4-19: Waterbirds of Conservation Concern Observed during Baseline Surveys, 2020 and 2021

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N

0 3 6 9 12
Kilometers

N



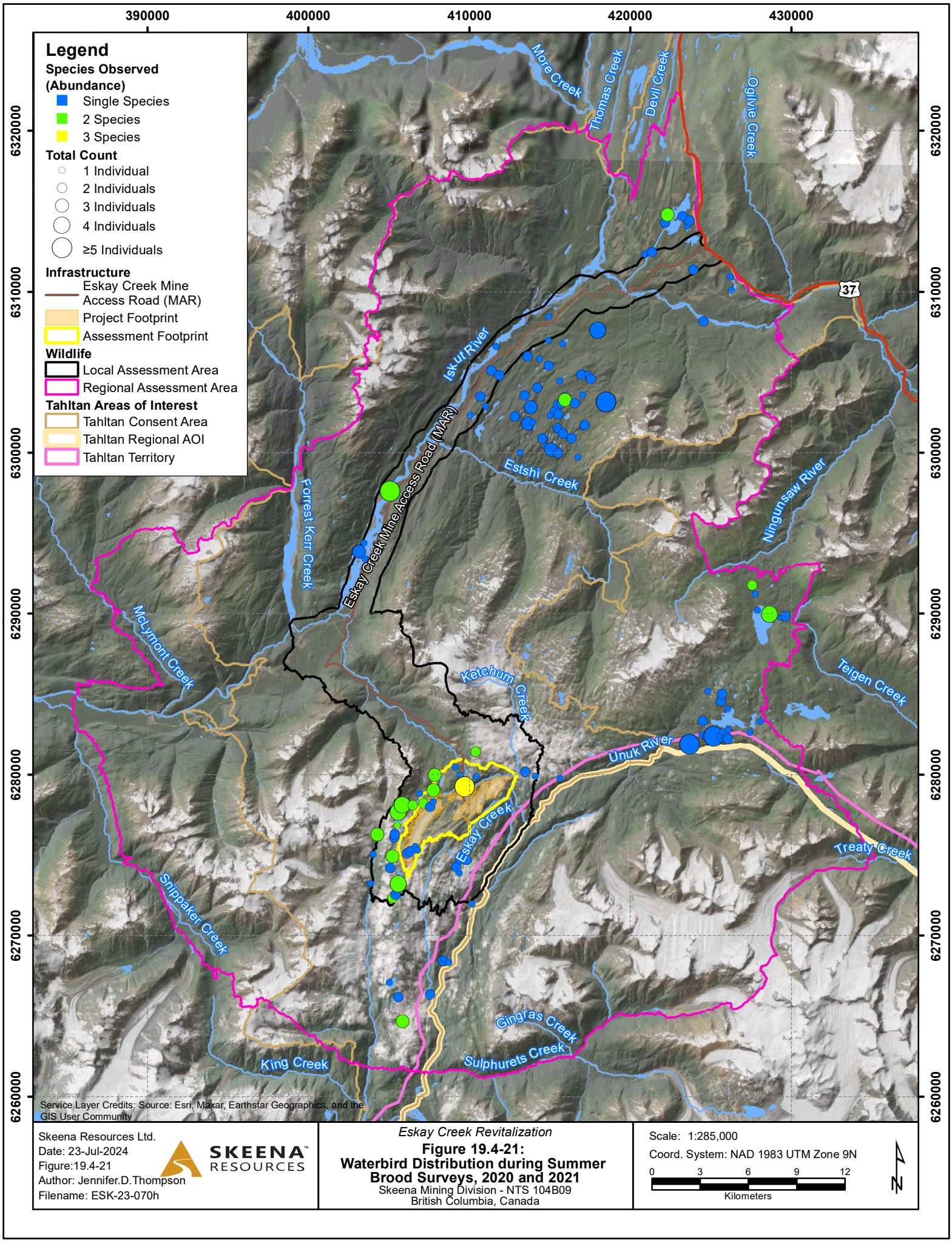
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure:19.4-20
Author: Jennifer.D.Thompson
Filename: ESK-23-070g

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-20:
Waterbird Distribution during Spring Pair Surveys, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



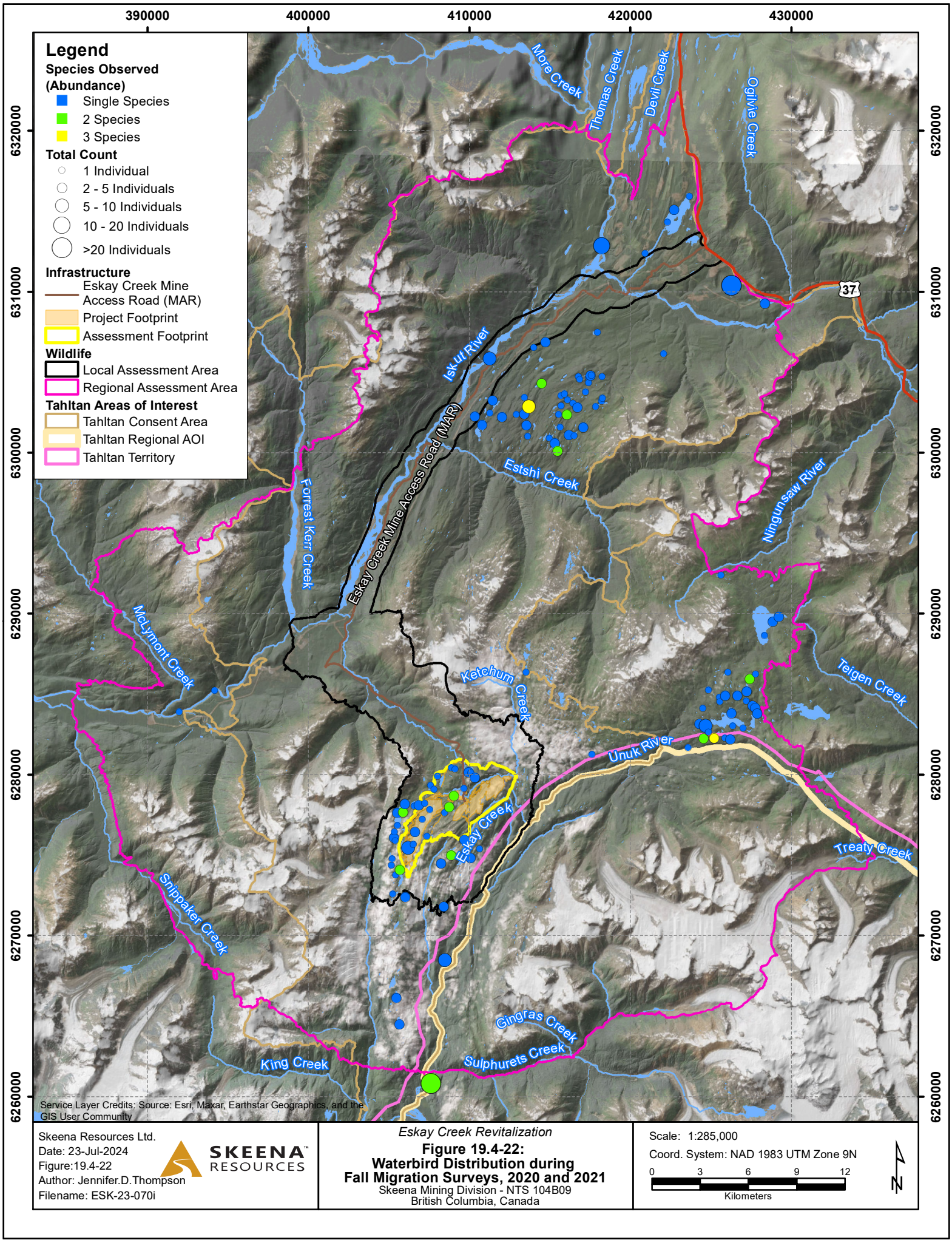
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure:19.4-21
Author: Jennifer.D.Thompson
Filename: ESK-23-070h

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-21:
Waterbird Distribution during Summer Brood Surveys, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N



Skeena Resources Ltd.
Date: 23-Jul-2024
Figure:19.4-22
Author: Jennifer.D.Thompson
Filename: ESK-23-070i

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-22:
Waterbird Distribution during Fall Migration Surveys, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:285,000
Coord. System: NAD 1983 UTM Zone 9N
0 3 6 9 12
Kilometers
N

Historical Surveys

Historical records indicate that mid-elevation ranges of the RAA contain the highest densities of breeding songbirds (Keystone Wildlife Research 1993; Prime Resources Group Inc. 1993). There have been point-count surveys for both forest and alpine birds completed at nearby sites (KSM 2008 and 2009 and Brucejack 2010 to 2012) with four sites from KSM overlapping with the RAA (Rescan 2010a, 2013a). Historically, no species of conservation concern were detected within the RAA but several have been recorded at nearby Brucejack and KSM sites (Rescan 2010a; 2013a). Species recorded at nearby sites include olive-sided flycatcher (*Contopus cooperi*), ist'akadle[15] (barn swallow, *Hirundo rustica*), and rusty blackbird (*Euphagus carolinus*). Olive-sided flycatcher and barn swallow are Yellow-listed in BC and listed as Special Concern and Threatened, respectively, on Schedule 1 of SARA. Rusty blackbird is Blue-listed in BC and listed as Special Concern on Schedule 1 of *SARA* (Table 19.4-3; BC CDC 2024; Government of Canada 2024). Historical data sources for the Eskay Creek Revitalization Project regional and LAA include records of sooty, ruffed, and spruce grouse.

Baseline Studies

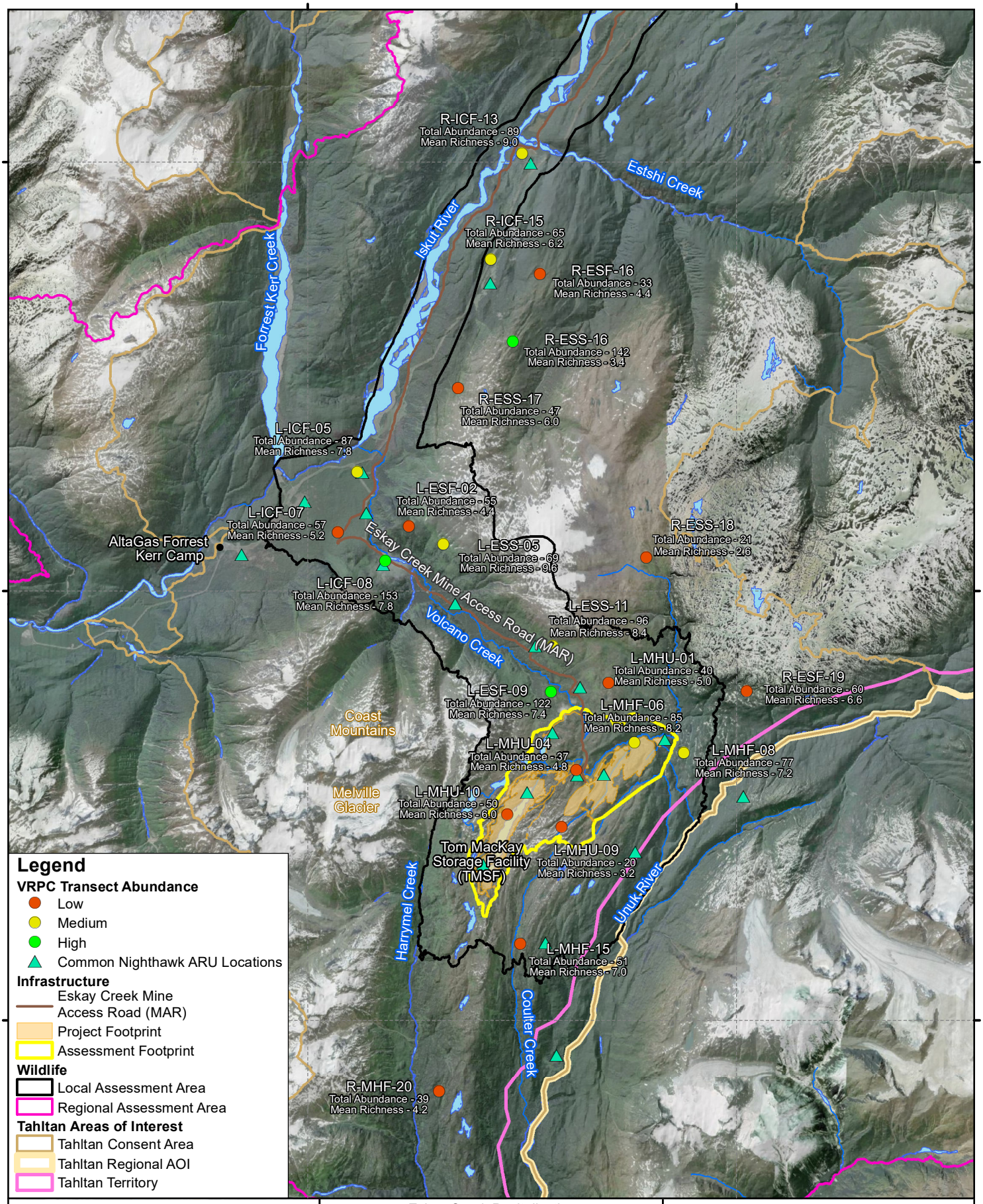
To assess both species richness and the relative abundance of upland breeding birds, variable radius point counts were completed by qualified biologists following RIC standards (Appendix 19-1, Wildlife Cumulative Baseline Report 2020–2021; RIC 1999c).

A total of 259 variable radius point counts were completed, yielding detections of 2,325 individual birds across 60 species (Figure 19.4-23). A total of 110 variable radius point counts in 2020 recorded 780 breeding territories of 52 species, while in 2021, 149 variable radius point counts recorded 636 breeding territories from 38 species. Common species detected at greater than or equal to (≥) 20% of sites were dark-eyed junco (*Junco hyemalis*), fox sparrow (*Passerella iliaca*), hermit thrush (*Catharus guttatus*), pine siskin (*Spinus pinus*), ruby-crowned kinglet (*Corthylio calendula*), sooty grouse (*Dendragapus fuliginosus*) kābalū[16], Townsend's warbler (*Setophaga townsendi*), varied thrush (*Ixoreus naevius*), Wilson's warbler (*Cardellina pusilla*), and yellow-rumped warbler (*Setophaga coronata*). Sooty grouse were recorded in more than 20% of the point-count surveys, with a total of 91 individuals observed.

Community analyses suggest that the estimated species richness of the upland bird community in the surveyed area is 83 species (95% confidence interval: 62 to 170) and the 60 species detected from 2020 to 2021 nearly reached the 95% confidence interval, suggesting it adequately describes the upland bird community. Species richness was highest in the central portion of the LAA, and along the Eskay Creek MAR (>50 species; Figure 19.4-23). Overall abundance, species richness, and singing behaviour increased in mid- to late June 2021, most notably in high-elevation zones, including areas of mountain hemlock and mid-elevation mountain hemlock. Breeding upland birds are present throughout the region, but the community shifts toward more high-elevation species around the RAA. Additionally, both species richness and abundance increased in the open forest habitat types of the Engelmann Spruce – Subalpine Fir and Interior Cedar Hemlock zones. Overall, the number of breeding territories per site was relatively similar across BEC zones, except for a few sites in the mature forest Engelmann Spruce – Subalpine Fir and Mountain Hemlock zones.

[15] From "Tāłtān Dictionary" (TCG 2024)

[16] From "Tāłtān Dictionary" (TCG 2024)



Skeena Resources Ltd.
Date: 22-Jul-2024
Figure:19.4-23
Author: Jennifer.D.Thompson
Filename: ESK-23-070j

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.4-23: Upland Bird Variable Radius Point Count Transects and Common Night Hawk ARU Baseline Survey Locations

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:175,000
Coord. System: NAD 1983 UTM Zone 9N
0 2 4 6 8
Kilometres
N

Two species of conservation concern, the barn swallow and the olive-sided flycatcher, were detected within or in proximity to the RAA. Barn swallow was commonly detected near the old Eskay Creek camp infrastructure, which is likely supporting nesting individuals. Olive-sided flycatcher was detected within and to the north of the LAA, in lower elevations along conifer forest edges. Similarly, olive-sided flycatcher was also detected in 2023 along the Eskay Creek MAR near the edge of a gravel clearing adjacent to mature forest (Appendix 19-2, 2023 Overall Fieldwork Report).

Additionally, auditory surveys were completed for common nighthawk āshinagwātl[17] (*Chordeiles minor*) in 2021 following a standardized survey protocol (Knight et al. 2019) after the species was incidentally detected in 2020. COSEWIC assessed common nighthawk as a species of special concern, and it is listed as threatened on Schedule 1 of *SARA* (Government of Canada 2024). To supplement the auditory survey, ARUs were deployed at 20 sites in the LAA and portions of the RAA in June of 2021 to detect the presence of the species.

Common nighthawk were detected a total of 14 times at 2 unique ARU sites. One of these sites was located at the northern tip of the LAA and the other was located approximately 2 km west of the LAA both of these sites occurred near Forest Kerr Creek. These sites were both associated with meadow openings and clearcut conifer forest within the Interior Cedar – Hemlock BEC zones. There was also an incidental nighthawk sighting during aerial waterbird surveys in August 2020 near the Iskut River in the northwestern region of the RAA.

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Likely due to their small size vehicle-related mortalities of upland breeding birds were not recorded in this total but mortalities of upland birds due to vehicle collisions are expected to occur along Highway 37, particularly in winter when upland birds collect grit on plowed roads. Hunter harvest data for upland birds are not available.

19.4.10 Amphibians

Wetlands and watercourses through the RAA provide habitat for amphibians. There are six amphibian species with the potential to occur in the RAA: western toad, Columbia spotted frog (*Rana luteiventris*), wood frog (*Lithobates sylvaticus*), long-toed salamander (*Ambystoma macrodactylum*), northwestern salamander (*Ambystoma gracile*), and roughskin newt (*Taricha granulosa*; Stebbins 2003). Amphibians, including tehkahche[18] (frogs), toads, and salamanders appear as powerful, often dangerous or ominous, supernatural figures in a variety of Tahltan cultural stories (Albright 1982; Teit 1914; Teit 1921; Higgins 1982). Amphibians have not been historically or contemporarily consumed by Tahltan members (Teit 1956).

Western toad is the only amphibian species at risk within the RAA, being Yellow-listed (secure) in BC, assessed by COSEWIC as special concern (COSEWIC 2012a), and listed on Schedule 1 of *SARA* as special concern (BC CDC 2024; Government of Canada 2024). Additionally, western toad is afforded protection under the *BC Wildlife Act* (RSBC 1996, c 488) and has a priority rating of “two” for goal two in BC’s Conservation Framework, meaning that the Province is interested in preventive conservation to keep this species from becoming at risk. The importance of maintaining breeding habitat and connectivity at a regional

[17] From “Tāłtān Dictionary” (TCG 2024)

[18] From “Tāłtān Dictionary” (TCG 2024)

scale for supporting populations has been recognized, given that this migratory amphibian can travel up to 7 km from its natal pond, and is potentially vulnerable to human disturbance (BC MWLAP 2004a; Carr and Fahrig 2001).

Western toad breeding habitat is variable and includes open water wetlands, the shallow margins of lakes, and seasonal pools such as ditches (Provincial Western Toad Working Group 2014). Typically, breeding wetlands occur between elevations of 0 to 900 m (the Project is located at an elevation of 750 m).

Baseline Studies

Both aerial and ground-based baseline surveys were completed for western toad in 2020 and 2021, to identify and confirm the breeding potential of waterbodies and wetlands. Ground-based surveys were completed following provincial RIC standards (Appendix 19-1, Wildlife Cumulative Baseline Report 2020–2021; RIC 1998e) and aerial surveys focused on identifying western toad habitat to inform the ground-based survey.

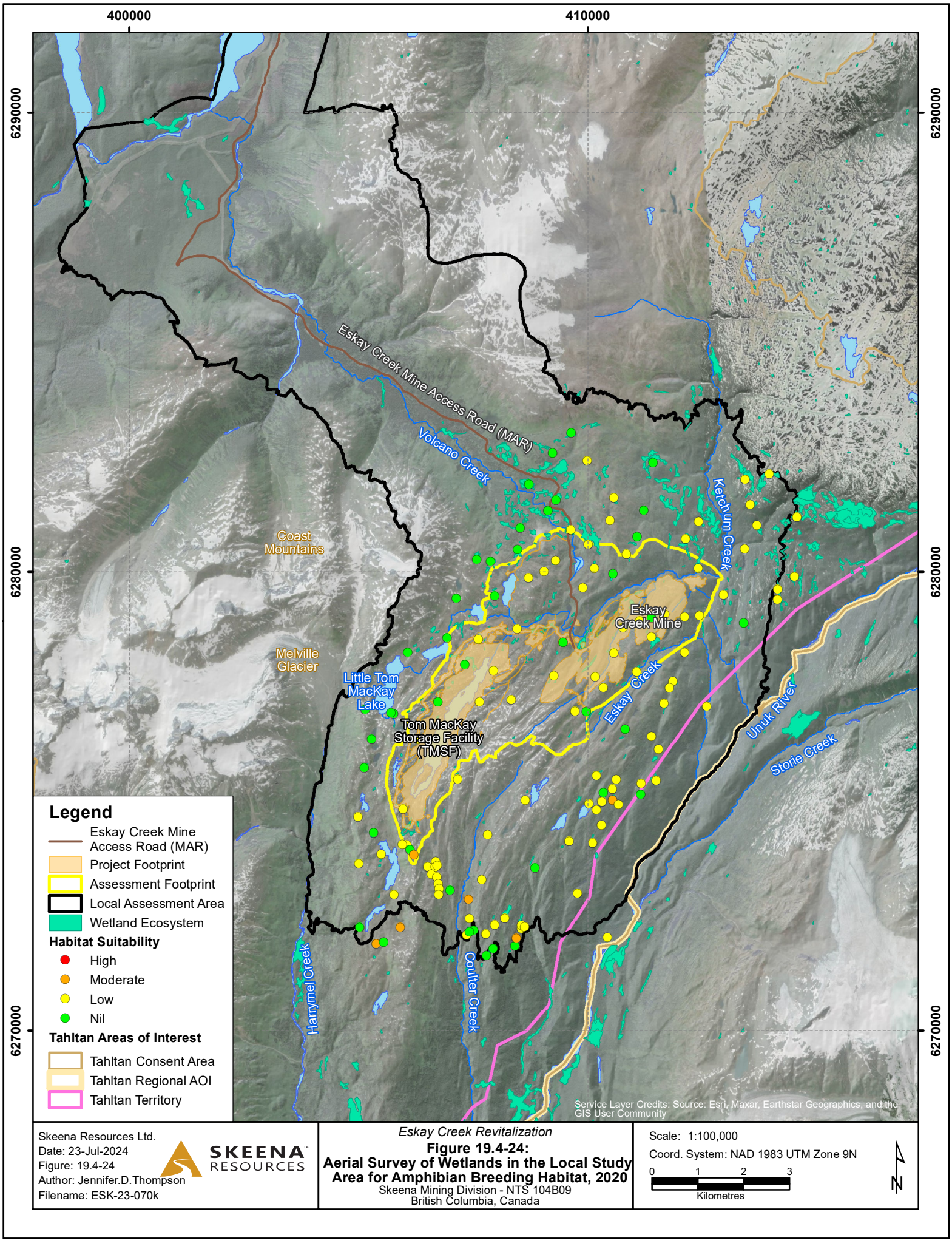
Aerial surveys completed in 2020 detected 139 wetlands and wetland complexes in the LAA (Figure 19.4-24). Despite the abundant presence of wetlands and waterbodies, no sites were classified as having high habitat suitability for western toad breeding, and 6 sites were classified as moderately suitable. Most wetlands in the LAA are at high elevations (>900 m) and/or lakes and fens with deep water that do not contain the open canopy, muddy banks, and low water flow characteristics that western toad prefers.

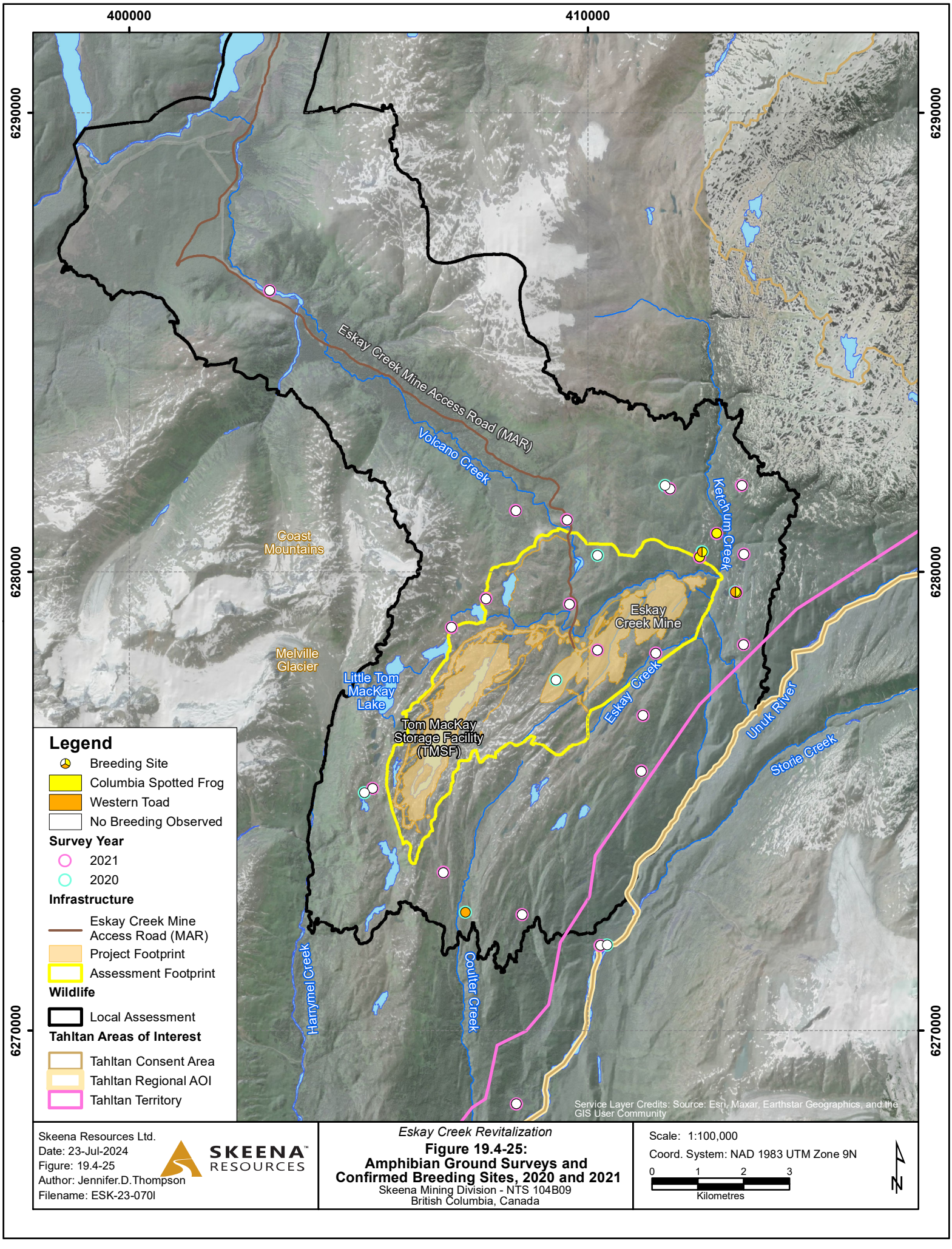
Sites that were classified as highly or moderately suitable during aerial surveys, and some less suitable sites due to lack of suitability representation, were chosen for ground surveys. Ground surveys were completed in 2020 at eight locations with the potential to support western toad breeding (Figure 19.4-25). Western toad breeding was confirmed at three survey locations, two locations adjacent to Ketchum Creek and one location adjacent to Coulter Creek. Breeding sites were found to be either fens or ponds with shallow open water along muddy banks, with an open canopy and low rate of water flow. Tadpoles were observed in low numbers (approximately 20 per breeding site), possibly indicative of these sites being of low value for western toad breeding, or due to the cold spring reducing breeding efforts. Additional ground surveys were completed at 24 wetlands in 2021. A total of 2 of the 3 sites identified in 2020 to have western toad tadpoles were re-surveyed in 2021 and no western toad individuals were detected.

Breeding sites were at mid-elevations (750 to 900 m) and on the upper limit of elevation where western toad typically breed. Generally, the LAA has low suitability for western toad breeding habitat and limited western toad presence. The only portion of the LAA that extends to lower elevations is very steep forested habitat on the west bank of the Unuk River and is not suitable for western toad breeding.

In addition to the western toad, baseline ground surveys confirmed Columbia spotted frog breeding in three ponds within the LAA (Figure 19.4-25). All Columbia spotted frog breeding sites were found in the northeastern LAA and do not overlap with proposed development areas. Typically, Columbia spotted frog have slightly different fine-scale habitat selection without extensive overlap of breeding sites with western toad in the region (Patla and Keinath 2005). However, limited suitable western toad breeding habitat may be causing more overlap among the two species' breeding sites than is typically expected.

In 2023, western toad was detected at three wetlands along the Eskay Creek MAR and none were detected within the Assessment Footprint; a total of 32 wetlands were surveyed (Appendix 19-2, 2023 Overall Fieldwork Report).


400000
410000
6290000
6280000
6270000
Eskay Creek Mine Access Road (MAR)
Volcano Creek
Ketchum Creek
Coast Mountains
Melville Glacier
Little Tom MacKay Lake
Tom MacKay Storage Facility (TMSF)
Eskay Creek Mine
Eskay Creek
Unuk River
Storie Creek
Harrymel Creek
Coulter Creek
Legend
Eskay Creek Mine Access Road (MAR)
Project Footprint
Assessment Footprint
Local Assessment Area
Wetland Ecosystem
Habitat Suitability
High
Moderate
Low
Nil
Tahltan Areas of Interest
Tahltan Consent Area
Tahltan Regional AOI
Tahltan Territory
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-24
Author: Jennifer.D.Thompson
Filename: ESK-23-070k
SKEENA RESOURCES
Eskay Creek Revitalization
Figure 19.4-24:
Aerial Survey of Wetlands in the Local Study Area for Amphibian Breeding Habitat, 2020
Skeena Mining Division - NTS 104B09
British Columbia, Canada
Scale: 1:100,000
Coord. System: NAD 1983 UTM Zone 9N
0 1 2 3
Kilometres
N


400000
410000
6290000
6280000
6270000
Eskay Creek Mine Access Road (MAR)
Volcano Creek
Ketchum Creek
Coast Mountains
Melville Glacier
Little Tom MacKay Lake
Tom MacKay Storage Facility (TMSF)
Eskay Creek Mine
Eskay Creek
Unuk River
Storie Creek
Harrymel Creek
Coulter Creek
Legend
Breeding Site
Columbia Spotted Frog
Western Toad
No Breeding Observed
Survey Year
2021
2020
Infrastructure
Eskay Creek Mine Access Road (MAR)
Project Footprint
Assessment Footprint
Wildlife
Local Assessment
Tahltan Areas of Interest
Tahltan Consent Area
Tahltan Regional AOI
Tahltan Territory
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.4-25
Author: Jennifer.D.Thompson
Filename: ESK-23-070l
SKEENA RESOURCES
Eskay Creek Revitalization
Figure 19.4-25:
Amphibian Ground Surveys and Confirmed Breeding Sites, 2020 and 2021
Skeena Mining Division - NTS 104B09
British Columbia, Canada
Scale: 1:100,000
Coord. System: NAD 1983 UTM Zone 9N
0 1 2 3
Kilometres
N

Wildlife Mortality

From 1988 to 2007 there was a total of 560 wildlife-related accidents across the 725 km of Highway 37 and 78 wildlife-related accidents across 66 km of Highway 37A (Sielecki 2010). Due to their small size vehicle-related mortalities of amphibians were not detected and recorded in this total but mortalities of amphibians due to vehicle collisions are expected to occur along Highway 37, particularly during rain events which facilitate seasonal dispersal, including mass-movement events (e.g., metamorphosed western toads moving into terrestrial habitats). For example, local knowledge indicates that there are seven toad crossing locations along Highway 37A and two along Highway 37 where mass-movement events have been observed (J. Jones, pers. comm., 5 May 2024). No similar information is available for Highway 37 north of Meziadin Junction.

19.4.11 Future Trends

Future trends in changes to wildlife habitat are correlated to changes in climatic conditions, as described in Section 19.4.2.5, Regional and Local Climate Projections. In particular, mean annual temperature and precipitation are predicted to rise in northwestern BC (Okane 2024). These changes in environmental variables are predicted to result in shifting BGC zones throughout northwestern BC. It is expected that by 2100, the Engelmann Spruce – Subalpine Fur, Boreal Altai Fescue Alpine, and Coastal Mountain-heather Alpine zones will be almost entirely lost within the Assessment Footprint and replaced by Mountain Hemlock and Interior Cedar Hemlock BGCs. The loss of variation in BGC and, ultimately, in vegetation communities in the Assessment Footprint may result in the loss of specialist species reliant on these vegetation communities and the decreased productivity of the ecosystem. Although the expansion and contraction of BGC zones are largely controlled by environmental factors working over large areas the localized loss of habitat which occurs with anthropogenic development may work to speed up these larger processes in local areas. Changes to BGC zones and wildlife habitat will occur over large geographic areas and changes within the LAA and RAA will occur with or without the Project.

Climate change is expected to also affect wildlife movement because changes in wildlife habitat will likely affect spatial and temporal aspects of wildlife migration and movements. Changes to animal movement may also include species stopping migration activities entirely which may result in larger ecosystem level effects. Other potential factors that may affect wildlife movement in the future includes increased linear disturbances, anthropogenic development, and vehicle traffic which can increase both physical and sensory disturbances. However, there are few reasonably foreseeable future projects within the RAA that could interact cumulatively (Section 19.7, Cumulative Effects Assessment).

Warming temperatures and increasing anthropogenic development in northern BC allow for the northern expansion of numerous generalist species which is altering ecosystem food webs (Bartley et al. 2019). An example of these range expansions can be seen in northern BC, where anthropogenic disturbance has allowed moose to access areas which they have not previously occupied (Mumma et al. 2018). The introduction of new predators to ecosystems can present adverse effects on wildlife mortality risks as prey species may not be able to physically or behaviourally adapt new predators. The factors resulting in the expansion or contraction of species' ranges will occur over large geographic areas and changes within the LAA and RAA will occur with or without the Project.

Future changes in wildlife health are likely to be primarily contributed to climate-related changes in species ranges and wildlife habitat. Changes in environmental variables due to climate change are likely to interact

with the prevalence, distribution, or intensity of pathogens (Gallana et al. 2013). The movement of new species into northern areas can increase the transmission of pathogens by introducing infection to previously unaffected hosts (i.e., chronic wasting disease; Latham et al. 2011; Sigurdson 2008). In contrast, some pathogens may be negatively affected by climate change (i.e., White-nose Syndrome; McClure et al. 2022). The climactic conditions, which are driving the transmission of pathogens, will occur over large geographic areas, and changes within the LAA and RAA will occur with or without the Project.

19.5 Potential Effects and Mitigation

19.5.1 Identification of Potential Interactions

As described in greater detail in Chapter 1, Project Overview, the proposed Project will restart mining at the past producing Eskay Creek Mine. The Project would include the construction of new infrastructure and the modification and use of existing infrastructure.

Project activities during Construction, Operations, Reclamation and Closure, and Post-closure phases have the potential to interact with the Wildlife and Wildlife Habitat VC, including changes to habitat, movement, mortality risk, and wildlife health. Table 19.5-1 provides an effects-scoping matrix of Project activities by their potential to interact with the Wildlife and Wildlife Habitat VC. A detailed description of Project activities and components listed in this table can be found in Chapter 1, Project Overview. Activities are separated into Project phases; however, activities can overlap between phases.

Within this matrix, the potential for interaction (positive or negative) is assigned a symbol as follows:

- **Empty circle (○):** an interaction between Project activities and the VC is not expected;
- **Half-filled circle (◐):** an interaction between Project activities and the VC is possible; and
- **Filled circle (●):** an interaction between Project activities and the VC is likely.

Table 19.5-1: Potential Interactions between Project Activities and the Wildlife and Wildlife Habitat Valued Component

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Construction (2 Years)	
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●
Operation of Eskay Creek MAR KM2 security gate and construction and operation of KM54.5 security gate	●
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●
Construction and use of mine site road infrastructure (new mine roads), including roadside diversion channels (non-contact water), collection channels (contact water), culverts and open bottom crossings	●
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Land clearing	●
Stripping and blasting (North Pit)—removal of topsoil and overburden, and initial access to waste rock and ore	●
Stockpiling topsoil and other material suitable for reclamation or construction uses	●
General earthworks, site levelling, foundations, buried services	●
Supply of concrete from existing offsite concrete batch plant	○
Construction of Process Plant and ancillary infrastructure (e.g., mine dry, administration building, warehousing, laboratory, medical) on existing disturbance area	●
Construction of crushing facilities, overland conveyor	●
Construction of tailings discharge and supernatant reclaim pipelines, and adjustments to the reclaim barge setup	●
Construction of water management systems, including ponds, sumps, channels, pipelines, and pumps	●
Construction of onsite electrical distribution system	●
Supply of electrical power from the regional system via an existing 69 kV Transmission Line to the onsite distribution system	○
Construction, commissioning, and operation of Mine Water Treatment Plant	●
Installation of groundwater wells and/or surface water intakes for Process Plant and/or potable use	●
Construction and operation of potable water and sewage treatment facilities, including onsite and offsite sewage sludge disposal	●
Construction of fuel storage (diesel, gasoline, and propane) facilities	●
Construction and operation of incinerators and burn pit	●
Construction of bulk explosives storage facility, Explosives and Detonator Magazine, and handling and storage of explosives	●
TMSF dam development (Stage 1: construct three starter embankment for North Dam)	●
Development of MRSA and ROM Pad	●
Construction of waste management facilities (storage of hazardous and non-hazardous wastes and materials prior to shipping offsite)	●
Use of existing onsite camps (MAR KM58, KM59 and Rig camps) prior to dismantling and removal during Construction	●
Expansion of Camp facilities on existing disturbance area near TMSF	●
Operation of Camp facilities near TMSF	●
Transportation of hazardous and non-hazardous wastes and materials for offsite disposal	●
Commissioning of Process Plant and associated facilities (e.g., crusher, overland conveyor) and initial processing of ore	●
Commissioning of tailings line and pumps (and initial deposition of water and tailings in TMSF), reclamation of water system, and other water management systems	●
Use of onsite laydown areas	●

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Use of Eskay Creek MAR KM2 laydown area	●
Storage of waste rock (MRSA/TMSF) development of ROM Pad, ore storage on ROM Pad	●
Construction of helipad for emergencies	●
Operation of helipad, including for emergencies	●
Procurement of employment and labour, services, goods, and use of infrastructure in the region	○
Operations (12 Years)	
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●
Operation of Eskay Creek MAR KM2 and KM54.5 security gates	●
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●
Maintenance of mine site road infrastructure (new mine roads and existing roads)	●
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●
Concentrate transportation from Process Plant to port facilities in the District of Stewart	●
Handling and storage of concentrate at port facilities in the District of Stewart, up to and including the point at which the loading of concentrate onto a vessel is complete	○
Land clearing	●
Stripping and blasting (South Pit)—removal of topsoil and overburden, and initial access to waste rock and ore	●
Stockpiling topsoil and other material suitable for reclamation or construction uses	●
Mining the North Pit and South Pit, including drilling, blasting, and excavation activities	●
Backfilling South Pit with waste rock	●
TMSF spillway construction and dam development (Stage 2: embankment raise of North Dam and South Dam; Stage 3, 4, and 5: subsequent embankment raises of North Dam and South Dam)	●
Use of MRSA and ROM areas, including onsite transportation of waste rock and ore by haul truck	●
Operation of water management systems including ponds, sumps, channels, pipelines, and pumps	●
Transportation of ore to crusher, and from crusher to Process Plant by conveyor	●
Transportation of waste rock to TMSF by haul truck	●
Storage of waste rock, tailings, and contact water in TMSF	●
Handling and storage of explosives and detonators	●
Operation of mine infrastructure facilities, crusher, and overland conveyor	●
Operation of ancillary infrastructure (e.g., Camp facilities, mine dry and administration building, warehousing, laboratory, medical facility)	●

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Mineral processing at Process Plant	●
Mill capacity expansion of Process Plant in Year 5 for throughput increase in Year 6 through Year 12	●
Conveyance of tailings and contact water from Process Plant and sumps to TMSF via pipeline	●
Operation of supernatant reclaim pipelines and adjustments to the reclaim barge setup	●
Supply of electrical power from the regional system via an existing 69 kV Transmission Line to the Eskay Creek Substation	○
Mine water treatment and discharge	●
Operation of potable water and sewage treatment facilities, including onsite and offsite sewage sludge disposal	○
Operation of groundwater wells and/or surface water intakes for Process Plant and/or potable use	○
Operation of maintenance and fuel storage facilities (e.g., diesel, gasoline, and propane)	●
Operation of incinerators and burn pits	●
Operation of waste management facilities (storage of hazardous and non-hazardous wastes and materials prior to shipping offsite)	●
Transportation of hazardous and non-hazardous wastes and materials for offsite disposal	●
Use of onsite laydown areas	●
Use of Eskay Creek MAR KM2 laydown area	●
Progressive reclamation of disturbed areas where possible, including backfilling South Pit with waste rock	●
Stockpiling topsoil and other material suitable for reclamation or construction uses	●
Operation of helipad, including for emergencies	●
Procurement of employment and labour, services, goods, and use of infrastructure in the region	○
Reclamation and Closure (3 Years)	
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●
Operation of Eskay Creek MAR KM2 and KM54.5 security gates	●
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●
Use of mine site road infrastructure (new mine roads and existing roads)	●
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●
Dismantling and removal of processing and mine support facilities	●
Dismantling and removal of ancillary infrastructure (e.g., Camp facilities, mine dry and administration building, warehousing, laboratory, medical facility, and first aid)	●

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Removal and disposal of hazardous wastes and materials	●
Recontouring landforms	●
Sampling and remediating contaminated soils	●
Cover placement in reclaimed areas, including soil and revegetation (e.g., seeding and planting native plant species)	●
Decommissioning and reclamation of mine site roads (including culverts), pipelines, and onsite electrical distribution system, if no longer required	●
Removal of security gatehouses (at Eskay Creek MAR KM54.5) if no longer required	●
Utilization of topsoil and overburden piles to recontour and scarify disturbed areas, as appropriate	○
Passive flooding of North Pit	●
Treatment of flooded North Pit water	●
Placement of vegetative cover over the MRSA	●
Closure activities associated with TMSF (e.g., tailings pipeline, recontouring of waste rock, dry cover system of NPAG waste rock)	●
Reclamation monitoring	●
Decommissioning of water management systems no longer required, such as diversion channels, and water collection sumps, channels, and ponds to reestablish natural flow paths where practicable	●
Mine water treatment (and maintenance of water management structures) to achieve stable long-term drainage and water quality objectives	●
Dismantling and removal of potable water and sewage treatment facilities	●
Decommissioning of groundwater wells and/or surface water intakes for Process Plant and/or potable use	●
Dismantling and removal of maintenance and fuel storage facilities (e.g., diesel, gasoline, and propane)	●
Dismantling and removal of incinerators, and reclamation of the burn pit	●
Removal of mining equipment	●
Operation of helipad, including for emergencies	●
Procurement of employment and labour, services, goods, and use of infrastructure in the region	○
Post-closure	
Maintaining site access as required	●
Environmental monitoring	●
Mine water treatment (and water management structures to achieve stable long-term drainage and water quality objectives, until no longer required	●
Dismantling and removal of Mine Water Treatment Plant, if no longer required	●
Engineering inspections of TMSF embankments and spillway, and MRSA	●
Implementation of follow-up measures, maintenance, and repairs as required	●

Project Activities and Phase	Potential for Interaction with Wildlife and Wildlife Habitat[1]
Operation of helipad, including for emergencies	●
Procurement of employment and labour, services, goods, and use of infrastructure in the region	○

Notes:

Eskay Creek MAR = Mine Access Road; MRSA = Mine Rock Storage Area; NPAG = non-potentially acid generating; ROM = Run of Mine; Sub-VC = Sub-valued Component; TMSF = Tom MacKay Tailings Storage Facility

KM = kilometre marker; km = kilometre; kV = kilovolt

[1] Potential for interaction is not identified for each Sub-VC because the interactions are anticipated to affect most Sub-VCs similarly (e.g., direct and indirect habitat loss or alteration is anticipated to affect all Sub-VCs).

○ *= interaction not expected.*

◐ *= possible interaction.*

● *= likely interaction.*

This evaluation considers any embedded controls (i.e., physical or procedural controls that are planned as part of the Project design). An example of an embedded control is a standard acoustic enclosure that is designed to be installed around a piece of major equipment. Cells coded as *not expected* (empty circle) are considered to have no potential for an interaction with the VC and are scoped out of further assessment. Interactions considered possible or likely are carried forward to the next step in the assessment.

19.5.2 Identification of Potential Effects

The Project's potential effects on the Wildlife and Wildlife Habitat VC were identified during engagement with Indigenous Nations, government agencies, local governments, and public and private stakeholders. For example, the Tahltan Nation raised general concerns in relation to wildlife which reflect the cultural importance of certain species described in Indigenous Knowledge (TEEM 2024, Section 19.4). Potential effects have also been identified through a review of best management practices (BMPs) and scientific literature, technical expertise, and professional judgment, as described in Chapter 10, Valued Component Effects Assessment Methods. These potential effects, as outlined in the Hybrid AIR (EAO 2023b), are as follows:

- Change in habitat;
- Change in movement (corridors);
- Change in mortality risk; and
- Change in wildlife health.

For each potential effect on the Wildlife and Wildlife Habitat VC, effect pathways and assessment parameters have been established to facilitate the quantitative or qualitative assessment of existing conditions and potential residual and cumulative effects on the VC and Sub-VCs (i.e., moose, mountain goat, furbearers, bats, raptors, waterbirds, upland breeding birds, and amphibians; Chapter 9, Valued Component Selection). While the assessment of potential effects used quantifiable assessment parameters where possible (e.g., direct loss of habitat), not all potential effects are amenable to quantitative methods (e.g., predicted change in mortality risk). A qualitative assessment was therefore undertaken using scientific literature, Indigenous Knowledge, verified environmental assessment predictions from similar projects, and professional judgment.

The potential effects, effect pathways (i.e., mechanism that results in, and interaction between the Project and the VC), and assessment parameters used in the Wildlife and Wildlife Habitat VC assessment to assess how the effects of the Project will interact with the VC, are described in Table 19.5-2. Any potential effects due to spills, equipment malfunctions, emergencies, or accidents are assessed in Chapter 29, Malfunctions and Accidents.

Table 19.5-2: Potential Effects, Effect Pathways, and Assessment Parameters for the Wildlife and Wildlife Habitat Valued Component

Potential Effects	Effect Pathways	Assessment Parameters
Change in Habitat	Direct loss or alteration of wildlife habitat (e.g., land clearing). Indirect loss or alteration of wildlife habitat (e.g., sensory disturbance, edge effects, altered surface water flows).	Quantitative evaluation of the amount (ha) of habitat directly and indirectly lost or altered for: • Moose; • Mountain goat; and • Furbearers (i.e., grizzly bear, wolverine, marten, fisher, hoary marmot). Qualitative evaluation of the amount of habitat directly and indirectly lost or altered for: • Black bear; • Bats; • Raptors; • Waterbirds; • Upland Breeding Birds; and • Amphibians. Qualitative evaluation of potential effects on known sensitive wildlife features (e.g., dens). Quantitative evaluation of potential effects on critical habitat.
Change in Movement	Alteration of large-scale wildlife movement patterns or movement corridors.	Qualitative evaluation of Project activities on wildlife movement.
Change in Mortality Risk	Direct increase in mortality risk (e.g., land clearing activities, vehicular collisions, human–wildlife conflicts). Indirect increase in mortality risk (e.g., altered predator-prey dynamics, harvest pressure).	Qualitative evaluation of direct mortality risk: • Risk of mortality due to land clearing and site preparation; • Risk of collisions with Project vehicles (e.g., increase in annual daily traffic volumes) or infrastructure; and • Risk of human–wildlife conflict. Qualitative evaluation of indirect mortality risk: • Predation risk due to change in predator-prey dynamics (e.g., change in predator mobility); and • Hunting/trapping harvest pressure (e.g., year-round access or access to new areas).
Change in Wildlife Health	Exposure to contaminants or other emissions that may affect the health of wildlife and wildlife habitat.	Evaluate the potential that the Project could result in ecological receptors (i.e., mammals, birds, reptiles, amphibians) experiencing adverse health effects as a result of exposure to COPC.

Notes:

COPC = contaminant of potential concern (e.g., contaminants, chemical hazards)

ha = hectares

To further focus the assessment, Table 19.5-3 identifies and ranks the potential for a Project activity to result in an effect on a VC, as follows:

- **Empty circle (O):** no potential for an effect anticipated; no further consideration is warranted in the assessment.
- **Blue (●):** negligible to minor potential for an adverse effect; implementation of best practices, standard mitigation and management measures; no monitoring required; no further consideration is warranted in the assessment.
- **Yellow (●):** moderate potential for an adverse effect; may require unique active management, mitigation, and/or monitoring; warrants further consideration in the assessment.
- **Red (●):** high potential for an adverse effect; warrants further consideration in the assessment.
- **Plus (+):** potential for positive effect; warrants further consideration in the assessment.

Supporting rationale for assigned rankings is provided in the discussion of potential effects below.

Table 19.5-3: Ranking Potential for Effects on the Wildlife and Wildlife Habitat Valued Component

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Construction (2 Years)				
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●	●	●	O
Operation of Eskay Creek MAR KM2 security gate and construction and operation of KM54.5 security gate	●	O	O	O
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●	●	●	O
Construction and use of mine site road infrastructure (new mine roads), including roadside diversion channels (non-contact water), collection channels (contact water), culverts and open bottom crossings	●	O	O	O
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●	O	O	O
Land clearing	●	●	●	O
Stripping and blasting (North Pit)—removal of topsoil and overburden, and initial access to waste rock and ore	●	O	O	O
Stockpiling topsoil and other material suitable for reclamation or construction uses	●	O	O	O
General earthworks, site levelling, foundations, buried services	●	O	●	O
Construction of Process Plant and ancillary infrastructure (e.g., mine dry, administration building, warehousing, laboratory, medical) on existing disturbance area	●	O	O	O
Construction of crushing facilities, overland conveyor	●	O	O	O

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Construction of tailings discharge and supernatant reclaim pipelines, and adjustments to the reclaim barge setup	●	○	○	○
Construction of water management systems, including ponds, sumps, channels, pipelines, and pumps	●	○	●	○
Construction of onsite electrical distribution system	●	○	○	○
Construction, commissioning, and operation of Mine Water Treatment Plant	●	○	○	○
Installation of groundwater wells and/or surface water intakes for Process Plant and/or potable use	●	○	○	○
Construction and operation of potable water and sewage treatment facilities, including onsite and offsite sewage sludge disposal	●	○	○	○
Construction of fuel storage (diesel, gasoline, and propane) facilities	●	○	○	○
Construction and operation of incinerators and burn pit	●	○	○	○
Construction of bulk explosives storage facility, Explosives and Detonator Magazine, and handling and storage of explosives	●	○	○	○
TMSF dam development (Stage 1: construct three starter embankment for North Dam)	●	○	○	○
Development of MRSA and ROM Pad	●	○	○	○
Construction of waste management facilities (storage of hazardous and non-hazardous wastes and materials prior to shipping offsite)	●	○	○	○
Use of existing onsite camps (MAR KM58, KM59 and Rig camps) prior to dismantling and removal during Construction	●	○	○	○
Expansion of Camp facilities on existing disturbance area near TMSF	●	○	○	○
Operation of Camp facilities near TMSF	●	○	○	○
Transportation of hazardous and non-hazardous wastes and materials for offsite disposal	●	○	○	○
Commissioning of Process Plant and associated facilities (e.g., crusher, overland conveyor) and initial processing of ore	●	○	○	○
Commissioning of tailings line and pumps (and initial deposition of water and tailings in TMSF), reclamation of water system, and other water management systems	●	○	○	○
Use of onsite laydown areas	●	○	○	○
Use of Eskay Creek MAR KM2 laydown area	●	○	○	○
Storage of waste rock (MRSA/TMSF) development of ROM Pad, ore storage on ROM Pad	●	○	○	○
Construction of helipad for emergencies	●	○	○	○
Operation of helipad, including for emergencies	●	○	○	○

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Operations (12 Years)				
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●	●	●	○
Operation of Eskay Creek MAR KM2 and KM54.5 security gates	○	○	●	○
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●	●	●	○
Maintenance of mine site road infrastructure (new mine roads and existing roads)	●	○	○	○
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●	○	○	○
Concentrate transportation from Process Plant to port facilities in the District of Stewart	●	●	●	●
Land clearing	●	○	○	○
Stripping and blasting (South Pit)—removal of topsoil and overburden, and initial access to waste rock and ore	●	○	○	○
Stockpiling topsoil and other material suitable for reclamation or construction uses	●	○	○	○
Mining the North Pit and South Pit, including drilling, blasting, and excavation activities	●	○	○	○
Backfilling South Pit with waste rock	●	○	○	○
TMSF spillway construction and dam development (Stage 2: embankment raise of North Dam and South Dam; Stage 3, 4, and 5: subsequent embankment raises of North Dam and South Dam)	●	○	○	○
Use of MRSA and ROM areas, including onsite transportation of waste rock and ore by haul truck	●	○	○	○
Operation of water management systems including ponds, sumps, channels, pipelines, and pumps	●	○	●	○
Transportation of ore to crusher, and from crusher to Process Plant by conveyor	●	○	○	○
Transportation of waste rock to TMSF by haul truck	●	○	○	○
Storage of waste rock, tailings, and contact water in TMSF	●	○	○	○
Handling and storage of explosives and detonators	●	○	○	○
Operation of mine infrastructure facilities, crusher, and overland conveyor	●	○	○	○
Operation of ancillary infrastructure (e.g., Camp facilities, mine dry and administration building, warehousing, laboratory, medical facility)	●	○	○	○
Mineral processing at Process Plant	●	○	○	○

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Mill capacity expansion of Process Plant in Year 5 for throughput increase in Year 6 through Year 12	●	○	○	○
Conveyance of tailings and contact water from Process Plant and sumps to TMSF via pipeline	●	○	○	○
Operation of supernatant reclaim pipelines and adjustments to the reclaim barge setup	●	○	○	○
Mine water treatment and discharge	○	○	○	●
Operation of maintenance and fuel storage facilities (e.g., diesel, gasoline, and propane)	●	○	○	○
Operation of incinerators and burn pits	●	○	○	○
Operation of waste management facilities (storage of hazardous and non-hazardous wastes and materials prior to shipping offsite)	●	○	●	●
Transportation of hazardous and non-hazardous wastes and materials for offsite disposal	●	○	○	○
Use of onsite laydown areas	●	○	○	○
Use of Eskay Creek MAR KM2 laydown area	●	○	○	○
Progressive reclamation of disturbed areas where possible, including backfilling South Pit with waste rock	●	○	○	○
Stockpiling topsoil and other material suitable for reclamation or construction uses	●	○	○	○
Operation of helipad, including for emergencies	●	○	○	○
Reclamation and Closure (3 Years)				
Vehicle transportation of personnel, equipment, materials, and other goods to and from offsite (highways) to mine site along the Eskay Creek MAR	●	●	●	○
Operation of Eskay Creek MAR KM2 and KM54.5 security gates	○	○	●	○
Transportation of personnel, equipment, materials, and other goods on Project mine site roads (new mine roads and existing roads)	●	●	●	○
Use of mine site road infrastructure (new mine roads and existing roads)	●	○	○	○
Charter flights to and from Bob Quinn Lake Aerodrome to transport workers in and out of the site and for emergencies	●	○	○	○
Dismantling and removal of processing and mine support facilities	●	○	○	○
Dismantling and removal of ancillary infrastructure (e.g., Camp facilities, mine dry and administration building, warehousing, laboratory, medical facility, and first aid)	●	○	●	○
Removal and disposal of hazardous wastes and materials	●	○	○	○
Recontouring landforms	●	●	○	○

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Sampling and remediating contaminated soils	●	○	○	●
Cover placement in reclaimed areas, including soil and revegetation (e.g., seeding and planting native plant species)	●	●	○	○
Decommissioning and reclamation of mine site roads (including culverts), pipelines, and onsite electrical distribution system, if no longer required	●	●	○	○
Removal of security gatehouses (at Eskay Creek MAR KM54.5) if no longer required	●	○	○	○
Passive flooding of North Pit	●	○	○	○
Treatment of flooded North Pit water	○	○	○	●
Placement of vegetative cover over the MRSA	●	○	○	○
Closure activities associated with TMSF (e.g., tailings pipeline, recontouring of waste rock, dry cover system of NPAG waste rock)	●	○	○	○
Reclamation monitoring	●	○	○	○
Decommissioning of water management systems no longer required, such as diversion channels, and water collection sumps, channels, and ponds to reestablish natural flow paths where practicable	●	○	○	○
Mine water treatment (and maintenance of water management structures) to achieve stable long-term drainage and water quality objectives	○	○	○	●
Dismantling and removal of potable water and sewage treatment facilities	●	○	○	○
Decommissioning of groundwater wells and/or surface water intakes for Process Plant and/or potable use	●	○	○	○
Dismantling and removal of maintenance and fuel storage facilities (e.g., diesel, gasoline, and propane)	●	○	○	○
Dismantling and removal of incinerators, and reclamation of the burn pit	●	○	○	○
Removal of mining equipment	●	○	○	○
Operation of helipad, including for emergencies	●	○	○	○
Post-closure				
Maintaining site access as required	●	●	○	○
Environmental monitoring	●	○	○	○
Mine water treatment (and water management structures to achieve stable long-term drainage and water quality objectives, until no longer required	○	○	○	●
Dismantling and removal of Mine Water Treatment Plant, if no longer required	●	○	○	○
Engineering inspections of TMSF embankments and spillway, and MRSA	●	○	○	○

Project Activities and Phase	Potential Effects			
	Change in Habitat[1]	Change in Movement	Change in Mortality Risk	Change in Wildlife Health
Implementation of follow-up measures, maintenance, and repairs as required	●	○	○	○
Operation of helipad, including for emergencies	●	○	○	○

Notes:

Eskay Creek MAR = Eskay Creek Mine Access Road; MRSA = Mine Rock Storage Area; NPAG = non-potentially acid generating; ROM = Run of Mine; TMSF = Tom MacKay Tailings Storage Facility

KM = kilometre marker; km = kilometre; kV = kilovolt

○ = *No potential for an effect anticipated; no further consideration is warranted in the assessment*

● = *Negligible to minor potential for an adverse effect; implementation of best practices, standard mitigation and management measures; no monitoring required; no further consideration is warranted in the assessment*

● = *Moderate potential for an adverse effect; may require unique active management, mitigation, and/or monitoring; warrants further consideration in the assessment*

● = *High potential for an adverse effect; warrants further consideration in the assessment*

[1] *Most Project activities will result in emissions such as sensory disturbances (e.g., noise, light) and dust that can result in an indirect loss or alteration of habitat.*

19.5.2.1 Negligible Interactions

Potential interaction associated with Project activities marked with blue circles in Table 19.5-3 are briefly discussed in this section. Minor interactions are expected to become negligible following the application of standard mitigation measures, which are also briefly discussed. Negligible to minor interactions are not considered further in the assessment.

Interactions associated with Project activities marked with yellow or red circles in Table 19.5-3 are discussed in greater detail in Section 19.5.2.2, Likely Interactions.

Change in Habitat

Habitat can be defined as an area containing the array of resources, physical factors, and biological factors necessary to support the survival and reproduction of a species (e.g., food, water, shelter, and absence of predators and competitors). Changes to habitat can alter a species' ability to carry out basic life requisites such as breeding, hibernating, and overwintering. Except for land clearing, all other activities will not result in the direct loss of wildlife habitat. Operation of the Project may require some minor land clearing during the Operations phase, but because most land clearing will occur during the Construction phase (Section 19.5.2.2, Likely Interactions), land clearing is collectively assessed under the Construction phase and is assumed to be negligible for the Operations phase. However, most other Project activities are anticipated to result in the indirect loss or alteration of habitat through the emission of sensory disturbance or dust and are discussed in Section 19.5.2.2, Likely Interactions.

Several Project activities during the Reclamation and Closure, and Post-closure phases are anticipated to remove mine infrastructure and/or reclaim disturbed lands for wildlife and an adverse effect is not anticipated. However, the demolition of buildings has the potential to remove habitat for nesting birds (e.g., barn swallow) and roosting bats, but the adverse effect is expected to be negligible following the application of standard mitigation measures such as avoiding clearing during the nesting season

(Section 19.5.3, Mitigation Measures and Effectiveness). Additionally, there will be an overall reduction in the amount and intensity of activity during the Reclamation and Closure, and Post-closure phases, including a reduction and eventual elimination of sensory disturbance and dust emissions (i.e., indirect loss or alteration of habitat). This overall reduction in activity is expected to improve conditions for wildlife habitat compared to the Construction and Operations phases and an adverse effect is not anticipated.

Change in Movement

Physical and sensory barriers caused by Project infrastructure and activities can fragment wildlife habitats and restrict or hinder their movement. The ability to move freely between habitats is important for a species' persistence and barriers to movement can reduce access to resources, alter seasonal movement patterns and dispersal events (Johnson et al. 1992; Nathan et al. 2008; Ament et al. 2014), and reduce reproductive success and gene flow (Hanski 1994 and 1999; Tewksburry et al. 2002). However, land clearing activities will not create linear disturbances extending beyond the Assessment Footprint that could alter wildlife movements (e.g., transmission lines) and the Project will use the existing MAR; therefore, the Project is not anticipated to create physical barriers to wildlife movement from linear feature development.

During the Reclamation and Closure and Post-closure phases, there will be reclamation activities that remove movement barriers and an overall reduction in the amount and intensity of activity from the existing conditions which will reduce sensory barriers (e.g., transportation activities). This overall reduction in activity is expected to improve conditions for wildlife movement compared to the Construction and Operations phases and an adverse effect is not anticipated.

Change in Mortality Risk

Wildlife mortalities can occur directly or indirectly from human activities. Mortalities may result directly from collisions with vehicles and infrastructure, destruction or abandonment of residences, and removal of animals attracted to the site. Indirect mortalities may occur from loss or modification of habitat leading to changes in abundance or distribution of predator and prey species and construction of linear disturbances such as roads that increase predator–prey interactions and access for hunters and trappers. Tahltan has previously expressed concerns regarding improved access for hunters and predators because of new access roads for development projects, and the risks posed by increased traffic along development access roads and public routes like Highway 37 (Pretium Resources 2014b; Seabridge Gold Inc. 2013c).

During Construction, site preparation activities that include land clearing and general earthworks have the potential to result in a direct increase in mortality risk for less mobile wildlife species such as amphibians, rodents, or fledgling birds, or those that burrow or hibernate in the soil (e.g., hoary marmot, black bear). Land clearing will result in the physical removal of up to 2,123.7 ha of wildlife habitat (see Table 19.6-2 in Section 19.6) but the potential for an adverse effect is expected to be negligible following the application of standard mitigation measures (Section 19.5.3, Mitigation Measures and Effectiveness), including to:

- Avoid key wildlife habitat features (e.g., dens, salt licks, nests, hibernacula, roosts, and breeding sites);
- Avoid clearing vegetation during wildlife-sensitive periods at these locations;
- When it is not possible to avoid wildlife-sensitive periods, conduct pre-clearing surveys and buffer any identified residences or breeding sites. Salvage amphibians and marmots if they are discovered in areas to be cleared (using a suitable wildlife permit);
- Minimize the size of any new cleared areas;

- Minimize disturbance to adjoining vegetation communities; and
- Minimize direct wildlife habitat loss by reusing existing disturbances, where possible, and completing timely reclamation.

Construction of water management systems, such as drainage ditches and water collection sumps and ponds, has the potential to increase wildlife mortality risk by creating open excavations that could entrap wildlife. However, the potential for an adverse effect is expected to be negligible following the application of standard mitigation measures such as installing exclusionary fencing (Section 19.5.3, Mitigation Measures and Effectiveness).

During Operations, Project activities have the potential to increase mortality risk for some wildlife species as is described above for the Construction phase. Maintenance activities of infrastructure (e.g., roads) may occasionally require land clearing, and the operation of water management systems may entrap wildlife or result in drownings, but the adverse effect is expected to be negligible following the application of standard mitigation measures. Waste generated by the Project, particularly putrescent waste such as food waste, has the potential to attract wildlife (e.g., bears) which could result in human–wildlife encounters and increased mortality risk, although the removal of habituated individuals. However, the potential for an adverse effect is expected to be negligible following the application of standard mitigation measures such as storing waste in wildlife-proof containers, including trash cans and dumpsters with a bear-resistant design and considerations to contain odours (Section 19.5.3, Mitigation measures and Effectiveness). Additionally, policies against feeding wildlife and littering will be implemented and a bear awareness and response program will be implemented to further reduce the potential for adverse interactions.

The existing Eskay Creek MAR is gated near Highway 37 and access is controlled, eliminating the potential for indirect mortality risks associated with creating or enhancing access for hunters/trappers and predators to portions of the LAA that were previously more isolated. Additionally, the Project will not create linear disturbances (e.g., transmission lines) that extend beyond the Assessment Footprint, which could alter predator-prey dynamics. Therefore, a negligible potential for indirect mortality risk to wildlife is expected.

The Reclamation and Closure and Post-closure phases will result in an overall reduction in the amount and intensity of activity that will generally reduce wildlife mortality risks. Notably, the reduction and eventual elimination of the transportation of personnel and goods will remove the primary pathway for an increase in direct mortality risk (i.e., vehicle collisions). The dismantling and removal of ancillary infrastructure has the potential to result in increased mortality risk for nesting birds (e.g., barn swallow) and roosting bats, but the adverse effect is expected to be negligible following the application of standard mitigation measures such as avoiding clearing during the nesting season (Section 19.5.3, Mitigation Measures and Effectiveness).

Change in Wildlife Health

In the consultation process for other mine projects in the region, TSKLH has raised concerns about the contamination of country foods and resulting effects on wildlife consumption (Pretium Resources 2014a), and the Tahltan Nation has previously expressed concerns regarding the potential role of spills on wildlife species (NovaGold Canada Inc. 2006a). In relation to the current Project, the Tahltan Nation has also raised general concerns around contaminants (TEEM 2024).

Construction of the Project has the potential to result in emissions, wastes, and discharges that may be deposited into the environment (e.g., dust, water) that have the potential to result in adverse effects on

wildlife health. However, the potential for an adverse effect is expected to be negligible following the application of standard mitigation measures (Section 19.5.3, Mitigation Measures and Effectiveness).

Treated water from the mine water treatment plant will be discharged to the receiving environment (i.e., Tom MacKay Creek) utilizing a discharge location that is located downstream of the TMSF North Dam, and immediately downstream of the existing TM1 permitted discharge location that will be covered as the North Dam is developed. Water from the Project site will be treated; however, exceedances of water quality guidelines relevant to wildlife health are predicted for total selenium. Additionally, the following Project-specific plans will be developed and implemented to eliminate or reduce the potential for deleterious substances to enter the environment that could result in adverse effects on the Wildlife and Wildlife Habitat VC as it relates to a change in wildlife health:

- Erosion and Sediment Control Plan;
- Air Quality and Fugitive Dust Control Management Plan; and
- Aquatic Effects Monitoring Plan.

A description of the above plans is provided in Appendix A-1, Summary of Management Plans and Mitigation Measures, and the Metal Leaching/Acid Rock Drainage Management Plan and the Mine Site Water Management Plan have been developed and are included in full in Appendix A-1, Summary of Management Plans and Mitigation Measures.

The accidental release of hazardous contaminants (e.g., spills) is assessed in Chapter 29, Malfunctions and Accidents, and is not considered in the Wildlife and Wildlife Habitat VC assessment.

Along the TCAA, air quality modelling predicts overall low dust deposition rates (i.e., less than or equal to [≤] 2.0 milligrams per square decimetre per day (mg/dm^2/day); Chapter 12, Air Quality) and standard mitigation (e.g., wetting and tarping concentrate loads) will be used to reduce or eliminate the potential for concentrate-containing dust to be deposited into the environmental during transportation.

Within the LAA and Assessment Footprint, baseline soil testing indicated that arsenic, chromium, nickel, antimony, copper, molybdenum, zinc, and selenium concentration are present in both the LAA and Assessment Footprint at levels that, in some samples, exceeded Canadian Council of Ministers of the Environment soil quality guidelines for parkland regions (Chapter 17, Terrain and Soils), which is common for mountainous areas that are naturally metalliferous. Air quality modelling results predict that Project operations will result in dust emissions that will contain increased concentrations of these metals, which will primarily be deposited in a localized area to the northeast of the Assessment Footprint and will generally be confined to within the LAA. Wildlife species most likely to be adversely affected are those that are non-migratory with small home ranges, which results in continuous exposure to elevated levels of COPC. For example, relatively wide-ranging species, such as moose and grizzly bear, are not expected to be continuously exposed to elevated concentrations of COPC resulting from dust deposition in localized areas near the Project, and adverse health risks are negligible. Conversely, hoary marmot is at greater risk of experiencing adverse health effects because in addition to burrowing into soil (dermal contact) and consuming water, vegetation, and soil (inadvertently), the species is non-migratory with a small home range size, which means it may be continuously exposed to elevated concentrations of COPC. However, the area to the northeast of the Assessment Footprint where dust deposition and corresponding exceedances of COPC are predicted to be the greatest, contains only small patches of low-suitability habitats for hoary

marmot (Appendix 19-3, Wildlife Habitat Suitability Baseline) and the species or supporting habitat were not detected during baseline field surveys (Appendix 19-1, Wildlife Cumulative Baseline Report 2020–2021).

Within the Assessment Footprint, exceedances of BC selenium water quality guidelines to protect wildlife are predicted for water and aquatic invertebrate tissues (as a dietary item for wildlife) in Tom MacKay Creek and Ketchum Creek during Operations (Chapter 16, Fish and Fish Habitat Effects Assessment). Wildlife most likely to be aversely affected by changes in water quality parameters are aquatic-dependent wildlife such as waterbirds and amphibians; however, few waterbirds and amphibians have been observed using these fast-flowing watercourses in the LAA (Appendix 19-1, Wildlife Cumulative Baseline Report 2020–2021), suggesting these watercourses provide limited foraging habitat for wildlife. Food web accumulation of selenium in these areas is unlikely to occur in wildlife.

Predictions of the concentrations of COPC concentrations in game animal (large mammals, small mammals, and birds) tissues are provided in the Appendix 20-1, Human Health Risk Assessment, using a food chain model for all phases of the Project, indicating potential uptake of metals through diet. Predicted tissue concentrations are representative of animal populations in the area outside of the Assessment Footprint which are of relevance to human health. The information presented here does not represent animal tissue metal concentrations within the Assessment Footprint, where no data is available. Incremental changes are calculated as the modelled 95% ULCM (upper confidence limit of the mean; representing a feasible upper case concentration) divided by the base case concentration. Values of 1 indicate no predicted change in metal concentrations in from base case scenarios for that COPCs, values greater than 1 represent potentially increasing metal concentrations. Concentrations are presented on a wet weight basis of tissues, where literature values typically report in dry weight, thus caution is advised in interpretation of results. For example, animal muscle tissue moisture rates are approximately 75%, suggesting that wet weight concentrations of COPCs would be approximately 1/4 of dry weight concentrations. Methods and data sources are described in detail in Appendix 20-1, Human Health Risk Assessment.

Tissue metal concentrations of antimony, bismuth, boron, molybdenum, selenium, thallium and uranium are predicted to increase by at least 2 times in wildlife tissues in Operations, with antimony, and uranium remaining elevated through the Post-closure phase (Appendix 20-1, Human Health Risk Assessment). Tissue quality guidelines for the protection of wildlife health have not been developed for metals besides selenium, due to availability of data. However, predictions of small increases in tissue concentrations of antimony, bismuth, boron, thallium and uranium are not expected to result in toxicity to wildlife. Increasing tissue concentrations of molybdenum in animal tissues can result in some toxicity in wildlife; ruminants are particularly susceptible to molybdenosis (Stone et al. 1983); however, maximum predicted tissue concentrations of 1.6 mg/kg ww are consistent with liver tissue concentrations observed in healthy moose populations (0.3 to 1.1 mg/kg ww; Frøslie et al. 1984, 0.9 ± 0.4 mg/kg ww; Gamberg et al. 2005) and thus changes in molybdenum concentrations in large mammal liver tissues are not expected result in adverse effects.

The maximum tissue concentration of selenium of 2.5 mg/kg ww (or approximately 10 mg/kg dw) was predicted to occur in large mammal liver tissues. This maximum predicted concentration could potentially exceed the chronic selenium tissue guideline level for the protection of wildlife health is 6 µg/g dw (Ministry of Environment and Climate Change Strategy [ENV] 2014); however, there is great uncertainly in the applicability of the guideline to wildlife. The wildlife tissue guideline applies to bird eggs and there is no current guidance for mammals. Toxicity studies on aquatic-dependent mammals or other small mammal species exposed to selenium contamination have not yet yielded tissue concentration-response

relationships with selenium for mammalian wildlife (ENV 2014). Studies to date, however, suggest that aquatic-dependant mammals may be less sensitive to selenium than fish or birds (Janz et al. 2010). Predicted concentrations of selenium in other game animal tissues fell well below the chronic tissue guideline (Appendix 20-1, Human Health Risk Assessment).

Bioaccumulation of molybdenum can lead to molybdenosis toxicity, a condition where wildlife are unable to absorb copper, particularly where copper occurs at low concentrations (Ward 1994). Ruminant mammals (including cattle, sheep, goats, deer, and moose) are generally recognized to be tenfold more susceptible to molybdenosis than non-ruminant mammals given the unique physiology of their digestive tract (Blakley 2017). Therefore, molybdenosis presents the greatest risk to moose and mountain goat.

Project water quality modelling predicted elevated total molybdenum concentrations in surface water in all the evaluated waterbodies except Harrymel Creek. However, the BC wildlife guideline for molybdenum (0.034 milligrams per litre [mg/L]) is only exceeded in Tom MacKay Creek (by 1.8 times), and Ketchum Creek (up to 1.3 times) within the Assessment Footprint, having highest peaks during 3 years of Operations, and mainly during winter months (March of 2033 to 2036; Chapter 15, Surface Water Valued Component Effects Assessment). Conservatism is incorporated into the derivation of the provincial water quality guidelines for wildlife which is based on sensitivity of white-tailed deer and applied to all ruminant wildlife species (ENV 2021). The species-specific water quality guidelines for moose (0.040 mg/L) and goats (livestock; 0.036 mg/L) are slightly higher than the general water quality guidelines, somewhat reducing the predicted risk of exposure to molybdenum in water to moose and mountain goat from what is presented in Chapter 15, Surface Water Valued Component Effects Assessment.

Increases in tissue concentrations in individual moose and mountain goats could occur as result of exposure to molybdenum in water of Tom MacKay Creek and Ketchum Creek, as these watercourses and their valleys are predicted to provide suitable winter habitat. However, suitable habitat is expected to be lower in the winter and individuals are likely to move seasonally up and down the elevation and not spend extended time exclusively in one area, reducing the overall risk of exposure to molybdenum over time. Generally, wildlife are less likely to be exposed to high molybdenum concentrations from a point source because they are not confined to one area and exposure to molybdenum is amortized through grazing (and incidental soil ingestion) and drinking surface water over a wider geographic area (ENV 2021). Additionally, the Human Health Risk Assessment predicts minimal changes in tissue concentrations for animals outside of the Project Footprint and the range of moose and mountain goats would include areas inside and outside of the Project Footprint representing a prediction relevant to the overall population, although some individuals may occasionally be exposed to higher concentrations for limited periods of time. Water quality monitoring will be implemented in watercourses in the area of the Project and compared to monitoring criteria established for the protection of wildlife and adaptive management will be implemented, if necessary.

The Project is not predicted to result in an adverse effect on the Wildlife and Wildlife Habitat VC within the TCAA or LAA as it relates to changes in wildlife health and this potential effect is not advanced further in the assessment.

19.5.2.2 Likely Interactions

Interactions associated with Project activities marked with yellow or red circles in Table 19.5-3 are discussed in greater detail in this section, including their effect pathways, and advanced into the assessment of residual effects (Section 19.6, Characterization of Residual Effects).

Change in Habitat

The primary pathway for a direct change in habitat during construction is through land clearing as part of the site preparation activities that will result in a loss or alteration of wildlife habitat where the removal of upland and wetland habitat in the Project Footprint is required. Site preparation activities may occur progressively over time. General earthworks and site levelling have the potential to result in the direct loss or alteration of habitat for wildlife species that may inhabit disturbed sites (e.g., common nighthawk), if present. However, if these species are present, it is anticipated that the Assessment Footprint would provide similar habitats for these species, and not all habitat in the Assessment Footprint will be lost (although assumed so for the purposes of this assessment). Land clearing is also a primary pathway for an indirect change in habitat during construction that will result in the loss or alteration of habitats for wildlife through edge effects, windthrow, and fragmentation.

Edge effects are abiotic (physical) or biotic (biological) changes in the vegetation community structure that occur at the boundary of two or more different habitats. Abiotic changes at forest edges such as increased solar radiation and wind exposure following tree removal can alter the structure, composition, and function of the surrounding vegetation community. Resulting effects on wildlife can include changes in wildlife community structure (Schmiegelow et al. 1997), increased nest predation (Paton 1994), or behavioural responses (Machtans 2006) that are particularly harmful to breeding songbird species. Abiotic effects on vegetation fragmented generally do not extend beyond 100 m and changes associated with microclimate primarily occur within one tree length of the dominant trees (Spittlehouse et al. 2004). Trees remaining along the edges of cleared forests are more susceptible to disease, insect attacks, and windfall depending on the magnitude of change (Saunders et al. 1991; Chen et al. 1995). Edge effects on wildlife may be less pronounced in more open habitats, such as the Project Footprint which is located at higher elevations in non-treed or sparsely treed areas.

Windthrow refers to trees uprooted by wind and is common along newly created forest edges where trees have not been previously exposed to wind. The risk of windthrow can be elevated by site conditions such as high wind speeds or soil conditions that restrict root depth or reduce soil friction, such as shallow or wet soils. Windthrow can extend over 100 m into forest stands (Burton 1991); however, most windthrow is expected within 10 to 20 m of forest edges (Stathers et al. 1994). An increase in fire hazard and insect epidemics may occur when downed trees are not salvaged (Stathers et al. 1994). Windthrow has the greatest potential to occur along cleared forest edges within the first few years after construction, after which trees become more windfirm as they adjust to new levels of wind exposure.

Fragmentation occurs when previously continuous ecosystems become separated or fragmented due to land clearing and the development of infrastructure. The resulting patches of habitat are likely to support less biodiversity than the previously intact ecosystems (Saunders et al. 1991) by affecting ecological processes, including biomass and nutrient cycles (Haddad et al. 2015), species interactions (e.g., plant-pollinator [Rahimi and Jung 2023], predator-prey [Haapakoski et al. 2013], competition [Buskirk et al. 1999]), and gene flow (Schlaepfer et al. 2018). These effects can then influence structural characteristics, species composition, and ecosystem function (Oliver et al. 2005; Society for Ecological Restoration 2013). Fragmentation can isolate species, particularly organisms with limited dispersal (Brown et al. 1997); however, even species with high dispersal abilities may experience small local population decreases associated with disruption of cover from land clearing (Lynch and Whigham 1984). Fragmentation can also reduce species richness and species abundance for many taxonomic groups (Harris 1988).

Another primary pathway for an indirect change in habitat is through the production of sensory disturbances (i.e., noise, vibration, light) and/or dust emissions that are emitted during Construction, which may result in the functional loss or alteration of habitats for wildlife. Indirect loss or alteration of habitat creates an area adjacent to the Project Footprint that exhibits some degree of reduced ecological effectiveness, compared to the existing condition, which typically varies by effect pathway and wildlife species. Most construction activities involve the use of heavy machinery, road usage, and/or development of mine infrastructure which will result in the emission of noise, light, and dust. Sensory disturbance from most construction activities can disturb wildlife and change the use of habitat adjacent to the Project Footprint (e.g., habitat avoidance, fine-scale changes in individuals' movement patterns and associated energetic costs). Additionally, helicopter noise, including to and from the Bob Quinn Lake Aerodrome, has the potential to contribute to sensory disturbance beyond the LAA which can adversely affect species sensitive to helicopter disturbance, such as mountain goat. For previous projects in the region, TSKLH has expressed concern regarding these effects of helicopter disturbance on mountain goats and bears (ERM Rescan 2014; Rescan 2009b). Dust deposition associated with construction can affect vegetation composition adjacent to the Project Footprint which may alter habitat use by wildlife.

In addition to identifying generalized change to habitat as a concern in relation to wildlife populations, the Engaged Indigenous Nations have previously noted particular concerns regarding displacement of moose and mountain goat as a result of development activities (e.g., AltaGas Renewable Energy Inc. 2011c; ERM Rescan 2014; Rescan 2012b; Seabridge Gold Inc. 2013c), while TSKLH has specifically noted issues around development-related camps and facilities creating smells and waste that are attractive to species like bear and marten (Pretium Resources 2014b; ERM Rescan 2014).

Operation of the Project may require some minor land clearing during the Operations phase but because most land clearing will occur during the Construction phase, land clearing is collectively assessed under the Construction phase. However, indirect habitat loss is expected to continue through the Operations phase. The primary pathways for an indirect change in habitat during operation are through the maintenance of edge effects and fragmentation and through the continued production of sensory disturbances (i.e., noise, vibration, light) and/or dust that are emitted. The maintenance of edges and habitat fragmentation are anticipated to interact with wildlife and wildlife habitat in a similar manner as described above for the Construction phase and includes a functional loss or alteration of habitat and change in wildlife community adjacent to the Project Footprint. Similarly, continued dust generation during the Operations phase is anticipated to affect the vegetation community and subsequent habitat use by wildlife as described above for the Construction phase but dust will be managed under the Fugitive Dust Management Plan, which will be developed as discussed in Appendix A-1, Summary of Management Plans and Mitigation Measures. Collectively, sensory disturbance, edge effects, and dust deposition are anticipated to reduce the ecological effectiveness of habitats adjacent to the Project Footprint for some species, but not exceed the larger, more conservative Assessment Footprint.

The primary means of mitigating effects on wildlife habitat will be through reclamation of the Project Footprint to equivalent land capability. There may be a minor loss or alteration of habitat for some species that inhabit disturbed areas or anthropogenic structures (e.g., common nighthawk, barn swallow); however, reclamation of the Project Footprint will restore wildlife habitat for many species as active revegetation and natural succession restore disturbed areas to functional wildlife habitat. Ecological functions within habitats adjacent to the Project Footprint will also return following the discontinuation of sensory disturbance and

dust generation. Although wildlife habitat may not return to its original ecological condition, its quality will improve following reclamation and continue to improve throughout the Post-closure phase.

Change in Movement

Project activities that result in a loss or alteration of wildlife habitat through land clearing or sensory disturbance during the Construction and Operations phases have the potential to alter the use of movement corridors that connect areas of habitat across the landscape if present. These Project activities can create physical or sensory barriers that inhibit the ability of wildlife to move freely between resource patches, which can adversely affect a species' persistence by reducing access to key resources, causing range shifts, and altering seasonal movement patterns and dispersal events (Johnson et al. 1992; Nathan et al. 2008; Ament et al. 2014). The Tahltan Nation has previously noted that construction of new access roads or use of existing ones for development activities poses a particular concern in relation to the movement of moose (Pretium Resources 2014b; Seabridge Gold Inc. 2013c; TCG 2023a), and TSKLH has previously noted issues that can arise for moose movement when plowed snow forms barriers along cleared routes (Pretium Resources 2014b).

Additionally, sensory disturbance can limit the availability of food resources and increase exposure to risk and energy expenditure (Beyer et al. 2014), especially during winter when energy expenditure is higher (Bradshaw et al. 1998; Saher and Schmiegelow 2005). The extent to which Construction and Operations phase activities might alter wildlife movement will vary by species.

Change in Mortality Risk

Project activities during the Construction and Operations phases of the Project have the potential to increase mortality risk for wildlife, both directly and indirectly. The primary pathway for a direct increase in mortality risk is through vehicle-wildlife collisions on the Eskay Creek MAR and TCAA during the transportation of personnel and goods to Project site. Vehicle-wildlife collisions have the potential to increase mortality risk for a wide range of wildlife species, including amphibians, birds, and small and large mammals. Additionally, effects may extend to Highway 37 and 37A during the Operations phase when trucks travel to/from the Project to the ports in the District of Stewart while hauling concentrate.

19.5.3 Mitigation Measures and Effectiveness

This section discusses mitigation measures to avoid, minimize, restore onsite, and offset each of the potential effects on the Wildlife and Wildlife Habitat VC.

The predicted effectiveness of mitigation measures is evaluated to determine if the Project will have any residual effects. If the implementation of mitigation measures is expected to eliminate a potential effect (i.e., the measures are classified as highly effective), then no residual effect is identified for that VC, and the potential effect is not considered further in this assessment. If the proposed implementation controls and mitigation measure(s) are not thought to be sufficient to eliminate an effect (i.e., the measures' effectiveness are classified as low or moderate), or if the effectiveness of the measures is unknown, a residual effect is identified and carried forward into Section 19.6, Characterization of Residual Effects, for additional characterization. The anticipated effectiveness of the proposed mitigation measures to minimize the potential for adverse effects is evaluated and classified in Table 19.5-4 and is based on professional judgement, regulatory requirements, and use on similar projects.

Table 19.5-4: Summary of Existing and New Mitigation Measures for the Wildlife and Wildlife Habitat Valued Component

Potential Effect – *Effect Pathway*	Category	Mitigation Measure	Project Phase	Existing or New Mitigation	Effectiveness[1]	Potential Residual Effect?
Change in Habitat – *Direct loss or alteration of wildlife habitat (e.g., land clearing).*	Infrastructure Management	Camp hardening	Construction Operations	Existing	High	Yes
		Barn swallow nest mitigation	Construction Operations	New	Moderate	
		Remote camera monitoring	Construction Operations	New	Moderate	
	Land Clearing and Construction Management	Identification and avoidance of sensitive wildlife features	Construction	Existing	Moderate	
		Pre-clearing surveys, monitoring, and reporting for species on Schedule 1 of Migratory Bird Regulations	Construction	New	Moderate	
		Bat artificial roosting structures	Construction Operations	New	Moderate	
	Water Management	Water testing and monitoring	Operations Reclamation and Closure	Existing	High	
		Monitor pond use by wildlife	Operations Reclamation and Closure	Existing	High	
	Pre-Construction Surveys	Pre-construction surveys for site-specific mitigation	Construction	New	Moderate	
Change in Habitat – *Indirect loss or alteration of wildlife habitat (e.g., sensory disturbance, edge effects, altered surface water flows).*	Road and Traffic Management	speed limits, right-of-way, road access management	Construction Operations Reclamation and Closure	Existing	High	Yes
	Helicopter Management	Provincial helicopter operations recommendations	Construction Operations Reclamation and Closure	Existing	High	
		Helicopter wildlife setbacks	Construction Operations Reclamation and Closure	Existing	High	

Potential Effect – *Effect Pathway*	Category	Mitigation Measure	Project Phase	Existing or New Mitigation	Effectiveness[1]	Potential Residual Effect?
Change in Habitat – *Indirect loss (cont'd)*	Land Clearing and Construction Management	Identification and avoidance of sensitive wildlife features	Construction	Existing	High	
		Pre-clearing surveys, monitoring, and reporting for species on Schedule 1 of Migratory Bird Regulations	Construction	New	High	
	Dust Management	Dust suppression measures	Construction Operations Reclamation and Closure	New	Moderate	
	Noise Management	Noise suppression and avoidance measures	Construction Operations Reclamation and Closure	New	Moderate	
	Pre-Construction Surveys	Pre-construction surveys for site-specific mitigation	Construction	New	Moderate	
Change in Movement – *Alteration of large-scale wildlife movement patterns or movement corridors.*	Road and Traffic Management	Speed limits, right-of-way, road access management	Construction Operations Reclamation and Closure	Existing	Moderate	Yes
		Record and share wildlife information	Construction Operations Reclamation and Closure	Existing	Moderate	
		Use of multi-passenger vehicles	Construction Operations Reclamation and Closure	New	Moderate	
		Refuge areas	Construction Operations Reclamation and Closure	New	Moderate	
		Road stream crossing wildlife passages	Construction Operations Reclamation and Closure	New	Moderate	
		Exclusionary fencing	Construction Operations Reclamation and Closure	New	Moderate	

Potential Effect – *Effect Pathway*	Category	Mitigation Measure	Project Phase	Existing or New Mitigation	Effectiveness[1]	Potential Residual Effect?
Change in Movement *(cont'd)*	Land Clearing and Construction Management	Identification and avoidance of sensitive wildlife features	Construction	Existing	Moderate	
	Noise Management	Noise suppression and avoidance measures	Construction Operations Reclamation and Closure	New	Moderate	
	Pre-Construction Surveys	Pre-construction surveys for site-specific mitigation	Construction	New	Moderate	
Change in Mortality Risk – *Direct increase in mortality risk (e.g., land clearing activities, vehicular collisions, human-wildlife conflicts).*	Infrastructure Management	Camp hardening	Construction Operations	Existing	High	Yes
		Remote camera monitoring	Construction Operations	New	Moderate	
	Road and Traffic Management	speed limits, right-of-way, road access management	Construction Operations Reclamation and Closure	Existing	Moderate	
		Record and share wildlife information	Construction Operations Reclamation and Closure	Existing	Moderate	
		Use of multi-passenger vehicles	Construction Operations Reclamation and Closure	New	Moderate	
		Refuge areas	Construction Operations Reclamation and Closure	New	Moderate	
		Road stream crossing wildlife passages	Construction Operations Reclamation and Closure	New	Moderate	
		Exclusionary fencing	Construction Operations Reclamation and Closure	New	Moderate	

Potential Effect – *Effect Pathway*	Category	Mitigation Measure	Project Phase	Existing or New Mitigation	Effectiveness[1]	Potential Residual Effect?
Change in Mortality Risk *(cont'd)*	Land Clearing and Construction Management	Identification and avoidance of sensitive wildlife features	Construction	Existing	Moderate	
		Pre-clearing surveys, monitoring, and reporting for species on Schedule 1 of Migratory Bird Regulations	Construction	New	Moderate	
		Exclusionary fencing	Construction	New	High	
	Waste Management	Implementation of waste management procedures	Construction Operations Reclamation and Closure	Existing	High	
		Waste management infrastructure inspections	Construction Operations Reclamation and Closure	Existing	High	
		Remote camera monitoring	Construction Operations	New	Moderate	
	Water Management	Water testing and monitoring	Operations Reclamation and Closure	Existing	High	
		Monitor pond use by wildlife	Operations Reclamation and Closure	Existing	High	
	Human-Wildlife Interactions Management	Hierarchical bear and predatory wildlife responses	Construction Operations Reclamation and Closure	Existing	High	
		Employees to follow wildlife site policies and report incidental observations	Construction Operations Reclamation and Closure	Existing	High	

Potential Effect – *Effect Pathway*	Category	Mitigation Measure	Project Phase	Existing or New Mitigation	Effectiveness[1]	Potential Residual Effect?
Change in Wildlife Health – *Exposure to contaminants or other emissions that may affect the health of wildlife and wildlife habitat.*	Water Management	Water testing and monitoring	Operations Reclamation and Closure	Existing	High	No
		Monitor pond use by wildlife	Operations Reclamation and Closure	Existing	High	
	Dust Management	Dust suppression measures	Construction Operations Reclamation and Closure	New	Moderate	

Notes:

VC = Valued Component

[1] Effectiveness is characterized as:

***Unknown** = The mitigation measure has not been tried elsewhere in similar contexts and its effectiveness is unknown.*

***Low** = After implementation of the mitigation measure, the effect is largely unchanged (i.e., there is anticipated to be little to no improvement in the condition of the VC).*

***Moderate =** After implementation of the mitigation measure, the effect is moderately changed (i.e., there is anticipated to be a moderate improvement in the condition of the VC).*

***High** = After implementation of the mitigation measure, the effect is greatly improved (i.e., there is anticipated to be a major improvement in the condition of the VC, or for the effect to be completely eliminated).*

[2] "Existing" mitigation measures include measures currently applied and implemented at the existing Eskay Creek Mine site and those proposed for the Eskay Creek Technical Sample Project.

As part of the Eskay Creek Mine, several existing and new measures to mitigate these potential effects are being implemented. Existing mitigation measures have been adapted from the existing Eskay Creek Wildlife Management Plan (WMP) which was developed in accordance with Skeena Resources' Exploration Permit (MX-1-11) and *Mines Act* Permit (M-197) for the Eskay Creek Mine, in addition to the Health, Safety, and Reclamation Code of BC and associated reclamation reporting requirements (Ministry of Energy, Mines and Low Carbon Innovation [EMLI] 2021).

The Reclamation and Closure Plan (Appendix 1-9) will be used to meet reclamation objectives, including the re-establishing wildlife habitats within the Project Footprint. Additional mitigation measures outlined in other VC sections will further reduce potential adverse effects on Wildlife and Wildlife Habitat, including for Chapter 12, Air Quality Effects Assessment, Chapter 13, Noise and Vibration Effects Assessment, Chapter 14, Groundwater Effects Assessment, Chapter 15, Surface Water Effects Assessment, Chapter 17, Terrain and Soils Effects Assessment, and Chapter 18, Vegetation and Ecosystems Effects Assessment, are not listed here. New mitigation measures (i.e., those not previously implemented as part of the existing Eskay Creek Mine WMP) are proposed to further reduce potential adverse effects of the Project on the Wildlife and Wildlife Habitat VC. A summary of the existing and new mitigation measures that will be implemented to reduce potential adverse effects on wildlife and wildlife habitat are summarized in Table 19.5-4 and mitigation details are provided in the subsections below.

19.5.3.1 Infrastructure Management

Existing Mitigation Measures

Camp buildings and infrastructure will be designed and/or maintained to exclude wildlife both for wildlife and personnel safety in a process known as "camp hardening". These measures are best practices used by many remote mining camps in BC and are:

- Install self-closing exterior steel doors at waste management buildings, kitchens, storerooms, and dormitories.
- Install physical deterrents to exclude wildlife from camp infrastructure, including skirting on trailer-style buildings.

To verify effectiveness of camp hardening, Skeena Resources will:

- Maintain an incidental wildlife observation logbook and record any wildlife sightings, interactions, or incidents, and complete monthly (or more) inspections of the camp and infrastructure.

New Mitigation Measures

New mitigation measures are:

- Install two artificial nesting structures for barn swallows prior to removal of existing buildings, with the planning, installation, and future maintenance of artificial nesting structures completed under the guidance of a qualified professional.
- Deploy remote cameras at mine infrastructure to inform wildlife use of the Project Footprint, waste management strategies, and the need for additional mitigation measures.

19.5.3.2 Road and Traffic Management

Existing Mitigation Measures

Specific measures to minimize the potential effects of mine roads on wildlife are:

- Set and adhere to speed limits on mine roads.
- Give wildlife the right-of-way on mine roads while all personnel remain in their vehicle until wildlife has vacated the road.
- Maintain road access controls consistent with road use agreements and road use permits (Note that access through the KM2 gate for Tahltan conducting traditional food gathering activities (no firearms) can be requested through the TCG).
- Prohibit all non-work-related off-road vehicle use by all personnel and visitors to site.
- Communicate the locations of any high-risk wildlife areas on mine roads and the Eskay Creek MAR to Project personnel daily, if known.

New Mitigation Measures

For roads under Project control, new mitigation measures are:

- Use multi-passenger vehicles if available at the time needed for use.
- Manage dust on site and along roads by implementing dust control measures developed by a Qualified Professional).
- Plow refuge areas along mine roads at regular intervals during winter.
- Incorporate clear span bridges, concrete box culverts, open bottom culverts, and/or partially embedded closed-bottom culverts into mine road stream crossing designs.
- Implement migration deterrents (e.g. drift fencing) in areas of likely interaction (e.g., wetlands or other waterbodies with standing water within 30 m of mine road edges) during western toad breeding and seasonal movement periods (e.g., spring migration to congregate at breeding sites and during late summer migration when juvenile toads migrate en masse from breeding sites).
- Install warning signage along high-risk wildlife areas on mine roads.

19.5.3.3 Helicopter Management

Existing Mitigation Measures

Helicopter flights will follow these provincial recommendations (MFLNRO 2014), unless impracticable for health and safety reasons:

- Follow recommended flight paths between staging areas and the Mine site.
- Operate in a predictable and non-threatening manner.
- Use the same routes and elevations to and from work areas.
- Use topographic barriers to separate helicopters from ungulates.
- Operate helicopters below ungulates when working close to mountains.

- Avoid flying directly toward, hovering near, or landing near animals.
- Limit the number of flights and time spent in the area with ungulates.
- Avoid directly approaching or flying over observed wildlife, including those with young, or sensitive features such as mineral licks, and birthing areas.
- Avoid known areas that support mountain goats.
- Maintain an incidental wildlife observation logbook and record any wildlife sightings, interactions, or incidents.
- Record an electronic flight path of helicopters.

Pilots will follow these recommended helicopter setbacks (MFLNRO 2014) and maintain these minimum distances from ungulate and ungulate habitat (either horizontally or vertically),unless impracticable for health and safety reasons, or unless authorized by a Qualified Professional:

- Maintain a 2-km horizontal separation and 500-m vertical distance above ground from moose mineral licks and mountain goat winter and sensitive life stage habitat (1 November to 15 July) and escape terrain.
- Maintain a 500-m vertical distance above ground from moose winter and sensitive life stage habitat (16 November to 15 July).
- Prohibit circling of moose and mountain goat winter range, mineral licks, and for birthing areas.
- Vacate the area if wildlife is noticeably disturbed or displaced by aircraft when following the recommended horizontal and vertical flight distances.

19.5.3.4 Land Clearing and Construction Management

Existing Mitigation Measures

During clearing, appropriately trained personnel will identify sensitive wildlife features and implement appropriate procedures to minimize potential adverse effects on these areas. Mitigation activities and sensitive periods for the wildlife species of interest are summarized below.

General management measures to avoid and minimize disturbance to wildlife habitat are:

- Avoid land clearing near sensitive wildlife habitat features (e.g., dens, salt licks, nests, hibernacula, roosts, and breeding sites) and during sensitive periods for wildlife species, where practicable. If land clearing must occur during sensitive time periods or near sensitive wildlife habitat features, a Qualified Professional will complete pre-clearing surveys focused on areas of suitable habitat.
- Complete pre-clearing wildlife surveys as advised by a Qualified Professional and buffer any identified wildlife residences or breeding sites when it is not possible to avoid wildlife-sensitive periods. Complete salvages of amphibians and marmots if they are discovered in areas to be cleared under the authority of the relevant provincial permits and guidelines and under the guidance of a Qualified Professional.
- Do not disturb vegetation where clearing is not required. Where clearing is required, consider maintaining continuity with adjoining vegetation.
- Existing infrastructure and disturbed areas will be utilized.

New Mitigation Measures

New mitigation measures are:

- Install artificial roosting structures for bats to replace known bat roosts where bat use is documented, and where clearing is proposed. The installation will follow the guidance of a qualified professional, including during the planning, installation, and future maintenance of artificial roosting structures.
- As per Schedule 1 of the Migratory Bird Regulations (CRC, c 1035) implement the following regarding great blue heron and pileated woodpecker nests:
    - Report an active or inactive nest of either species via the Abandoned Nest Registry and complete additional annual monitoring and reporting as outlined in the Migratory Bird Regulations.
    - If necessary for the Project, only disturb a great blue heron or pileated woodpecker nest after a nest has been determined to be inactive for the time period outlined in Schedule 1 of the Regulations (i.e., 24 and 36 months, respectively, from the date identified), unless a permit allowing for the relocation of a nest is obtained.
- Complete pre-clearing surveys to identify the presence of nest trees within suitable habitats for great blue heron and pileated woodpecker by using the respective species-specific Resource Information Standards Committee standards.
- Suspend land clearing and construction activities if an occupied wildlife residence is encountered (e.g., nest, den, hibernacula) and report immediately to the Environmental Manager or delegate.
- Complete pre-disturbance wildlife surveys by a Qualified Professional to identify sensitive wildlife features (e.g., raptor nests, mineral licks, and furbearer dens) and implement mitigation measures advised by the Qualified Professional.
- Install wildlife-appropriate exclusionary fencing around temporary excavations.

19.5.3.5 Waste Management

Existing Mitigation Measures

Waste management will be implemented to manage risks to wildlife from attraction, entrapment, or exposure to unsafe chemicals. Waste management includes wastewater, effluents, mine tailings, food waste, and human waste. Mitigation measures pertaining to waste management are:

- Store wildlife-attracting waste in wildlife-proof containers.
- Remove wildlife-attracting waste regularly from collection sites and incinerate (or remove from site) all waste.
- Dispose only non-wildlife-attracting waste at landfills.
- Complete monthly mine road and camp cleanups to verify that no hazardous substances, wires, or loose materials are present to endanger wildlife and to verify proper storage and disposal of wastes.
- Implement a bear awareness and response program.
- Complete monthly inspections of the waste management infrastructure and camp, or more frequently, and adaptively manage waste handling practices.
- Record bear and furbearer interactions or incidents and communicate with the TCG and the Conservation Officer Service before implementing a management response if time allows, or report to the TCG and Conservation Officer Service after a management response has been implemented.

New Mitigation Measures

- NA

19.5.3.6 Water Management

Existing Mitigation Measures

The Project has several water attenuation and storage ponds that may attract wildlife, particularly waterfowl and amphibians. Mitigation and monitoring will occur in the following steps:

1. Test water periodically to compare against wildlife guidelines (CCME 2006; ENV 2021).
2. If water in the water management pond/s do not meet water guidelines (e.g., BC water quality guidelines for the protection of wildlife or livestock (ENV 2021) and Canadian Council of Ministers of the Environment (CCME) water quality guidelines for the protection of livestock (CCME 2006) and wildlife is using these pond/s, then implement management strategies for improving water quality, remove wildlife (e.g., salvage) or deter wildlife from entering the pond (e.g., physical or sensory barriers).

19.5.3.7 Noise Management

Implement measures to reduce potential noise emissions, including specific timing windows that minimize disruption to wildlife resources during critical life stages, if/as advised by a wildlife Qualified Professional.

19.5.3.8 Human-Wildlife Interactions Management

Existing Mitigation Measures

All employees are required to record and report incidental observations of wildlife and adhere to wildlife site policies:

- No feeding or harassing of wildlife;
- No littering (including cigarette butts); and
- As per Project policies, communicate and enforce rules that prohibit hunting, fishing, and gathering for all employees and contractors on the Project mine site and while commuting to and from the Project.

The following management activities promote the safety of personnel and dissuade habituated or aggressive wildlife from visiting the site. At least one person on-site at all times should be trained in appropriate bear and predatory wildlife responses, including the use of deterrents. Management measures meant to dissuade habituated or aggressive wildlife from visiting the site will be implemented, such as:

- Monitoring: report and record incidental wildlife sightings and signs.
- Communicate warnings to workers: provide accurate and current information of all potentially dangerous wildlife in the area.
- Area closures: restrict worker access to areas with problem wildlife, pending suitable controls.
- Adverse conditioning: apply adverse conditions activities to problem wildlife to prevent or reverse habituation.

19.5.3.9 Pre-construction Surveys

Pre-construction surveys have been completed to identify sensitive habitats with the potential to interact with the Project in portions of the LAA not previously surveyed (Appendix 19-2, 2023 Overall Fieldwork Report), including for nesting bird species of conservation concern, roosting bats, and breeding western toad along the Eskay Creek MAR. Additional pre-construction surveys using remote cameras are being undertaken at the request of THREAT to confirm wildlife habitat use prior to construction, including for the use of wetland habitats by wildlife, moose winter habitat use, wildlife movement corridors, and linear corridor use. Once the results of the pre-construction surveys are available, apply site-specific mitigations, if deemed to be required by a Qualified Professional.

19.6 Assessment of Residual Effects

As noted in Section 19.5, Potential Effects and Mitigation, after the application of mitigation and management measures, adverse residual effects are predicted for the Wildlife and Wildlife Habitat VC. Residual effects relate to changes in habitat, movement, mortality risk, and wildlife health. No positive effects on the Wildlife and Wildlife Habitat VC are anticipated. This section provides an assessment and characterization of these predicted residual effects, and ultimately, evaluates the level of confidence in the effects assessment.

This section provides an assessment and characterization of these predicted negative residual effects, and ultimately the confidence relating to the assessment conclusions. Residual effects are characterized using a standard set of criteria, defined in Chapter, 10, Valued Component Effects Assessment Methods that have been customized for the Wildlife and Wildlife Habitat VC (Table 19.6-1).

Table 19.6-1: Characterization of Residual Effects on Wildlife and Wildlife Habitat

Criteria	Description	Quantitative Measure or Qualitative Category
Magnitude	The amount of habitat loss or alteration for wildlife[1].	Change in Habitat (quantitative) *Low*: the Project changes up to 10% of habitat in the LAA for representative species, or up to 5% of habitat for representative species that are also species of conservation concern; *Moderate*: the Project changes 11 to 20% of habitat in the LAA for representative species, or 6 to 10% of habitat for representative species that are also species of conservation concern; or *High*: the Project changes 21% or more of habitat in the LAA for representative species, or 11% or more of habitat for representative species that are also species of conservation concern.
	The change in wildlife abundance and/or distribution.[2]	Change in Habitat (qualitative), Movement, and Mortality Risk *Low*: a measurable change in the abundance of wildlife in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur; *Moderate*: a measurable change in the abundance and/or distribution of wildlife in the LAA might occur, but a measurable change on the abundance of wildlife in the RAA is not anticipated; or *high*: a measurable change in the abundance and/or distribution of wildlife in the RAA is predicted.

Criteria	Description	Quantitative Measure or Qualitative Category
Geographic extent	The geographic area in which a residual effect occurs.	*Local:* an effect is limited to the Assessment Footprint; *Landscape:* an effect extends beyond the Assessment Footprint into the LAA or TCAA; *Regional:* an effect extends beyond the LAA or TCAA into the RAA; or *Beyond regional:* an effect that extends beyond the RAA.
Duration	The length of time the residual effect lasts.	*Short-term:* an effect that lasts approximately 1 to 5 years, or much less than a single generation; *Medium-term:* an effect that lasts between 6 to 25 years, or less than one generation; *Long-term:* an effect that lasts between 26 and 50 years, or over one generation; or *Far-future:* an effect that lasts more than 50 years, or several generations.
Frequency	How often the residual effect occurs.	*Once:* an effect that occurs once, during any phase; *Sporadic:* an effect that occurs at sporadic or intermittent intervals during any phase; *Regular:* an effect that occurs regularly during any phase; or *Continuous:* an effect that occurs constantly during any phase.
Reversibility	The degree to which Wildlife and Wildlife Habitat may return to its initial condition.	*Reversible short-term:* an effect that can be reversed relatively quickly (1 to 5 years); *Reversible long-term:* an effect that can be reversed after many years (6 to 50 years); or *Irreversible:* an effect that cannot be reversed (i.e., is permanent) and therefore is considered irreparable according to Tahltan Risk Assessment Factors.
Resiliency	Resilience to a residual effect given the environmental setting.	*Low*: the VC is considered to be of low resiliency following disturbances; *Moderate*: the VC is considered to be moderately resilient following disturbances; or *High*: the VC is considered to be highly resilient following disturbances.
Ecological or social context	The current condition and sensitivity of the VC and Sub-VCs, including important habitat areas, birthing, breeding, and wintering areas, and migration corridors.	*Low*: the VC is considered to have little to no unique attributes, including known high-sensitivity areas or environmentally sensitive areas, or disclosed sacred areas within Tahltan Territory; *Neutral*: the VC is considered to have some unique attributes, including known high-sensitivity areas or environmentally sensitive areas, or disclosed sacred areas within Tahltan Territory; or *High*: the VC is considered to be unique, including known high-sensitivity areas or environmentally sensitive areas, or disclosed sacred areas within Tahltan Territory.
Importance	The effect or underlying issue has previously been identified as an interest and/or priority, including identified species of importance to Tahltan.	*Low*: the effect has previously been identified by some individuals, but not by Indigenous Nations, community members, or government agencies; *Moderate*: the effect has previously been identified as an interest by Indigenous Nations, community members, the public, and local governments and/or government agencies, but not stated as a top interest; or *High*: the effect has been identified repeatedly as a top interest by Indigenous Nations, community members, the public, local governments, and/or government agencies.

Criteria	Description	Quantitative Measure or Qualitative Category
Probability	The likelihood that an adverse residual effect will occur in circumstances where it is not certain that the effect will materialize.	*Low*: an effect that is unlikely, but could occur; *Medium*: an effect that is likely, but may not occur; or *High*: an effect that is highly likely to occur.

Notes:

LAA = Local Assessment Area; RAA = Regional Assessment Area Sub-VC = Sub-valued Component; VC = Valued Component

% = percent

[1] See Section 19.6.1.1, Analytical Assessment Techniques, for a description of the thresholds used to characterize the magnitude of effect for change in habitat.

[2] Abundance and distribution of wildlife in the context of this assessment relates to the local population, which is defined as a group of individuals within the applicable spatial boundaries (i.e., LAA or RAA) which is used to evaluate potential residual and cumulative effects on the VC, instead of broader spatial units (e.g., Wildlife Management Units) that are less applicable to the Project and assessment.

19.6.1 Change in Habitat

19.6.1.1 Analytical Assessment Techniques

Change in habitat was assessed quantitatively for several representative wildlife species (Section 19.5.2, Identification of Potential Effects) and seasons using HSMs. Change in habitat was assessed qualitatively for the remaining representative species/species groups where HSMs do not effectively identify micro-site conditions (e.g., western toad) or when effects on a species could be reasonably represented by HSMs of other species. A detailed description of the HSMs developed to support the assessment of change in habitat is available in the 2021 Wildlife Habitat Suitability Baseline (Appendix 19-3, Wildlife Habitat Suitability Baseline).

The HSMs were used to estimate the area of effective habitat that will be removed or altered by the Project. Effective habitat is defined as the sum of high to moderate habitat suitability classes for a species and excludes low to nil habitat suitability classes. Direct habitat loss will be limited to the Project Footprint (i.e., area of physical disturbance). An indirect loss or alteration of habitat created through sensory disturbance, edge effects, and dust deposition is expected to result in habitats with reduced ecological effectiveness adjacent to the Project Footprint but are expected to not extend beyond the Assessment Footprint (Section 19.3.1.2, Assessment Footprint). For example, baseline daytime noise levels outside the LAA (i.e., quiet reference areas) are <35 A-weighted decibels (dBA), and noise levels outside of the Assessment Footprint are generally not predicted to exceed 45 dBA during the Construction and Operations phases (Appendix 13-2, Noise Model and Vibration Study). Studies have shown that noise ≥45 dBA (i.e., 10 dBA above ambient noise levels) has the potential to adversely affect wildlife, including affecting songbird song characteristics, abundance, and species richness (Shannon et al. 2016). Therefore, 45 dBA is used as the threshold for considering adverse effects on wildlife and wildlife habitat. Potential adverse effects are not expected to extend beyond the Assessment Footprint, and the assessment of change in habitat assumes that the quantifiable direct and indirect loss or alteration of wildlife and wildlife habitat is contained within this Assessment Footprint spatial boundary (i.e., this Assessment Footprint is considered as nil habitat suitability in the residual effects calculations). However, sensory disturbances may infrequently extend beyond the Assessment Footprint (e.g., helicopter use) which will be assessed qualitatively. The assessment of change in habitat conservatively assumes that the post-construction habitat suitability for habitats within the Assessment Footprint is nil. However, some altered or uncleared lands in the Assessment Footprint are expected to provide habitat opportunities for some wildlife species.

Thresholds used in this assessment are described using the magnitude outlined in Table 19.6-1, which are representative of benchmarks used for other recently approved mining environmental assessments in Canada (e.g., Alamos Gold Inc. 2020). This assessment is anticipated to be conservative because the Assessment Footprint (2,275.8 ha) is over three times larger than the Project Footprint (626.5 ha) and will not all be subject to a direct loss of habitat. Therefore, one-third of the Assessment Footprint will be unavailable long-term for wildlife, with the remaining two-thirds returning to the existing conditions following Reclamation and Closure, except for localized effects of dust, for example. A more conservative threshold is used for representative species that are also species of conservation concern (mountain goat, grizzly bear, wolverine, fisher) that may be disproportionately affected by habitat loss or alteration. Additionally, the proposed Technical Sample footprint is considered as an existing disturbance in the existing condition to more comprehensively account for disturbance within the LAA.

A conservative approach is used to address uncertainty and improve confidence in the environmental effects assessment. The habitat-based approach described above focuses on identifying suitable habitats affected by the Project relative to the availability of those habitats in the LAA. This approach is considered conservative as it assumes that wildlife species are present if the habitat is available, which is not always the case. Additionally, the Assessment Footprint is conservatively assumed to be lost to wildlife but two-thirds of it will not be affected by physical disturbance and portions of the physical disturbance (i.e., Project Footprint) will be reclaimed over time. Some species will also use disturbed sites. Comparing proportional habitat loss to availability within the LAA has been completed for both short- and wide-ranging species because the assessment focuses on considering how effects might adversely affect the ability of species, not individuals, to persist within the LAA.

19.6.1.2 Residual Effects Assessment

Construction of the Project may result in the direct and indirect loss or alteration of up to 2,123.7 ha of wildlife habitat (i.e., native vegetative cover exclusive of HSMs) compared to the existing condition (Table 19.6-2). The loss or alteration represents a change of 10% of wildlife habitat in the LAA and 1% in the RAA from the existing condition.

Construction of the Project may also result in the direct and indirect loss or alteration of up to 1,994.7 ha of Tahltan Upper Elevation AOI (a 19% decrease in the LAA from the existing condition) and 229.0 ha of Tahltan Lower Elevation AOI (a 2% decrease in the LAA from the existing condition; Section 19.3.1.7, Tahltan Areas of Interest).

The federal government is required to produce a recovery strategy for species listed as Threatened or Endangered under Schedule 1 of *SARA* (2002; Table 19.4-3) which identifies critical habitat for each species. Following habitat mapping and baseline studies, no *SARA*-defined critical habitat has been identified in the LAA or RAA. Habitat mapping and extensive ground surveys have identified that, except for amphibian breeding ponds and marmot dens (which are relatively common), there are no other sensitive wildlife features known to occur in the LAA with the potential to interact with the Project, including mineral licks, ungulate wallows, calving areas, raptor stick nests, heronries, or migratory stopover sites.

A residual effects assessment for change in habitat for each Wildlife and Wildlife Habitat VC Sub-VC is provided in the following sections.

Table 19.6-2: Residual Habitat Loss or Alteration for Wildlife in the Local and Regional Assessment Areas

General Ecosystem Type[1]	Existing Condition[2]		Residual Condition[2]				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
Upland habitats							
Forest - dry	1,591.4	14,305.9	14.9	1,576.5	-1	14,291.0	<-1
Forest - moist	2,384.7	13,830.1	38.8	2,345.8	-2	13,791.3	<-1
Forest - parkland	938.4	4,595.7	291.0	647.5	-31	4,304.8	-6
Forest - zonal	5,233.6	37,096.3	99.5	5,134.2	-2	36,996.8	<-1
Krummholz	1,266.4	4,568.4	412.8	853.6	-33	4,155.6	-9
Shrub	152.0	1,774.4	8.3	143.7	-5	1,766.1	<-1
Heath	1,511.4	6,761.7	556.5	954.9	-37	6,205.2	-8
Herb	458.2	2,924.5	134.9	323.3	-29	2,789.6	-5
Sparse	2,358.7	5,3822.4	303.9	2,054.8	-13	53,518.5	-1
Avalanche	2,018.9	18,877.4	97.2	1,921.7	-5	18,780.1	-1
Glacier	85.7	14,960.1	0.0	85.7	0	14,960.1	0
Upland subtotal	17,999.4	173,517.0	1,957.8	16,041.6	-11	171,559.2	-1
Wetland habitats							
Riparian	698.7	2,056.0	7.2	691.5	-1	2,048.8	<-1
Wetland - forested	220.8	1,909.1	0.0	220.8	0	1,909.1	0
Wetland - fen	131.7	1,159.0	11.9	119.8	-9	1,147.1	-1
Wetland - bog	27.4	120.9	0.0	27.4	0	120.9	0
Wetland - marsh	1.9	47.7	0.0	1.9	0	47.7	0
Wetland - swamp	22.9	78.2	0.0	22.9	0	78.2	0
Wetland - shallow open water	23.7	97.0	10.8	12.9	-46	86.2	-11
Water	1,385.0	4,237.8	135.9	1,249.1	-10	4,101.9	-3
Wetland Subtotal	2,512.2	9,705.7	165.9	2,346.3	-7	9,539.9	-2
Native Ecosystems Subtotal[3]	20,511.6	183,222.7	2,123.7	18,387.9	-10	181,099.0	-1
Anthropogenic	761.6	1,143.3	152.1	2,885.3	279	3,267.0	186
Total	**21,273.2**	**184,365.9**	**2,275.8**	**21,273.2**	**0.0**	**184,365.9**	**0.0**

Notes:

LAA = Local Assessment Area; RAA = Regional Assessment Area

% = percent; ha = hectare

[1] General ecosystem types summarized from the Eskay Creek Revitalization Project: 2020-2021 Vegetation and Ecosystem Mapping Baseline Report (Appendix 18-1).

[2] Percent totals may be greater or less than 100% due to rounding.

[3] Native ecosystems include the sum of upland and wetland general ecosystem types.

Moose

Moose generally prefer higher elevations in summer and fall and move to valley bottoms in winter and spring where there is increased forage and reduced snowpack which is consistent with the results of the baseline winter moose survey. Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of moose growing season, early winter, and late winter habitats. The Project is situated on a bench north-west of the Unuk River, ranging in elevation from 670 to 1,230 metres above sea level (masl) which is generally too high to be suitable winter moose habitat and is considered to be the limiting habitat type for moose populations (Appendix 19-3, Wildlife Habitat Suitability Baseline).

Effective moose late winter habitat in the LAA has a comparable distribution as early winter habitat but with reduced suitability at higher elevations and/or where there is increased snow depth and reduced forage availability. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 322.7 ha of effective moose late winter habitat within the LAA, a 3% decrease from the existing condition (Table 19.6-3; Figure 19.4-2). The residual change in habitat is predicted to be low in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a less than (<) 1% decrease in effective moose late winter habitat within the RAA from the existing condition.

Table 19.6-3: Change in Moose Late Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	437.1	1,404.1	1.4	435.7	<-1	1,402.8	<-1
Moderately High	3,497.8	16,898.0	46.7	3,451.1	-1	16,851.4	<-1
Moderate	7,157.5	46,756.0	274.7	6,882.8	-4	46,481.3	-1
Low	5,003.9	40,531.4	1,254.9	3,749.0	-25	39,276.5	-3
Very Low	2,079.8	33,743.1	398.1	1,681.7	-19	33,345.0	-1
Nil	3,093.7	44,633.3	300.2	5,069.4	64	46,608.9	4
Effective Habitat	**11,092.4**	**65,058.1**	**322.7**	**10,769.7**	**-3**	**64,735.4**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective moose early winter habitat is comparatively less abundant in the Assessment Footprint than growing season habitat because of the higher elevation, and early winter habitat is primarily distributed along river valleys in lower elevations. As a result, effective habitat occurs primarily as moderate suitability habitat classes and there is limited high to moderately high suitability habitat classes. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 332.9 ha of effective moose early winter habitat within the LAA, a 3% decrease from the existing condition (Table 19.6-4; Figure 19.4-3). The residual change in habitat is predicted to be low in magnitude because less than 10% of effective habitat within the

LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 1% decrease in effective moose early winter habitat within the RAA from the existing condition.

Table 19.6-4: Change in Moose Early Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	531.7	1,640.6	1.9	529.8	<-1	1,638.7	<-1
Moderately High	3,485.5	16,903.3	47.6	3,437.9	-1	16,855.8	<-1
Moderate	7,702.6	49,604.9	283.5	7,419.1	-4	49,321.4	-1
Low	7,667.2	77,466.9	1,647.1	6,020.1	-22	75,819.8	-2
Very Low	943.0	22,233.0	37.9	905.1	-4	22,195.1	<-1
Nil	939.7	16,117.1	257.9	2,957.6	215	18,135.1	13
Effective Habitat	**11,871.4**	**68,148.9**	**332.9**	**11,386.8**	**-3**	**67,815.9**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective moose growing season habitat is generally abundant throughout the LAA, particularly in lower elevation river valleys, including along the Iskut River, Volcano Creek, and Eskay Creek. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 1,697.9 ha of effective moose growing season habitat within the LAA, a 10% decrease from the existing condition (Table 19.6-5; Figure 19.4-4). The residual change in habitat is predicted to be low in magnitude because up to 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 2% decrease in effective moose growing season habitat within the RAA from the existing condition.

The Operations phase is not anticipated to result in the direct loss or alteration of year-round moose habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint and the area adjacent to the Eskay Creek MAR. Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species, and reclaimed habitats are expected to support moose over time, particularly growing season habitat adjacent to wetlands. While reclaimed habitats are unlikely to support moose early and late winter habitat, the existing condition does not support a notable amount of these habitats given the relatively high elevation of the Assessment Footprint.

Table 19.6-5: Change in Moose Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	4,036.9	25,984.4	182.9	3,854.0	-5	25,801.5	-1
Moderately High	9,048.2	60,302.4	512.1	8,536.2	-6	59,790.3	-1
Moderate	4,301.7	24,721.6	1,003.0	3,298.7	-23	23,718.6	-4
Low	1,331.4	28,129.5	113.3	1,218.1	-9	28,016.1	<-1
Very Low	1,611.8	28,994.5	206.7	1,405.1	-13	28,787.8	-1
Nil	942.7	16,173.4	257.9	2,960.6	214	18,191.4	13
Effective Habitat	**17,386.8**	**111,008.4**	**1,697.9**	**15,688.9**	**-10**	**109,310.4**	**-2**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Mountain Goat

Mountain goat generally prefer alpine and subalpine habitats above 1,500 masl (Assessment Footprint is 670 to 1,230 masl) associated with escape terrain (e.g., steep cliffs, rocky outcrops, and talus slopes) and spend the summer at higher elevations above tree line and the winter at lower elevation near or below tree line (Appendix 19-3, Wildlife Habitat Suitability Baseline). This seasonal distribution is consistent with the results of the baseline winter and summer mountain goat survey results. Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of mountain goat growing season and winter habitats.

Effective mountain goat winter habitat generally occurs in small patches throughout the LAA, but larger patches are present, particularly in higher elevations along the north side of the Volcano Creek valley which are the limiting habitat for the species. Low-elevation canyon goat habitat, part of Ungulate Winter Range U-6-002 overlaps with the LAA along the Unuk River but is outside of the Assessment Footprint and unlikely to be adversely affected. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 216.3 ha of effective mountain goat winter habitat within the LAA, a 4% decrease from the existing condition (Table 19.6-6; Figure 19.4-5). The residual change in habitat is predicted to be low in magnitude because less than 5% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective mountain goat winter habitat within the RAA from the existing condition.

Table 19.6-6: Change in Mountain Goat Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	1,682.3	19,922.9	30.6	1,651.7	-2	19,892.3	<-1
Moderately High	2,130.7	24,464.7	80.7	2,050.0	-4	24,384.0	<-1
Moderate	2,248.0	28,030.7	105.1	2,142.9	-5	27,925.7	<-1
Low	6,724.8	56,605.7	789.4	5,935.5	-12	55,816.4	-2
Very Low	2,748.9	12,096.9	333.4	2,415.5	-12	11,763.5	-3
Nil	5,735.0	42,800.8	936.7	7,074.1	23	44,139.9	3
Effective Habitat	**6,061.0**	**72,418.3**	**216.3**	**5,844.7**	**-4**	**72,202.0**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective mountain goat growing season habitat generally occurs throughout the RAA on particular peaks with a combination of good escape terrain and green forage, including John's Peak and the Unuk Finger on the east side of the Unuk River, as well as Mount Rube between the Iskut and Unuk River, and the southern slopes of Faisal Peak 53-35 west of the Unuk River. Within the LAA effective mountain goat growing season habitat is found on high-elevation peaks, including above the Iskut River, Volcano Creek, and Eskay Creek. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 1,112.0 ha of effective mountain goat growing season habitat within the LAA, a 9% decrease from the existing condition (Table 19.6-7; Figure 19.4-6). The residual change in habitat is predicted to be moderate in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 1% decrease in effective mountain goat growing season habitat within the RAA from the existing condition.

Table 19.6-7: Change in Mountain Goat Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	3,755.8	43,590.9	156.5	3,599.3	-4	43,434.4	<-1
Moderately High	4,264.6	46,366.8	350.4	3,914.2	-8	46,016.4	-1
Moderate	4,216.9	41,847.0	605.2	3,611.7	-14	41,241.8	-1
Low	5,469.5	23,343.7	776.9	4,692.6	-14	22,566.8	-3
Very Low	842.2	4,718.0	78.0	764.1	-9	4,640.0	-2

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
Nil	2,720.6	24,055.2	308.8	4,687.7	72	26,022.3	8
Effective Habitat	**12,237.3**	**131,804.8**	**1,112.0**	**11,125.3**	**-9**	**130,692.7**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

The Operations phase is not anticipated to result in the direct loss or alteration of year-round mountain goat habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint and the area adjacent to the Eskay Creek MAR. Notably, mountain goat may be particularly sensitive to helicopter noise during Project Construction and Operations, including to and from the Bob Quinn Lake Aerodrome and beyond the LAA, but evidence suggests mountain goats may become habituated to mining activities over time (Seabridge Gold Inc. 2013). Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue. An indirect loss or alteration of habitat may result in the temporary avoidance of the LAA by mountain goat. However, there is limited effective mountain goat habitat, including winter habitat, for the species within the LAA (i.e., within 1.0 to 1.5 km; Table 19.6-6) and there were only three detections of the species within the LAA during baseline surveys (Section 19.4.4, Mountain Goat).

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species and reclaimed habitats are expected to support mountain goat over time. While reclaimed habitats are unlikely to support mountain goat winter habitat, the existing condition does not support a notable amount of these habitats given the limited amount of steep south-facing rocky areas in Assessment Footprint.

Furbearers

Grizzly Bear

Grizzly bears generally prefer low-elevation riparian areas in the spring and summer (e.g., along rivers; <1,000 masl) with increased use of higher elevation drainages in the summer (>1,000 masl), and fall habitat is widely distributed and expanded upwards in elevation (Appendix 19-3, Wildlife Habitat Suitability Baseline). The Assessment Footprint ranges from 670 to 1,230 masl. Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of grizzly bear habitats.

Effective grizzly bear spring habitat occurs in riparian areas throughout the LAA, including along the northern portion of Volcano Creek, near the Iskut River, and along the eastern side of the Unuk River and Ketchum Creek. Construction of the Project is predicted to result in the direct and indirect loss and alteration

of 155.2 ha of effective grizzly bear spring habitat within the LAA, a 2% decrease from the existing condition (Table 19.6-8; Figure 19.4-7). The residual change in habitat is predicted to be low in magnitude because less than 5% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective grizzly bear spring habitat within the RAA from the existing condition.

Table 19.6-8: Change in Grizzly Bear Spring Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	5,002.3	25,076.6	40.0	4,962.4	-1	25,036.6	<-1
Moderately High	3,532.2	22,022.9	89.4	3,442.8	-3	21,933.5	<-1
Moderate	784.9	2,584.6	25.9	759.0	-3	2,558.7	-1
Low	3,737.2	38,419.3	72.8	3,664.3	-2	38,346.4	<-1
Very Low	4,622.1	22,732.2	1,459.9	3,162.2	-32	21,272.3	-6
Nil	3,594.0	73,470.1	587.9	5,282.0	47	75,158.1	2.3
Effective Habitat	**9,319.4**	**49,684.1**	**155.2**	**9,164.2**	**-2**	**49,528.9**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective grizzly bear summer habitat occurs in riparian areas in the LAA and in alpine areas that are uncommon within the Assessment Footprint. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 171.4 ha of effective grizzly bear summer habitat within the LAA, a 2% decrease from the existing condition (Table 19.6-9; Figure 19.4-8). The residual change in habitat is predicted to be low in magnitude because less than 5% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective grizzly bear summer habitat within the RAA from the existing condition.

Table 19.6-9: Change in Grizzly Bear Summer Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	260.5	9,029.1	8.3	252.2	-3	9,020.8	<-1
Moderately High	8,923.2	53,402.8	130.3	8,792.9	-2	53,272.5	<-1
Moderate	1,987.8	12,474.7	32.7	1,955.1	-2	12,441.9	<-1
Low	7,225.1	48,289.9	1,610.0	5,615.1	-22	46,679.9	-3

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
Very Low	1,933.4	44,608.2	236.6	1,696.8	-12	44,371.6	-1
Nil	942.7	16,501.1	257.9	2,960.6	214	18,519.1	12
Effective Habitat	**11,171.5**	**74,906.6**	**171.4**	**11,000.1**	**-2**	**74,735.2**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectares

Effective grizzly bear fall habitat is widely distributed throughout the LAA, except for the highest elevation areas. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 1,308.9 ha of effective grizzly bear fall habitat within the LAA, an 8% decrease from the existing condition (Table 19.6-10; Figure 19.4-9). The residual change in habitat is predicted to be moderate in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 1% decrease in effective grizzly bear fall habitat within the RAA from the existing condition.

Table 19.6-10: Change in Grizzly Bear Fall Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	3,218.3	16,180.1	57.3	3,161.0	-2	16,122.8	<-1
Moderately High	576.8	3,256.8	15.8	560.9	-3	3,241.0	-1
Moderate	12,583.3	93,938.1	1,235.7	11,347.5	-10	92,702.3	-1
Low	3,936.0	54,576.4	705.9	3,230.1	-18	53,870.4	-1
Very Low	15.6	181.0	3.2	12.5	-20	177.8	-2
Nil	942.7	16,173.4	257.9	2,960.6	214	18,191.4	13
Effective Habitat	**16,378.4**	**113,375.0**	**1,308.9**	**15,069.5**	**-8**	**112,066.1**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

The Project is not anticipated to result in the loss or alteration of grizzly bear denning habitat given the subdued slopes and bedrock-dominated surficial material within the Assessment Footprint that are both expected to limit denning opportunities for grizzly bear. While microsites within the Assessment Footprint may provide denning opportunities for grizzly bear, these sites are expected to be uncommon, and the

existing disturbance is expected to have further deterred individuals from denning near the Project and no denning bears have been documented to date.

The Operations phase is not anticipated to result in the direct loss or alteration of year-round grizzly bear habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint and the area adjacent to the Eskay Creek MAR. Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species and reclaimed habitats are expected to support grizzly bear year-round over time.

Black Bear

Construction and operation of the Project has the potential to interact with black bear habitat. However, black bear is common throughout much of BC with stable populations and has been incidentally observed throughout the LAA. The species is a habitat generalist but adequate denning habitat for torpor (i.e., a state of inactivity often referred to as hibernation) during the winter season is required. There can be a large degree of variation in individual den locations, but the species is generally associated with standing or fallen trees and may be found in tree cavities or in hollows below a tree, often in areas at valley bottoms that support large cottonwoods and other large trees (Lariviere 2001). Previous surveys completed for the nearby KSM and Brucejack projects identified suitable denning habitat occurring along riparian areas, particularly adjacent to creeks and rivers such as the Unuk River (Rescan 2010b). Therefore, it is likely that similar suitable denning habitat occurs along creeks and rivers within the RAA, especially along the Unuk and Iskut rivers and may overlap with areas to be cleared for road upgrades on the Iskut River and Volcano Creeks, but likely does not overlap with the mine site.

The Project is anticipated to result in the direct loss or alteration in the availability of general habitat for black bear, but high-suitability denning habitats along the Unuk and Iskut rivers are predicted to remain unaffected. As such, the residual change in habitat is predicted to be low in magnitude because a measurable change in the abundance of black bear in the LAA is not anticipated although temporary local shifts in distributions in the LAA might occur (Table 19.6-1).

Residual adverse effects on black bear during the Operations and Closure and Reclamation phases are the same as those predicted for grizzly bear.

Wolverine

Wolverine is generally distributed relative to prey availability instead of specific habitat types and is expected to occur throughout the RAA during the growing season. Winter habitat requirements are more defined and is strongly associated with mature forested habitats that support high-suitability ungulate habitat. Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of wolverine habitats.

Effective wolverine growing season habitat is widely distributed throughout the LAA, with high-suitability habitats occurring in the Volcano Creek and Iskut River valleys. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 1,419.7 ha of effective wolverine growing season habitat within the LAA, a 9% decrease from the existing condition (Table 19.6-11; Figure 19.4-10). The residual change in habitat is predicted to be moderate in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Wolverine prefers habitat that support year-round food supplies in large, sparsely inhabited wilderness areas, rather than particular habitat types with specific topographical or vegetative associations (Lofroth and Krebs 2007). Regionally, construction of the Project is predicted to result in a 1% decrease in effective wolverine growing season habitat within the RAA from the existing condition.

Table 19.6-11: Change in Wolverine Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	5,873.5	45,371.6	23.7	5,849.8	<-1	45,347.8	<-1
Moderate	9,536.6	84,578.5	1,395.9	8,140.7	-15	83,182.6	-2
Low	3,552.6	33,692.3	556.0	2,996.6	-16	33,136.3	-2
Nil	2,310.0	20,663.4	300.2	4,285.7	86	22,639.1	10
Effective Habitat	**15,410.1**	**129,950.1**	**1,419.7**	**13,990.4**	**-9**	**128,530.4**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective wolverine winter habitat is limited within the LAA and generally occurs in small, isolated patches on southern and western-facing slopes within the LAA, with the largest patches occurring within the Volcano Creek valley. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 25.5 ha of effective wolverine winter habitat within the LAA, a 1% decrease from the existing condition (Table 19.6-12; Figure 19.4-11). The residual change in habitat is predicted to be moderate in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective wolverine winter habitat within the RAA from the existing condition.

The Operations phase is not anticipated to result in the direct loss or alteration of year-round wolverine habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint and the area adjacent to the Eskay Creek MAR. Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Table 19.6-12: Change in Wolverine Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	258.3	509.9	0.0	258.3	0	509.9	0
Moderate	2,277.6	22,194.8	25.5	2,252.1	-1	22,169.3	<-1
Low	17,027.0	131,820.1	1,745.0	15,282.0	-10	130,075.1	-1
Nil	1,709.8	29,781.0	505.3	3,480.3	104	31,551.5	6
Effective Habitat	**2,535.9**	**22,704.6**	**25.5**	**2,510.4**	**-1**	**22,679.2**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area.
% = percent; < = less than; ha = hectare

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species, and reclaimed habitats are expected to support wolverine and prey species for most of the year over time. Additionally, reclamation will include previously disturbed areas within the Assessment Footprint, which will improve conditions compared to the existing condition.

Marten

Marten home ranges remain relatively static year-round and habitat requirements during the growing season and winter are similar, with the main difference being a greater likelihood to use open habitats and travel upslope in the growing season (i.e., low suitability habitats). Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of marten habitats.

Effective marten growing season habitat is widely distributed throughout the LAA, with high-suitability habitats occurring in the lower elevations of the Volcano Creek, Eskay Creek, Unuk River and Iskut River valleys. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 405.2 ha of effective marten growing season habitat within the LAA, a 4% decrease from the existing condition (Table 19.6-13; Figure 19.4-12). The residual change in habitat is predicted to be low in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 1% decrease in effective marten growing season habitat within the RAA from the existing condition.

Table 19.6-13: Change in Marten Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	6,361.8	45,656.8	109.5	6,252.4	-2	45,547.3	<-1
Moderate	3,113.8	20,141.9	295.8	2,818.1	-10	19,846.1	-2
Low	8,554.5	68,428.8	1,449.7	7,104.8	-17	66,979.1	-2
Nil	3,242.5	50,078.3	420.9	5,097.4	57	51,933.2	4
Effective Habitat	**9,475.7**	**65,798.7**	**405.2**	**9,070.4**	**-4**	**65,393.4**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective marten winter habitat is widely distributed throughout the LAA as described above for growing season habitat (i.e., high and moderate suitability habitats are the same between seasons) largely focused in forested areas and so below the mine site in elevation. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 405.2 ha of effective marten winter habitat within the LAA, a 4% decrease from the existing condition (Table 19.6-14; Figure 19.4-13). The residual change in habitat is predicted to be low in magnitude because less than 10% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a 1% decrease in effective marten winter habitat within the RAA from the existing condition.

Table 19.6-14: Change in Marten Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	6,361.8	45,656.8	109.5	6,252.4	-2	45,547.3	<-1
Moderate	3,113.8	20,141.9	295.8	2,818.1	-10	19,846.1	-2
Low	822.8	5,219.7	12.7	810.1	-2	5,207.0	<-1
Nil	10,974.2	113,287.4	1,857.9	11,392.1	4	113,705.3	<1
Effective Habitat	**9,475.7**	**65,798.7**	**405.2**	**9,070.4**	**-4**	**65,393.4**	**-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectares

The Operations phase is not anticipated to result in the direct loss or alteration of year-round marten habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint and the area adjacent to the Eskay Creek MAR. Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species, and reclaimed habitats are expected to support marten year-round habitat over time.

Fisher

Fisher home ranges remain relatively static year-round and habitat requirements during the growing season and winter are similar, with the main difference being a greater likelihood to use open habitats and travel upslope in the growing season (i.e., low suitability habitats). Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of fisher habitats.

Effective fisher growing season habitat is widely distributed throughout the LAA, with high-suitability habitats occurring in the lower elevations of the Volcano Creek, Eskay Creek, Unuk River, and Iskut River valleys but unlikely to overlap with the mine site. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 109.5 ha of effective fisher growing season habitat within the LAA, a 1% decrease from the existing condition (Table 19.6-15; Figure 19.4-14). The residual change in habitat is predicted to be low in magnitude because less than 5% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective fisher growing season habitat within the RAA from the existing condition.

Table 19.6-15: Change in Fisher Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	4,802.3	28,359.8	0.0	4,802.3	0	28,359.8	-0
Moderate	3,840.6	27,406.8	109.5	3,731.1	-3	27,297.3	<-1
Low	8,896.7	77,476.5	1,746.9	7,149.8	-20	75,729.6	-2
Nil	3,733.1	51,062.7	419.5	5,589.5	50	52,919.1	4
Effective Habitat	**8,642.8**	**55,766.5**	**109.5**	**8,533.4**	**-1**	**55,657.1**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Effective fisher winter habitat is widely distributed throughout the LAA as described above for growing season habitat (i.e., high and moderate suitability habitats are similar between seasons). Construction of the Project is predicted to result in the direct and indirect loss and alteration of 109.5 ha of effective fisher winter habitat within the LAA, a 1% decrease from the existing condition (Table 19.6-16; Figure 19.4-15). The residual change in habitat is predicted to be low in magnitude because less than 5% of effective habitat within the LAA will be affected (Table 19.6-1). Regionally, construction of the Project is predicted to result in a <1% decrease in effective fisher winter habitat within the RAA from the existing condition.

Residual adverse effects on fisher during the Operations and Closure and Reclamation phases are the same as those predicted for marten.

Table 19.6-16: Change in Fisher Winter Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	4,516.2	27,772.6	0.0	4,516.2	0	27,772.6	0
Moderate	3,834.1	27,453.9	109.5	3,724.6	-3	27,344.4	<-1
Low	1,947.6	15,906.4	308.5	1,639.2	-16	15,597.9	-2
Nil	10,974.8	113,172.9	1,857.9	11,392.7	4	113,590.8	<1
Effective Habitat	**8,350.3**	**55,226.5**	**109.5**	**8,240.8**	**-1**	**55,117.0**	**<-1**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

Hoary Marmot

Hoary marmot occurs year-round in open alpine and subalpine sites that support lush plant growth, good visibility to detect predators, and appropriate underlying soil structure both to facilitate burrowing and uphold the structural integrity of burrows over time. Existing anthropogenic disturbances within the LAA, including the Eskay Creek MAR and the past producing Eskay Creek Mine, have resulted in the direct and indirect loss or alteration of hoary marmot habitats.

Effective hoary marmot growing season habitat occurs throughout much of the LAA at higher elevations and is noticeably absent along the Iskut River valley that contains the Eskay Creek MAR. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 1,310.2 ha of effective hoary marmot growing season habitat within the LAA, a 20% decrease from the existing condition (Table 19.6-17; Figure 19.4-16). The residual change in habitat is predicted to be moderate in magnitude because less than 20% of effective habitat within the LAA will be affected (Table 19.6-1).

Table 19.6-17: Change in Hoary Marmot Growing Season Habitat in the Local Assessment Area and Regional Assessment Area

Habitat Suitability Class	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
High	986.6	16,710.6	23.7	962.9	-2	16,686.8	<-1
Moderate	5,693.6	57,155.8	1,286.5	4,407.1	-23	55,869.3	-2
Low	767.1	13,607.5	247.5	519.6	-32	13,360.0	-2
Nil	13,825.3	96,831.8	718.1	15,383.0	11	98,389.5	2
Effective Habitat	**6,680.2**	**73,866.4**	**1,310.2**	**5,370.0**	**-20**	**72,556.2**	**-2**

Source: Appendix 19-3, Wildlife Habitat Suitability Baseline

Notes:
LAA = Local Assessment Area; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare

The LAA supports a greater number of hoary marmot colonies than the Assessment Footprint (Appendix 19-1, Wildlife Cumulative Baseline Report) and the bench where the Project is situated likely provides lower suitability habitat for denning hoary marmot because of its lower elevation and subdued topography.

In addition, soil surficial material information was unavailable for the RAA, which has likely resulted in an overprediction of habitat suitability in the Assessment Footprint and LAA (Appendix 19-3, Wildlife Habitat Suitability Baseline). Therefore, adverse effects on hoary marmot are anticipated to be less than those predicted by the HSM. Additionally, adverse effects on hoary marmot will be reduced through species-specific mitigation measures (e.g., pre-clearing survey and salvage if individuals, if necessary) and follow-up activities (Section 19.8, Follow-up Strategy). Regionally, construction of the Project is predicted to result in a 2% decrease in effective hoary marmot growing season habitat within the RAA from the existing condition.

The Operations phase is not anticipated to result in the direct loss or alteration of marmot growing season habitats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint, including adjacent to the Eskay Creek MAR. Additionally, adverse residual effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species, and reclaimed habitats are expected to support hoary marmot over time.

Bats

The potential for the Project to interact with little brown myotis and long-eared myotis is assessed in this section based on baseline survey results. Conditions that typically support bat hibernacula, such as karst topography, is absent within the LAA and baseline surveys indicated that existing mine adits in the LAA are not in use by bats. There is some evidence that bats can use smaller natural features such as rock crevices for overwintering, but the long cold winter at the Project site likely precludes their use of this type of hibernacula.

Habitat use by bats in the LAA is likely limited to foraging and roosting habitats. Old-growth forests and low-elevation riparian areas, wetlands, and open water often support abundant insect populations for foraging bats and occur throughout the low-elevation areas of the LAA and RAA. Old-growth forests that include dead or declining trees, or rocky outcrops with crevices, are often used for maternity roosts. However, these habitats are limited near the mine site that is higher in elevation with most treed areas made up of krummholz or stunted smaller trees.

Construction of the Project is predicted to result in the direct and indirect loss and alteration of 379.4 ha of mature and old structural stage forest habitats within the LAA, a 4% decrease from the existing condition (Table 19.6-18). Maternity roosting habitats within the LAA are expected to be primarily limited to the riparian areas along the Unuk and Iskut rivers and Volcano Creek that support mature cottonwood, spruce, and fir trees that may support maternal roosts and day roosts for various bat species. Therefore, the Project will result in limited losses of potential maternity roosting habitat and bat-specific mitigation measures such as avoiding clearing during the summer roosting season (Section 19.5.3, Mitigation Measures and Effectiveness) will be implemented.

Table 19.6-18: Change in Mature and Old Forest Habitats in the Local Assessment Area and Regional Assessment Area

Structural Stage[1]	Existing Condition		Residual Condition				
	LAA Area (ha)	RAA Area (ha)	Amount of Habitat Lost/ Altered (ha)	LAA Area (ha)	Percent Change in the LAA (%)	RAA Area (ha)	Percent Change in the RAA (%)
Mature	6,248.1	49,539.7	271.5	5,976.6	-4	49,268.2	<-1
Old	3,376.9	16,676.4	107.9	3,269.0	-3	16,568.5	<-1
Total	**9,625.0**	**66,216.1**	**379.4**	**9,245.6**	**-4**	**65,836.7**	**<-1**

Source: Adapted from Table 18.6-4 in Section 18.6.1. Loss of Ecosystem Site Groups, of the Vegetation and Ecosystems VC Assessment (Chapter 18, Vegetation and Ecosystem Effects Assessment)

Notes:

LAA = Local Assessment Area; RAA = Regional Assessment Area.

% = percent; < = less than; ha = hectare

[1] Structural stage summarized from the Eskay Creek Revitalization Project: 2020-2021 Vegetation and Ecosystem Mapping Baseline Report (Appendix 18-1) where mature = 80–250 years and old = >250 years

The Operations phase is not anticipated to result in the direct loss or alteration of habitat for bats (i.e., through land clearing) beyond what has already been considered during the Construction phase. However, the Project will result in an indirect change in habitat resulting from emissions, discharges, and wastes (i.e., sensory disturbance). The Project will result in noise, vibration, and light emissions that collectively have the potential to result in avoidance of the Assessment Footprint, including adjacent to the Eskay Creek MAR.

Additionally, adverse effects associated with edge effects and fragmentation that were initiated during the Construction phase will continue and the duration will extend through the Operations phase.

Reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in topography and surficial materials made throughout the mining process and therefore, reclaimed habitats are not considered as being suitable for the purposes of this residual effects assessment. However, active revegetation will use native plant species, and reclaimed habitats are expected to support bats, more immediately for foraging and for roosting over time.

Species of Conservation Concern

While bat species have varying habitat preferences, the residual effects described above for the bat Sub-VC are anticipated to be representative of potential effects on bat species of conservation concern detected within the RAA: little brown myotis, silver-haired bat, and northern myotis. Additionally, mitigation measures are anticipated to be effective at reducing potential adverse effects on bat species of conservation concern, including hoary bat. No *SARA*-defined critical habitat for bats occurs within the RAA.

Raptors

Raptor species, including species of conservation concern (i.e., northern goshawk, Swainson's hawk, rough-legged hawk), use a variety of habitats for foraging, whereas nesting sites are typically more restricted to specific microsites that are also sensitive to disturbance. A variety of common raptor species have been detected within the RAA but there are no known raptor nests within the LAA. The LAA lacks the three standard elements of raptor habitat—large trees for nesting northern goshawk were not detected, large patches of open habitats that could support breeding short-eared owl or steep cliffs that support other nesting raptor species (e.g., peregrine falcon). Raptor nesting habitat is generally more abundant in low-lying riparian areas surrounding the Iskut and Unuk rivers and cliff habitat on the western side of the Iskut River where raptor nesting has been documented. Therefore, the Project will result in limited losses of potential raptor nesting habitat, including for species of conservation concern, particularly following the application of raptor-specific mitigation measures such as avoiding clearing during the nesting season near active nests (Section 19.5.3, Mitigation Measures and Effectiveness).

Species of Conservation Concern

Residual effects on raptor species of conservation concern detected within the RAA, including northern goshawk, Swainson's hawk, and rough-legged hawk, are anticipated to reflect the assessment for the raptors Sub-VC described above. Additionally, mitigation measures are anticipated to be effective at reducing potential adverse effects on raptor species of conservation concern. Species-specific surveys for northern goshawk yielded no detections of the species and the Project is unlikely to adversely affect the species. Swainson's hawk primarily nests in small forest patches or in solitary trees large enough to support a raptor stick nest, which are limited within the assessment areas (Table 19.6-18), and occasionally on anthropogenic structures (Birds of the World 2022). Rough-legged hawk typically breeds high on cliffs, riverbanks, or rocky outcrops, which is are limited within the LAA, and rough-legged hawk is not anticipated to interact with the Project because the species typically breeds in the Arctic (Birds of the World 2022).

Waterbirds

Waterbirds use a variety of wetland, open water, and riverine habitats during the breeding and spring and fall staging and migration seasons. Species that breed within the LAA are relatively common, including common merganser, mallard, lesser scaup, Canada goose, and common loon. During migration, a greater

number of individuals and species occur within the LAA, but there were no large concentrations of birds observed within the LAA which is consistent with survey results for other mining projects in the region (i.e., Brucejack, KSM). The region surrounding the LAA contains small waterbodies that may be used for breeding by waterbirds, however, there is an overall more abundant use of low-elevation waterbodies by waterbirds. The LAA contains little seasonally available staging habitat and cannot accommodate large flocks of waterbirds.

Construction of the Project is predicted to result in the direct and indirect loss and alteration of 165.9 ha of wetland habitat within the LAA, a 7% decrease from the existing condition (Table 19.6-2). Most of this habitat loss or alteration is attributable to the construction of the TMSF and the loss or alteration of 146.7 ha of open water habitat. Species most likely to be adversely affected are common and the Project is not anticipated to result in the loss or alteration of riverine habitats that could adversely affect more sensitive species. Therefore, the Project will result in limited losses of waterbird breeding and migration habitat, particularly following the application of waterbird-specific mitigation measures such as avoiding clearing during the nesting season (Section 19.5.3, Mitigation Measures and Effectiveness).

Species of Conservation Concern

Residual effects on waterbird species of conservation concern detected within the RAA, harlequin duck, surf scoter, long-tailed duck, killdeer (*Charadrius vociferus)*, and red-necked phalarope (*Phalaropus lobatus*), are anticipated to reflect the assessment for the overall waterbirds Sub-VC. Additionally, mitigation measures are anticipated to be effective at reducing potential adverse effects on waterbird species of conservation concern. Harlequin duck breeds in fast-moving streams (Birds of the World 2022) which will remain unaffected by the Project. Surf scoter, long-tailed duck, and red-necked phalarope typically breed in more northern latitudes (Birds of the World 2022) and are unlikely to be affected by the Project outside of limited losses to migration habitat. Killdeer nest in a variety of open habitats, such as mudflats and large patches of gravel (Birds of the World 2022). The LAA does not contain large patches of open habitats and rather, killdeer may be attracted to the Project Footprint once areas are cleared during phases of the Project which will be mitigated by the application of pre-clearing surveys during the nesting season (Section 19.5.3, Mitigation Measures and Effectiveness). The Project is not anticipated to interact with habitat for great blue heron or western grebe.

Upland Breeding Birds

Upland birds use a variety of upland and wetland habitats during the breeding for nesting and foraging. Construction of the Project is predicted to result in the direct and indirect loss and alteration of 2,123.7 ha of native ecosystems within the LAA, a 10% decrease from the existing condition (Table 19.6-2). However, due to the elevation and slope position of the Project Footprint, most species that breed within the LAA are relatively common, including varied thrush, fox sparrow, Wilson’s warbler, dark-eyed junco, and sooty grouse.

Species most likely to be adversely affected are common and the Project is not anticipated to result in a notable loss or alteration of species of conservation concern or unique habitats for upland breeding birds. Construction of the Project may create breeding habitat for species that tend to breed in developed sites, such as olive-sided flycatcher. Therefore, while the Project will result in the loss or alteration of habitat for upland breeding birds, adverse effects will be reduced following the application of mitigation measures, such as avoiding clearing during the nesting season (Section 19.5.3, Mitigation Measures and Effectiveness).

Residual adverse effects on upland breeding birds during the Operations and Closure and Reclamation phases are the same as those predicted for bats.

Species of Conservation Concern

Residual effects on upland breeding bird species of conservation concern detected within the RAA, barn swallow, common nighthawk, and olive-sided flycatcher, are anticipated to generally reflect the assessment for the overall upland breeding birds Sub-VC. Additional, mitigation measures are anticipated to be effective at reducing potential adverse effects on upland breeding bird species of conservation concern. Olive-sided flycatcher is a species that often inhabits edge or disturbed habitats (Birds of the World 2022) and was detected in the LAA along the Eskay Creek MAR leading to the existing mine camp, and in two areas of the RAA but not on the mine site. Common nighthawk is often associated with open areas at disturbed sites where nesting occurs amongst exposed substrates (Birds of the World 2022) and the species was detected in the LAA at an existing aggregate stockpile area along the Eskay Creek MAR, and in the RAA near the camp for the Forrest Kerr Hydroelectric Dam but not at the mine site. Barn swallow is also a species associated with disturbed sites, with nesting being strongly connected with anthropogenic structures, rarely nesting in natural habitats (Bird of the World 2022). Olive-sided flycatcher, common nighthawk, and barn swallow may be attracted to the Project Footprint once areas are cleared and infrastructure is established during phases of the Project which will be mitigated, if necessary, by the application of pre-clearing surveys during the nesting season for active nest sites and residences (Section 19.5.3, Mitigation Measures and Effectiveness). Barn swallow were observed nesting on the existing buildings at the historic Eskay Creek Mine in previous years and will require mitigation during the construction and operation of the Project (Section 19.5.3, Mitigation Measures and Effectiveness). The Project is not anticipated to interact with habitat for black swift.

Amphibians

Construction of the Project is predicted to result in the direct and indirect loss and alteration of 165.9 ha of wetland habitat within the LAA, a 7% decrease from the existing condition (Table 19.6-2). Habitat suitability of wetlands for breeding amphibians within the LAA is generally low, but there are a limited number of wetlands that support breeding western toad and Columbia spotted frog. In many cases ponds in the mine site area are frozen until June, thereby missing the amphibian breeding period and few contained amphibians during baseline surveys. Wetlands with breeding amphibians in the LAA are at low-elevation outside of the Project Footprint and are not anticipated to be adversely affected by the Project. Therefore, the Project will result in limited losses of amphibian breeding habitat, if any, particularly following the application of amphibian-specific mitigation measures such as avoiding clearing during the breeding season (Section 19.5.3, Mitigation Measures and Effectiveness).

Residual adverse effects on amphibians during the Operations and Closure and Reclamation phases are the same as those predicted for bats.

Species of Conservation Concern

Residual effects on the only amphibian species of conservation concern detected within the RAA, western toad, are anticipated to reflect the assessment for the overall amphibians Sub-VC. Additionally, mitigation measures are anticipated to be effective at reducing potential adverse effects on western toad. Western toad breeds in wetlands with shallow margins, low water flow, and an open canopy, characteristics which provide warmer water temperatures for tadpoles to develop (Provincial Western Toad Working Group 2014). The majority of wetlands within the LAA are of low habitat suitability for western toad. Three confirmed breeding

sites occur outside of the Assessment Footprint and are additionally separated from the Project Footprint by a narrow canyon and the Tom MacKay Creek and Ketchum Creek which provide a physical barrier. Metamorphosed toads and adults disperse from breeding sites post-breeding or post-breeding season and forage and overwinter in a variety of habitats such as forests and meadows (Provincial Western Toad Working Group 2014). Although western toad may disperse up to 7 km from breeding sites (Provincial Western Toad Working Group 2014), known breeding sites within the LAA are physically separated from the Project Footprint, therefore, the Project is anticipated to result in limited losses to western toad overwintering habitat.

19.6.1.3 Characterization of Residual Effect for Change in Habitat

Following the implementation of mitigation measures described in Section 19.5.3, Mitigation Measures and Effectiveness, residual effects for the measurable parameters used to assess change in habitat (Table 19.5-2) are summarized below, followed by a summary of the overall residual effect characterization for change in habitat.

The Project will result in the direct and indirect loss and alteration of wildlife habitat and the degree to which species are predicted to be adversely affected is summarized in Table 19.6-19. Effects are generally expected to be contained within the LAA, but mountain goats may temporarily avoid the LAA due to sensory disturbance associated with helicopter activity. Except for hoary marmot dens that are relatively common in the LAA, there are no known sensitive habitat features within the Assessment Footprint with potential to interact with the Project. However, mitigation measures (e.g., pre-clearing surveys) and follow-up activities are planned (Section 19.8, Follow-up Strategy). A low to moderate magnitude adverse residual effect is predicted for all Sub-VCs and representative species (Table 19.6-19). Additionally, construction of the Project is not anticipated to result in a disproportionate amount of habitat loss or alteration for species of conservation concern known or assumed to occur within the LAA, including for *SARA*-listed species (i.e., grizzly bear, wolverine, bat species, barn swallow, common nighthawk, olive-sided flycatcher, red-necked phalarope, western toad), and habitats for these species will remain relatively abundant in the LAA and RAA.

Table 19.6-19: Summary of Residual Change in Habitat Results

Sub-VC and Representative Species (if Applicable)		HSM (Season)	Amount of Effective Habitat Lost/ Altered (ha)	Percent (%) Change in Effective Habitat in the LAA	Percent (%) Change in Effective Habitat in the RAA	Magnitude of Residual Effect[1]
Moose		Late winter	322.7	-3	<-1	Low
		Early winter	332.9	-3	-1	Low
		Growing	1,697.9	-10	-2	Low
Mountain goat		Winter	216.3	-4	<-1	Low
		Growing	1,112.0	-9	-1	Moderate
Furbearers	Grizzly bear	Spring	155.2	-2	<-1	Low
		Summer	171.4	-2	<-1	Low
		Fall	1,308.9	-8	-1	Moderate
	Black bear	ND	ND	ND	ND	Low
	Wolverine	Growing	1,419.7	-9	- 1	Moderate
		Winter	25.5	-1	<-1	Low

Sub-VC and Representative Species (if Applicable)		HSM (Season)	Amount of Effective Habitat Lost/ Altered (ha)	Percent (%) Change in Effective Habitat in the LAA	Percent (%) Change in Effective Habitat in the RAA	Magnitude of Residual Effect[1]
Furbearers *(cont'd)*	Marten	Growing	405.2	-4	-1	Low
		Winter	405.2	-4	-1	Low
	Fisher	Growing	109.5	-1	<-1	Low
		Winter	109.5	-1	<-1	Low
	Hoary Marmot	Growing	1,310.2	-20	-2	Moderate
Bats		ND	ND	ND	ND	Low
Raptors		ND	ND	ND	ND	Low
Waterbird		ND	ND	ND	ND	Low
Upland Breeding Birds		ND	ND	ND	ND	Low
Amphibians		ND	ND	ND	ND	Low

Notes:
HSM = Habitat Suitability Model; LAA = Local Assessment Area; ND = no data; RAA = Regional Assessment Area
% = percent; < = less than; ha = hectare
[1] Magnitude criteria described in Table 19.6-1

During the Reclamation and Closure and Post-closure phases, there will be a reduction in sensory disturbance within the LAA from the existing condition. While reclamation activities are not predicted to produce a post-mining landscape that is identical to pre-mining conditions due to the changes in climate (hotter and wetter than the existing condition), topography, and surficial materials made throughout the mining process, it is anticipated that the reclaimed habitat that was lost or altered will over time provide habitat opportunities for wildlife.

The residual effect for a change in habitat is characterized as follows:

- Magnitude is low to moderate: a low-magnitude adverse residual effect is predicted for most Sub-VCs and representative species. Except for hoary marmot dens that will require additional mitigation, there are no known sensitive wildlife features (e.g., mineral licks, raptor nests) expected to interact with the Project.
- Geographic extent is landscape to regional: most sensory disturbance will occur within the LAA which may result in avoidance by species such as mountain goat, but helicopter traffic may disturb wildlife beyond the LAA.
- Duration is far-future: while most activities will cease once the Post-closure phase begins (i.e., after 17 years), reclamation and natural succession lasting >50 years will be required to restore wildlife habitat.
- Frequency is continuous: the direct and indirect habitat loss and alteration will persist continuously during construction and operation of the Project, but only the physical disturbance will remain into the Post-closure phase.
- Reversibility is irreversible: while wildlife habitats will be established following reclamation of the Project, they are not expected to replicate the existing conditions within 50 years (e.g., mature forest).
- Resilience is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative residual effect.

- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife habitat have been identified as concerns by Indigenous Nations and government agencies.
- Probability is high: the Project is highly likely to result in an adverse residual effect on wildlife habitat.

19.6.2 Change in Movement

19.6.2.1 Analytical Assessment Techniques

Change in movement is assessed qualitatively relative to existing conditions for wildlife by considering factors that contribute to the sensitivity of wildlife to Project-specific effect mechanisms, relevant literature, and professional judgment. The Project will use the existing Eskay Creek MAR and haul roads and no new linear features will be constructed that could adversely affect wildlife movement. Therefore, a quantitative analysis for change in movement (e.g., linear feature density analysis) is not necessary and effects on wildlife resulting from a change in movement can be confidently assessed qualitatively.

Effects on the wildlife movement of birds and bats are not considered a potential effect for these species because they can avoid the Project by flying around or over barriers. Additionally, the Project is not anticipated to disrupt the movement of hoary marmot due to the relatively small home range size of this species (13.5 ha; Armitage 2000). Therefore, the assessment of change in movement (corridors) focuses on the other mammal Sub-VCs and the amphibian Sub-VCs.

19.6.2.2 Residual Effects Assessment

Wildlife corridors consist primarily of natural landscape features, such as river valleys between mountains, that facilitate and concentrate the movement of individuals between habitat patches. As such, the mine is not anticipated to present a physical or sensory barrier to wildlife as it is higher in elevation and relatively open habitat and wildlife will continue to be able to move around in all directions and maintain seasonal movement patterns. Additionally, the LAA is subject to existing disturbance by the existing Eskay Creek Mine. Primary movement corridors in the LAA are expected to include the Volcano and Harrymel creeks and the Iskut and Unuk River valleys.

The Project will not result in the creation of physical barriers that could adversely affect wildlife movement along the Harrymel Creek and Unuk River. Additionally, these waterways are ≥1.2 km and ≥2.0 km from the Assessment Footprint, respectively, and the Project is unlikely to create a sensory barrier that would adversely affect wildlife movement in these corridors. As such, effects of the Project on wildlife movements along the Harrymel Creek and Unuk River valleys are anticipated to be negligible.

The Iskut River valley is a potential wildlife corridor that facilitates and concentrates wildlife movements along the Iskut River further westwards and eastwards, including connecting to the Ningunsaw River valley in the east. This wildlife corridor is subject to existing physical and sensory barriers through the construction and operation of the Eskay Creek MAR and the Forrest Kerr Hydroelectric Dam and associated hydroelectric transmission lines that have likely had an adverse effect on wildlife movement in the LAA. Construction of the Project is not anticipated to result in the addition of physical barriers that could adversely affect wildlife movements, but the increase in vehicular traffic along the Eskay Creek MAR will increase

sensory disturbance which could reduce barrier permeability (i.e., increased level of resistance to animal movement across the landscape). The Iskut River valley is 4 to 8 km wide. Even if wildlife were avoiding the Eskay Creek MAR, they can still move through the river valley due to its width and availability of habitat. Effects are expected to be reversible long-term as traffic volumes and the associated sensory barriers will begin to subside following the Construction and Operations phases, a collective period of 14 years.

The Volcano Creek valley is a potential wildlife corridor that facilitates and concentrates wildlife movement between the Unuk and Iskut River valleys. This wildlife corridor is subject to existing physical and sensory barriers through the construction and operation of the Eskay Creek MAR and Volcano Creek Hydroelectric Dam that has likely had an adverse effect on wildlife movement in the LAA. Construction and operation of the Project will not result in the expansion of existing physical barriers to wildlife movement, but sensory disturbance associated with Project transportation will be increased and as described above, is expected to be reversible.

Species most likely to be adversely affected by a change in movement are those that move between seasonal ranges and/or use defined movement corridors (i.e., moose, mountain goat, grizzly bear, wolverine, western toad) compared to those that have relatively small home ranges and limited seasonal movements (i.e., marten, fisher):

- Moose generally prefer high-elevation areas in summer and move to lower elevations in winter. Linear features are often used by foraging moose as movement corridors to access preferred habitats (Finnegan 2023). However, predators may also exploit linear features which may increase moose mortality risk (Section 19.6.3, Change in Mortality Risk).
- Mountain goats generally prefer south- and west-facing slopes above the tree line in the summer and move below the tree line in the winter into similar habitats; both are associated with steep terrain used for escape from predators. The species is sensitive to disturbance, particularly helicopter noise, but evidence suggests mountain goats may become habituated to helicopters and other mining activities over time (Rescan 2013a). The potential effects of helicopter disturbance on mountain goat in the region have previously been of specific concern to TSKLH (Rescan 2009b; Rescan 2013b). Mountain goats seldom travel to low elevations and could interact with the Project roads, except when travelling to salt licks; however, no salt licks were observed during baseline surveys.
- Grizzly bears generally prefer low-elevation riparian areas in the spring and summer (e.g., along rivers) with increased use of higher elevation drainages in the summer, and fall habitat is widely distributed and expanded upwards in elevation. Seasonal movements avoid deep snowpack while following the seasonal availability food (e.g., salmon, berries, other plants) and individuals move back to higher elevations for denning in the winter. Grizzly bears may use linear features as movement corridors to access preferred habitats, but often avoid these features if associated with sensory disturbance (e.g., vehicles; Wielgus 2011). Additionally, the potential effects of helicopter disturbance on grizzly bear in the region have previously been of specific concern to TSKLH (Rescan 2009b).
- Wolverine seasonal and daily movement patterns are primarily driven by food availability and distribution (Weir 2004) and the availability of large expanses of undisturbed habitat. Prey species such as mountain goat, hoary marmot, and other ungulate species have seasonal movements that wolverines may follow. Wolverine often use anthropogenic linear features to improve foraging efficiency to move more easily across the landscape to access habitats that support prey, such as along rivers and creeks (Scafford 2017).

- Western Toad undergo pre- and post-breeding movements between wetland and upland habitats that at times can form mass-movement events (ECCC 2016). Known western toad breeding sites occur within the Assessment Footprint but are across the steep-banked Tom MacKay and Ketchum creeks where no physical Project disturbance is anticipated and, therefore, the Project is not anticipated to adversely affect the movement of western toad.
- Fisher and marten maintain relatively small territories in dense forest habitats and have limited seasonal movements. However, both species may undertake movement events when displaced by a competitor or by disturbance, and natal dispersal is important for population maintenance. Some studies suggest that fisher have low dispersal capabilities of <10 km (e.g., Arthur et al. 1993, Kyle et al. 2001) whereas others indicate that fisher can move long distances (over 200 km) and topographical features and large rivers did not impede fisher movements (Weir and Harestad 1997; Badry 2004). Similarly, marten have similar dispersal capabilities but have been documented moving long distances (up to 80 km), particularly where forested corridors are maintained (Hatler et al. 2003). While both species may disperse across large open areas, an abundance of coarse woody debris and regrowth along linear features, while maintaining surrounding forest connectivity, is presumed to assist in maintaining fisher and marten movement corridors. TSKLH has also previously noted changes in the movement of furbearers from traditional harvesting areas to camps in the region because of sensory attractants (e.g., smell, waste; Pretium Resources 2014b; Rescan 2013b).

Anthropogenic disturbances have already created physical and sensory barriers for wildlife movement within the LAA, but construction and operation of the Project will contribute additional barriers that may temporarily affect wildlife movement for some species. Over time it is expected that wildlife will acclimatize to the physical and sensory barriers presented by the Project and the corridors (i.e., surrounding valleys) will remain largely forested which is expected to facilitate the continued movement of wildlife and corresponding gene flow. While there are no documented wildlife corridors or large-scale movement patterns within the LAA or RAA, these have not explicitly been surveyed, and surveys will be completed in 2023/2024 to reduce uncertainty (Section 19.8, Follow-up Strategy).

During the Reclamation and Closure, and Post-closure phases, there will be a reduction in physical and sensory barriers within the LAA, and the conditions for wildlife following reclamation of the Project will return to, or be improved from, the existing condition over the long-term.

19.6.2.3 Characterization of Residual Effect for Change in Movement

Following the implementation of mitigation measures described in Section 19.5.3, Mitigation Measures and Effectiveness, residual effects for the measurable parameters used to assess change in movement (Table 19.5-2) are summarized below, followed by a summary of the overall residual effect characterization for change in movement.

There remains uncertainty regarding the presence and use of wildlife corridors or large-scale movement patterns within the LAA that will be informed through field surveys in 2023/2024 (Section 19.8, Follow-up Strategy). Existing anthropogenic disturbances such as the Eskay Creek MAR, the Forrest Kerr and Volcano Creek Hydroelectric Facilities and associated transmission lines have already created barriers to wildlife movement within the LAA. Construction and operation of the Project are expected to contribute to the existing sensory barrier along the Iskut River valley and the existing sensory and physical barriers along the Volcano Creek valley which may adversely affect wildlife movement.

During the Reclamation and Closure, and Post-closure phases, there will be a reduction in physical and sensory barriers within the LAA, and the conditions for wildlife following reclamation of the Project will return to, or be improved from, the existing condition over the long-term.

The residual effect of a change in movement is characterized as follows:

- Magnitude is low: a measurable change in the abundance of wildlife in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur.
- Geographic extent is local: an effect is limited to the Assessment Footprint and the LAA will remain unaffected to facilitate wildlife movement.
- Duration is medium-term: wildlife movement is expected to return to the existing condition following the completion of the Closure and Reclamation phase, a period of 17 years.
- Frequency is continuous: physical and sensory barriers will persist continuously during the Construction and Operations of the Project, but only the physical barrier will remain into the Post-closure phase.
- Reversibility is reversible long-term: effects are reversible following the completion of the Closure and Reclamation phase, a period of 17 years.
- Resiliency is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative residual effect.
- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife movement have been identified as concerns by Indigenous Nations and government agencies.
- Probability is low: construction and operation of the Project is unlikely to result in an adverse residual effect on wildlife movement, but it could occur.

19.6.3 Change in Mortality Risk

19.6.3.1 Analytical Assessment Techniques

Change in mortality risk was assessed qualitatively through changes in direct and indirect sources of mortality (e.g., vehicle-wildlife collisions, human–wildlife conflict). The qualitative assessment included a combination of literature review and professional judgment to predict the mortality risks to wildlife.

Direct sources of mortality risk were estimated based on vehicular traffic estimates and wildlife–vehicle accident data within the TCAA. Data exist to adequately assess vehicle-wildlife collisions for large mammals such as moose and bears, but collisions with smaller wildlife species, such as amphibians, birds (such as pine siskin that is often attracted to roadways), and small mammals, are underreported because they often do not result in vehicle damage or visible roadside carcasses. Therefore, the assessment of Project-related traffic on change in mortality risk is primarily based on predicted changes to effects on moose and bears and less mobile species such as amphibians. Life history aspects of moose and grizzly bear (e.g., lower fecundity rates) also suggest that populations of these species are most likely to be adversely affected by increased additive mortality resulting from vehicle collisions compared to other more abundant and resilient wildlife species.

19.6.3.2 Residual Effects Assessment

Highway 37 and Highway 37A are characteristically remote and have relatively low traffic volumes relative to their capacity (Traffic Volume Study, Appendix 1-9). The Project is anticipated to result in annual average daily traffic volume increases of up to 25 trips/day (8%) on Highway 37 north of Meziadin Junction and seven trips/day (7%) on Highway 37A (Traffic Volume Study, Appendix 1-9). The Project is also anticipated to result in annual average daily traffic volume increases of up to seven trips/day (1%) on Highway 37 south of Meziadin Junction which is a negligible change and is not assessed further. Values represent the peak predicted increases during the Operations phase (year 8) and are anticipated to be reduced during all other Project phases and other years of operation and are reversible following completion of the Project. Mitigation measures are expected to reduce wildlife mortality risk, such as abiding by posted speed limits and using multi-passenger vehicles, where practical, to reduce the potential for wildlife–vehicle collisions (Section 19.5.3, Mitigation Measures and Effectiveness).

The greatest potential for a change in mortality risk relates to increased mortality of western toad, a species of conservation concern that often undertakes mass-dispersal events during the breeding season and late-summer migration when juvenile toads migrate from breeding sites to upland overwintering habitats. Project transportation (e.g., concentrate hauling), particularly during rain events that facilitate seasonal dispersal, could result in the mortality of many individuals at one or more crossings along the Transportation Corridor which could have an adverse effect on the species' local population. However, Skeena Resources does not own the highway and there remains uncertainty relating to the degree to which Project transportation will interact with western toad mass-movement events due to a lack of data, particularly along Highway 37 north of the Meziadin Junction.

There were 42 and 47 reported vehicle collisions with moose and bears, respectively, along Highway 37 between Meziadin Junction and the Burrage Creek Bridge (176 km) over a 9-year period from 2004 to 2013 (Hesse and Rea 2016). When standardizing collision rates to the 137 km of Highway 37 between Meziadin Junction and the Eskay Creek MAR, annual collision rates are 3.6 and 4.1 collisions per year for moose and bears, respectively. Data for Highway 37A between Meziadin Junction and the town of Stewart are unavailable and collision rates for Highway 37 are assumed to be representative of Highway 37A. Therefore, the Project has the potential to increase annual vehicle-wildlife collisions by 0.3 collisions per year for both moose and bear on the 137 km of Highway 37 between Meziadin Junction and the Eskay Creek MAR. Additionally, the Project has the potential to increase annual vehicle-wildlife collisions by 0.1 collision per year for both moose and bear on the 64 km of Highway 37A from Meziadin Junction to ports in the District of Stewart (64 km).

The collision estimates have been developed specifically to reduce bias resulting from underreporting (Hesse and Rea 2016) and while collision rates could be higher, it is unlikely that there is notable underreporting of collisions with large mammals such as moose and bear. Additionally, there are no known high-risk wildlife crossings within the TCAA, including for western toads that undergo pre- and post-breeding movements between wetland and upland habitats that at times can form mass-movement events (ECCC 2016). Therefore, the residual adverse effect of Project-related traffic on wildlife mortality risk resulting from vehicle-wildlife collisions along Highway 37 and 37A is predicted to be low in magnitude and is reversible. While annual vehicle-collision rates are expected to be higher for other wildlife species (e.g., amphibians, birds, small mammals), the relatively low increase in Project-related traffic is also predicted to result in an adverse residual effect is predicted to be low in magnitude and is reversible for these species. This is a

prediction consistent with the extensive traffic effects assessment completed for the KSM Project, including moose population viability analyses (Rescan 2013d).

The existing annual traffic along the Eskay Creek MAR has been estimated at 3,637 one-way vehicle trips per year, or fewer than 20 passing vehicles per day (Environmental Assessment Leader, Skeena Resources, pers. comm., 11 September 2023). Estimates were generated from the start of the Eskay Creek MAR and are assumed to be reduced along the portion of the road adjacent to Volcano Creek (i.e., when excluding most other traffic sources). Assuming Project-related transportation results in the same traffic volume increase as along Highway 37 north of Meziadin Junction, the Project will result in an annual average daily traffic volume increase of up to 25 trips/day along the Eskay Creek MAR, more than doubling traffic volumes compared to the existing condition. However, up to 25 trips/day during peak operations remains a low-traffic load and when paired with the relatively slow maximum speed limit of 60 km/h, which will reduce wildlife mortality risk (Seiler 2005) along the Eskay Creek MAR, and an adverse residual effect is not anticipated.

During the Closure and Reclamation and Post-closure phases, Project-related traffic will be reduced and eventually eliminated along will the corresponding wildlife mortality risk.

19.6.3.3 Characterization of Residual Effect for Change in Mortality Risk

Following the implementation of mitigation measures described in Section 19.5.3, Mitigation Measures and Effectiveness, residual effects for the measurable parameters used to assess change in mortality risk (Table 19.5-2) are summarized below, followed by a summary of the overall residual effect characterization for change in mortality risk.

The Project is anticipated to result in a minor incremental increase in traffic along Highways 37 and 37A and along the access roads (i.e., within the TCAA). Species most likely to be adversely affected are large mammals, such as moose and bears, and less mobile species such as amphibians, but a wide range of wildlife species are predicted to be affected, such as birds, and small mammals. During Closure and Reclamation and Post-closure phases, there will be a reduction and eventual cessation of Project-related traffic which will reduce wildlife mortality risks to existing condition levels.

The residual effect for a change in mortality risk is characterized as follows:

- Magnitude is low to moderate: for most species, a measurable change in the abundance of wildlife in the LAA or TCAA is not anticipated, although temporary local shifts in distributions in the LAA might occur; however, a measurable change in the abundance and/or distribution of wildlife along the TCAA might occur for western toad, but a measurable change on the abundance of the species in the RAA is not anticipated.
- Geographic extent is landscape: mortality risks associated with Project transportation are not anticipated to extend beyond the LAA or TCAA.
- Duration is medium-term: wildlife mortality risk is expected to return to the existing condition following the completion of the Closure and Reclamation phase, a period of 17 years.
- Frequency is continuous: risks to wildlife will persist continuously during the construction and operation of the Project and will become reduced and eventually eliminated during the Post-closure phase.

- Reversibility is reversible long-term: effects are reversible following the completion of the Closure and Reclamation phase, a period of 17 years.
- Resiliency is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative residual effect.
- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife mortality risk have been identified as concerns by Indigenous Nations and government agencies.
- Probability is low: construction and operation of the Project is unlikely to result in an adverse residual effect on wildlife mortality risk, but it could occur.

19.6.4 Summary of the Assessment of Residual Effects

A summary of the characterization of residual adverse effects on the Wildlife and Wildlife Habitat VC is provided in Table 19.6-20.

Table 19.6-20: Characterization of Residual Effects

Residual Effect	Characterization Criteria				
Change in Habitat	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low to Moderate	Landscape to Regional	Far-Future	Continuous	High
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Irreversible	Moderate	High	High	
Change in Movement	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low	Local	Medium-term	Continuous	Low
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Reversible Long-term	Moderate	High	High	
Change in Mortality Risk	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low to Moderate	Landscape	Medium-term	Continuous	Low
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Reversible Long-term	Moderate	High	High	

Confidence in the assessment was also evaluated. Confidence, which can also be understood as the degree of scientific certainty, is a measure of how well residual effects are understood. Confidence includes a consideration of the acceptability of the data inputs and analytical methods used to predict and assess Project effects. It depends on the certainty of the predicted outcome, and it allows the decision-maker to evaluate the risk associated with the Project.

Confidence levels are defined as:

- **Low (less than 50% confidence):** the cause-effect relationship(s) between the Project and its interaction with the environment is poorly understood, datasets (including existing conditions data) for the area of the Project are incomplete or inconsistent, or scientific analyses are incomplete or inconclusive, or there is a combination of these factors, which leads to a high degree of uncertainty*;*
- **Medium (50% to 80% confidence):** the cause-effect relationship(s) between the Project and its interaction with the environment is not fully understood, datasets (including existing conditions data) for the area of the Project are nearly complete, scientific analyses are unverified, or there is a combination of those factors, which leads to a moderate degree of uncertainty; or
- **High (greater than 80% confidence):** the cause-effect relationship(s) between the Project and its interaction with the environment is well-understood, datasets (including existing conditions data) for the area of the Project are complete, and scientific analyses are complete and verified, which leads to a low degree of uncertainty.

A summary of the residual effects assessment for Wildlife and Wildlife Habitat VC is presented in Table 19.6-21. These are the residual effects predicted to occur after the implementation of the mitigation and management measures outlined in Section 19.5.3, Mitigation Measures and Effectiveness. In alignment with the Hybrid AIR (EAO 2023b), residual effects are carried forward into Section 19.7, Cumulative Effects Assessment, regardless of their characterization.

Table 19.6-21: Summary of Residual Effects on the Wildlife and Wildlife Habitat Valued Component

Project Phase	Residual Effect	Residual Effect Characterization	Confidence
Construction	Change in Habitat: Direct loss or alteration of wildlife habitat through land clearing.	**Magnitude:** low to moderate **Geographical extent:** local **Duration:** far-future **Frequency:** continuous **Reversibility:** irreversible **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	High
Construction Operations	Change in Habitat: Indirect loss or alteration of wildlife habitat through sensory disturbance and edge effects.	**Magnitude:** low **Geographical extent:** landscape to regional **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	High
Construction Operations	Change in Movement: Alteration of large-scale wildlife movement patterns or movement corridors.	**Magnitude:** low **Geographical extent:** landscape **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	Moderate

Project Phase	Residual Effect	Residual Effect Characterization	Confidence
Construction Operations	Change in Mortality Risk: Direct increase in mortality risk through vehicle-wildlife collisions.	**Magnitude:** low **Geographical extent:** landscape **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** low	High

19.7 Cumulative Effects Assessment

The potential for cumulative effects arises when the residual effects of a project overlap and interact with) the same resource/receptor that is affected by the residual effects of other past, present, or reasonably foreseeable future projects or activities. The cumulative effects assessment (CEA) considers the potential environmental, economic, health, social, and heritage cumulative effects of the Project according to the requirements of the EAO (as described in the Hybrid AIR). A detailed methodology for this CEA is provided in Chapter 10, Valued Component Effects Assessment. Cumulative effects are characterized using the same criteria as residual effects (Table 19.6-1 in Section 19.6 above), except qualitative magnitude criteria are used.

Cumulative effects have previously been a specific cause for concern for the Tahltan Nation, who, in relation to the current Project, have noted the potential pressures posed by multiple past or proposed mine developments in their territory. TCG has expressed particular concerns over placer mining of jade in their territory, noting that it has resulted in abandoned machinery and shipping containers of discarded jade boulders, in addition to environmental damage; however, TCG action and associated regulation by the provincial government have ended the issuance of new permits for these operations and required closure of existing ones within 5 years (EMLI 2024; TCG 2020a; 2021b; see also Appendix 21-2,Tahltan Socio-economic Baseline Report,).

19.7.1 Assessment Boundaries

The CEA considers the spatial and temporal extent of Project-related predicted changes and residual effects on VCs, combined with the anticipated residual effects from other projects and activities, to assist with analyzing the potential for a cumulative effect to occur.

19.7.1.1 Spatial Boundaries

As described in Section 19.3.1.4, Regional Assessment Area, the RAA is used to assess potential cumulative effects on the Wildlife and Wildlife Habitat VC (Figure 19.7-1; i.e., the RAA represents the CEAA). The Tahltan Cumulative Effects AOI, as described in Section 19.3.1.7, Tahltan Areas of Interest, encompasses the RAA, extending beyond it west to the Canada/United States of America border, east to the height of land between the Iskut and Bell-Irving Rivers and the headwaters of the Skeena River, Nass River and Tūdeẕe chō (Stikine River), north as far as the community of Iskut and south past Bowser Lake (EAO 2023b).

400000
420000
6320000
6300000
6280000
6260000

YT
NT
BC
Iskut
Project Location
Stewart
Smithers
Terrace
Prince George

Bob Quinn Lake
Northwest Transmission Line
37
Ningunsaw River
Volcano Creek Hydroelectric Project
Iskut River
Forrest Kerr Hydroelectric Power
McLymont Creek Hydroelectric Project
Eskay Creek Technical Sample Project/Existing
Eskay Creek Mine
Ketchum Creek
Harrymel Creek
Unuk River
KSM Mine

Service Layer Credits: Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCan, Ordnance Survey, © OpenStreetMap contributors, USGS,

Legend

- Eskay Creek Mine Access Road (MAR)
- Transmission Line
- Project Footprint
- Assessment Footprint

Wildlife

- Local Assessment Area
- Regional Assessment Area

Cumulative Effects Assessment Project Footprints and Point Locations

- Past
- Present
- Future

Tahltan Areas of Interest

- Tahltan Consent Area
- Tahltan Regional AOI
- Tahltan Territory

Skeena Resources Ltd.
Date: 23-Jul-2024
Figure: 19.7-1
Author: Jennifer.D.Thompson
Filename: ESK-23-088

SKEENA RESOURCES

Eskay Creek Revitalization

Figure 19.7-1: Cumulative Effects Assessment Area for the Wildlife and Wildlife Habitat Valued Component

Skeena Mining Division - NTS 104B09
British Columbia, Canada

Scale: 1:200,000
Coord. System: NAD 1983 UTM Zone 9N
0 4 8 12
Kilometres
N

The provincial "Effects Assessment Policy" (EAO 2020) states that "[t]he spatial boundary for CEA for a VC should encompass the area within which the residual effects of the Project are likely to interact cumulatively with the effects of other past, present and reasonably foreseeable future projects and activities on that same VC". The residual adverse Project effects associated with changes in habitat, movement, and mortality risk are not anticipated to extend beyond the LAA (Table 19.6-20) and therefore, the RAA is suitable for assessing cumulative interactions with past, present, or reasonably foreseeable future projects and activities that may overlap in space or time (Table 19.7-1, ahead). Notably, the RAA remains applicable for evaluating cumulative effects on wide-ranging wildlife species (e.g., moose, grizzly bear) because the assessment focuses on where and when residual Project effects interact cumulatively with effects of other projects and activities. For comparison, the RAA is 1,843.7 km^2, which is several times larger than the reported mean home range sizes for moose and grizzly bear. For example, coastal populations of moose have a reported mean annual home range size of up to 125 km^2 for males and 76 km^2 for females (Oehlers et al. 2011), and migratory and non-migratory moose in the Nass Wildlife Area have reported mean home range sizes of up to 218 km^2 and 42 km^2, respectively (Demarchi 2000, Demarchi et al. 2003). Similarly, coastal and interior grizzly bear have a reported mean home range size of up to 137 km^2 and 187 km^2, respectively (MacHutchon et al. 1993; Ciarniello 2006).

19.7.1.2 Temporal Boundaries

The CEA temporal boundaries consider the past and future projects and activities that are known or are reasonably foreseeable, and the degree to which the environmental effects of these projects and activities overlap those predicted from the Project. As noted in Section 19.3.2, Temporal Boundaries, per the Hybrid AIR's discussion of the Tahltan Risk Assessment, the Tahltan approach of forecasting across one to three generations (short-term) and across four to seven generations (long-term) is also considered.

For the Wildlife and Wildlife Habitat VC, the defined timelines extend far enough that the cumulative effects would no longer be measurable or would be considered negligible.

19.7.2 Potential Cumulative Effects and Mitigation

In this section, projects and activities (described and mapped in Chapter 10, Valued Components Effects Assessment Methods) with the potential to cause a cumulative effect with the Project are identified and discussed.

19.7.2.1 Identification of Potential Cumulative Interactions

An effects matrix approach was used to screen and rank the potential for cumulative interactions between the residual effects of the Project and those of other past, present, and reasonably foreseeable projects (Table 19.7-1), while activities with potential to interact cumulatively with the residual effects of the Project are presented below Table 19.7-1. Cumulative interactions identified are described and supporting rationale for the assigned interaction rankings are provided. Data gaps are clearly stated, and concerns related to cumulative effects raised by Indigenous Nations, government agencies, local governments, the public, and other stakeholders are summarized.

Within the effects matrix below, the potential for interaction is assigned a symbol as follows:

- **Empty circle (○):** a cumulative interaction between the Project's residual effects and those of other projects and activities is not expected;
- **Half-filled circle (◐):** a cumulative interaction between the Project's residual effects and those of other projects and activities is possible; and
- **Filled circle (●):** a cumulative interaction between the Project's residual effects and those of other projects and activities is likely.

Cells coded as *not expected* (○) are considered to have no potential for a cumulative interaction and are scoped out of further assessment in this chapter. Cumulative interactions considered *possible* (◐) or *likely* (●) are described below and carried forward to the next step in the assessment.

Table 19.7-1: Potential Interactions between the Residual Effects of the Project on the Wildlife and Wildlife Habitat Valued Component and the Residual Effects of Other Projects

Projects	Potential Interaction with the Wildlife and Wildlife Habitat VC		
	Change in Habitat	Change in Movement	Change in Mortality Risk
Past Projects			
Eskay Creek Mine (historical)	●	●	◐
Kitsault Mine[1]	○	○	◐
Snip Mine[1]	○	○	◐
Tulsequah Chief Mine	○	○	◐
Present Projects			
Brucejack Mine	●	○	◐
Coastal GasLink Pipeline	○	○	◐
Forrest Kerr Hydroelectric	●	●	◐
LNG Canada Export Terminal	○	○	◐
Long Lake Hydroelectric	○	○	◐
McLymont Creek Hydroelectric	●	●	◐
Northwest Transmission Line	●	●	◐
Pacific Trail Pipeline	○	○	◐
Premier Gold Mine	○	○	◐
Red Chris Mine	○	○	◐
Rio Tinto BC Works	○	○	◐
Silvertip Mine Project	○	○	◐
Volcano Creek Hydroelectric	●	●	◐

Projects	Potential Interaction with the Wildlife and Wildlife Habitat VC		
	Change in Habitat	Change in Movement	Change in Mortality Risk
Reasonably Foreseeable Future			
Cedar LNG Project	○	○	◐
Eskay Creek Mine (Technical Sample)[2]	●	●	◐
Galore Creek Mine	○	○	◐
Goldwedge Mine	●	○	◐
Kitsault Mine[1]	○	○	◐
Ksi Lisims LNG	○	○	◐
KSM Mine	●	●	◐
Kutcho Mine	○	○	◐
New Polaris Gold Mine	○	○	◐
Red Chris Underground Mine	○	○	◐
Red Mountain Project	○	○	◐
Ridley Island Export Logistics Project	○	○	◐
Silvertip Silver/Lead/Zinc Mine	○	○	◐
Sik-E-Dakh Sewage Collection and Treatment Facility	○	○	◐
Snip Mine[1]	○	○	○
Tenas	○	○	○
Vopak Pacific Canada (now Ridley Island Energy Export Facility)	○	○	○

Notes:

BC = British Columbia; VC = Valued Component

[1] Projects with both a historical operation and a proposed future operation

[2] The proposed Eskay Creek Mine (Technical Sample) footprint is quantitatively considered as an existing disturbance in the existing condition to more comprehensively account for disturbance within the LAA.

○ = *cumulative interaction not expected*

◐ = *possible cumulative interaction*

● = *likely cumulative interaction*

In addition to the projects identified in Table 19.7-1, activities with the potential to interact cumulatively with the residual effects of the Project have been considered in the CEA for the Wildlife and Wildlife Habitat VC and are:

- Infrastructure: physical disturbances associated with the Eskay Creek MAR, Highway 37, hydroelectric transmission lines (between the Northwest Transmission Line and the Volcano Creek, Forrest Ker, and McLymont Creek hydroelectric facilities), and Bob Quinn Lake Aerodrome;
- Transportation (i.e., terrestrial and aerial transportation of personnel and goods);
- Forestry; and
- Hunting, trapping, and Indigenous harvesting.

19.7.2.2 Identification of Potential Cumulative Effects

Residual effects arising from past, present, and reasonably foreseeable future projects and activities have similar pathways as those arising from the Project (Section 19.5.2.2, Likely Interactions) during the Construction, Operations, Reclamation and Closure, and Post-closure phases of the Project and are:

- A change in habitat: the direct loss or alteration of wildlife habitat through land clearing and dewatering activities and the indirect loss or alteration of habitat through sensory disturbance, edge effects, and dust deposition.
- A change in movement: the creation of physical or sensory barriers that inhibit the ability of wildlife to move freely between resource patches or altering seasonal movement patterns and dispersal events.
- A change in mortality risk: the direct increase in mortality risk through vehicle-wildlife collisions and human–wildlife conflict and indirect increase in mortality risk through altered predator-prey dynamics and harvest pressure.

The residual adverse effects of the Project (Table 19.6-21), and thus those effect pathways considered in the CEA, are predicted to be limited to:

- A change in habitat: direct and indirect loss or alteration of wildlife habitat through land clearing and sensory disturbance;
- A change in movement: alteration of large-scale movement pattern or movement corridors; and
- A change in mortality risk: direct increase in mortality risk through transportation activities (i.e., vehicle-wildlife collisions).

The potential cumulative effect pathways between the Project and past, present, and reasonably foreseeable future projects and activities are discussed in greater detail in the following sections by potential effect.

Change in Habitat

The RAA is relatively undisturbed and past and present projects and activities, including the existing Eskay Creek Mine, hydroelectric and transmission projects, and Bob Quinn Lake Aerodrome, have resulted in the direct loss of habitat (i.e., anthropogenic) in the RAA totalling 1,143.3 ha (Table 19.6-2). Additionally, projects and activities have resulted in indirect alteration of habitats, particularly the infrastructure projects (i.e., transmission lines, roads), which results in linear landscape features that increase fragmentation and edge effects and transportation activities that result in sensory disturbance and dust deposition along existing infrastructure. Forestry has further altered habitat availability within the LAA and RAA.

Reasonably foreseeable future projects with the potential to result in a direct or indirect loss or alteration of wildlife habitat that could interact cumulatively with residual effects of the Project are the Technical Sample, which is accounted for in the existing conditions (Section 19.6.1.1, Analytical Assessment Techniques), and the KSM Mine, which proposes to construct the Coulter Creek Access Road, which will result in a direct and indirect loss or alteration of habitat within the LAA and RAA. The Brucejack Mine and proposed Goldwedge Mine projects, along with the proposed KSM Mine project (excluding the Coulter Creek Access Road), are not anticipated to result in a direct loss of wildlife habitat but an indirect alteration of habitat resulting from the sensory disturbance from helicopter transportation that may interact cumulatively with Project-specific sensory disturbance, including the use of helicopters.

Change in Movement

Potential wildlife movement corridors in the RAA, such as river valleys, also provide suitable infrastructure corridors and as a result, these areas have undergone a higher degree of anthropogenic disturbance by past and present projects and activities in comparison to more remote portions of the RAA. As a result, the Project has the potential to interact cumulatively with past, present, and reasonably foreseeable future projects and activities and adversely affects wildlife movement along the Iskut River and Volcano Creek valleys, as described in Section 19.6.2.2, Residual Effects Assessment. The mine is not anticipated to present a physical or sensory barrier to wildlife that is notably different from the existing condition, and because the site remains higher in elevation and relatively open habitat, wildlife will continue to be able to move around in all directions and maintain seasonal movement patterns. Therefore, CEA focuses on the Project's interaction with potential movement corridors in the RAA.

The Project will not result in the construction of physical barriers that could adversely affect wildlife movement along the Iskut River and Volcano Creek valleys, but Project-related transportation will contribute to sensory disturbance through the use of the existing Eskay Creek MAR which follows the Iskut River and Volcano Creek valleys. This is anticipated to be a relatively minor contribution (up to 25 vehicle trips/day at peak operations; Traffic Volume Study, Appendix 1-9) to the existing sensory barriers, but interaction with other past, present, and reasonably foreseeable future projects and activities include:

- Iskut River valley: McLymont Creek and Forrest Kerr Hydroelectric facilities, Northwest Transmission Line, infrastructure (Eskay Creek MAR, Highway 37, and hydroelectric transmission), transportation (vehicle traffic that supports projects and activities, including the existing Eskay Creek Mine), and forestry activities.
- Volcano Creek valley: Volcano Creek Hydroelectric facility, infrastructure (Eskay Creek MAR and hydroelectric transmission), and transportation.

Like the Project, the proposed KSM Mine (via the Coulter Creek Access Road) and Eskay Creek Mine (Technical Sample) will not result in the construction of physical barriers that could adversely affect wildlife movement along the Iskut River and Volcano Creek valleys, but will include transportation, which will contribute to sensory disturbance through the use of the existing Eskay Creek MAR.

Change in Mortality Risk

Project-related transportation along Highways 37 (north of Meziadin Junction) and 37A has the potential to increase wildlife mortality risk through vehicle-wildlife collisions and interact cumulatively with other past, present, and reasonably foreseeable future transportation activities (e.g., mining, forestry, hydroelectric generation, public highway use).

19.7.2.3 Mitigation Measures and Effectiveness

No measures are proposed in addition to the mitigations for Project-specific residual effects described in Section 19.5.3, Mitigation Measures and Effectiveness. The potential cumulative effects identified are therefore considered to be residual cumulative effects and are characterized in Section 19.7.3.

19.7.3 Residual Cumulative Effects Characterization

This section provides an assessment and characterization of these predicted residual cumulative effects, and, ultimately, the confidence relating to the assessment conclusions. Residual cumulative effects on the Wildlife

and Wildlife Habitat VC are characterized using the descriptors defined in Section 10.6, Characterization of Residual Effects, in Chapter 10, Valued Component Effects Assessment Methods. Narrative descriptions and justifications for the characterizations are provided in the sections below.

19.7.3.1 Change in Habitat

Construction of the Project will result in the direct and indirect loss or alteration of up to 2,123.7 ha of native ecosystems (i.e., wildlife habitat) in the RAA (184,365.9 ha), which is a 1% reduction from existing condition (Table 19.6-2). Past, present, and reasonably foreseeable future projects are predicted to result in a direct loss of native habitats totalling 1,379.8 ha within the RAA (Table 18.7-2 in Section 18.7, Identification of Potential Cumulative Interactions), which with the Project is a <2% cumulative reduction of wildlife habitat in the RAA.

Wildlife habitat in the RAA will remain abundant following the construction of the Project because the Project involves the redevelopment of an existing mine site and does not involve the construction of access roads or other linear features, which also reduces indirect alteration of habitat through fragmentation and edge effects. For the measurable parameters that can be quantified, this is a direct and indirect loss or alteration within the RAA of up to 1% for mountain goat and most furbearers (i.e., grizzly bear, wolverine, marten, fisher) and up to 2% for moose and hoary marmot (Table 19.6-19). Similarly, the Project is anticipated to result in a comparable loss of habitat within the RAA for the remaining Sub-VCs (i.e., bats, raptors, waterbirds, upland breeding birds, and amphibians).

Forestry activities within the RAA have been limited to areas adjacent to Highway 37, away from the Eskay Creek Mine site, and residual effects of the Project and the Eskay Creek Technical Sample Project are accounted for in the existing condition (Section 19.6.1.1, Analytical Assessment Techniques). Therefore, infrastructure (i.e., Eskay Creek MAR and transmission line) and the Coulter Creek Access Road that extends from the proposed KSM Mine project to the Eskay Creek Mine (historical), are the only past, present, and reasonably foreseeable future projects with the potential to result in a direct loss of habitat for wildlife that overlaps in time and space with the residual loss of habitat resulting from the Project. Existing infrastructure has been routed along the Volcano Creek valley and has reduced habitat availability, including moderate and high-suitability habitats, for species such as moose, grizzly bear and other furbearers, bats, and upland breeding birds. Similarly, the Coulter Creek Access Road is single-lane access road (6 m surface width [Rescan 2012c]) that will result in a direct loss of habitat within the LAA and RAA which is also most likely to adversely affect the same species because the proposed right-of-way follows the Unuk River and Sulphurets Creek valleys. The Project will also interact cumulatively with these projects and activities as it relates to indirect alteration of habitat through edge effects that has the potential to reduce ecological effectiveness of habitats within the LAA. However, habitat within the RAA for moose, grizzly bear and other furbearers, bats, and upland breeding birds is expected to remain relatively abundant, as described above.

Construction and operation of the Project are anticipated to result in a minor increase in Project-related traffic (Section 19.6.3.2, Residual Effects Assessment) that will interact cumulatively with other transportation activities along the Eskay Creek MAR and Highway 37, including from forestry activities, Eskay Creek Mine (historical and Technical Sample), hydroelectric generation facilities, the proposed KSM Mine project (via the Coulter Creek Access Road), and Indigenous harvesting. Project transportation will contribute to sensory disturbance and dust deposition, which has the potential to reduce ecological effectiveness of habitats adjacent along the Eskay Creek MAR and Highway 37/37A; however, effects are anticipated to be comparable

to the existing condition given the low predicted increase in traffic. Additionally, Project construction and operation, including helicopter activity, will interact cumulatively with sensory disturbance from helicopter activity from the Brucejack Mine project and the proposed KSM Mine and Goldwedge Mine projects. This has the potential to adversely affect mountain goat that are known to be sensitive to disturbance from helicopter traffic. However, there is limited effective mountain goat habitat, including winter habitat, for the species within the LAA (i.e., within 1.0 to 1.5 km; Table 19.6-6), and there were only three detections of the species within the LAA during baseline surveys (Section 19.4.4, Mountain Goat).

The Project is anticipated to result in limited adverse effects on habitats for moose and grizzly bear, which are species sensitive to cumulative effects and for which habitat indicators have been established (Government of BC 2018 and 2020a). The Project is situated in a higher elevation area and moose habitat within the Assessment Footprint is comprised primarily of growing season habitat and limited amounts of early and late winter habitat (Section 19.6.1.2, Residual Effects Assessment). As described above, the construction of the Project will reduce these habitats within the RAA by 2% or less (Table 19.6-19) when considering past and present projects and activities. However, it is anticipated that the proposed KSM Mine will further reduce habitat availability in the LAA and RAA via construction of the Coulter Creek Access Road, as described above. Notably, the Project does not include the development of roads or other linear features that have the potential to interact cumulatively with roads or transmission lines within the RAA.

Similarly, grizzly habitat in the Assessment Footprint is comprised primarily of fall habitat and limited amounts of spring and summer habitat (Section 19.6.1.2, Residual Effects Assessment). As described above, the construction of the Project will reduce these habitats within the RAA by 1% or less (Table 19.6-19) when considering past and present projects and activities. However, it is anticipated that the proposed KSM Mine will further reduce habitat availability in the LAA and RAA via construction of the Coulter Creek Access Road, as described above. Notably, salmon-bearing streams in the RAA are not going to be adversely affected by the Project and the Project does not include the development of roads or other linear features that have the potential to interact cumulatively with roads or transmission lines within the RAA. Additionally, the RAA occurs within the Edziz-Lower Stikine and Steward GBPUs which identify grizzly bear as having *very low* conservation concern.

Common nighthawk and olive-sided flycatcher have been shown to occupy disturbed and regenerating habitats and it is expected that habitat loss or alteration for these species is temporary, with existing and future developed habitats in the Assessment Footprint becoming available following reclamation. Habitat for common nighthawk and olive-sided flycatcher is also expected to be widespread throughout the RAA. The Project and those projects and activities that may interact cumulatively are not likely to result in a reduction in the amount or composition of habitats within the RAA that would threaten the persistence or viability of bird and other species of conservation concern within the RAA (i.e., harlequin duck, killdeer, long-tailed duck, red-necked phalarope, surf scoter, Swainson’s hawk, rough-legged hawk, western toad).

Local and regional modelling suggests that the projected future climate at the Project will be both hotter and wetter than the existing condition (Section 19.4.2.5, Regional and Local Climate Projections) which could contribute to a change in habitat within the RAA. However, the climactic conditions which may result in a change in habitat will occur over large geographic areas and changes within the LAA and RAA will occur with or without the Project. The potential effects associated with climate change will be considered during the development and implementation of the Reclamation and Closure Plan (Appendix 1-9, Reclamation and Closure Plan).

In summary, the RAA has been subject to a relatively low amount of anthropogenic disturbances, and the Project and reasonably foreseeable future activities and projects will make a small contribution to the direct and indirect loss or alteration of wildlife habitat in the RAA, including for migratory birds and species of conservation concern. There are no known projects within the reasonably foreseeable future whose scale or scope could be considered a substantive development (e.g., a new mining development) and interact cumulatively with the Project to threaten the sustainability of wildlife Sub-VCs or their habitats in the RAA.

The residual cumulative effect of a change in habitat is characterized as follows:

- Magnitude is low: a measurable change in the abundance of wildlife in the RAA is not anticipated, although temporary local shifts in distributions in the LAA might occur.
- Geographic extent is regional: residual effects will overlap in time and space with those of other past, present, and reasonably foreseeable future projects within the RAA.
- Duration is far-future: most Project activities will cease once the Post-closure phase begins (i.e., after 17 years), reclamation and natural succession lasting >50 years will be required to restore wildlife habitat.
- Frequency is continuous: the direct and indirect habitat loss and alteration will persist continuously during construction and operation of the Project, but only the physical disturbance will remain into the Post-closure phase.
- Reversibility is irreversible: while wildlife habitats will be established following reclamation of the Project, they are not expected to replicate the existing conditions within 50 years (e.g., mature forest).
- Resilience is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative cumulative effect.
- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife habitat have been identified as concerns by Indigenous Nations and government agencies.
- Probability is high: the Project is highly likely to result in an adverse cumulative effect on wildlife habitat.

19.7.3.2 Change in Movement

Highway 37 north of Meziadin Junction has an annual average daily traffic volume of 305 trips/day and present and reasonably foreseeable mining projects for which data is available (i.e., Red Chris Mine, Brucejack Mine, KSM Mine, and Red Mountain Mine) are anticipated to add 136 trips/day (Appendix 1-8, Traffic Volume Study). Considering the Project's anticipated contribution of up to 25 trips/day on Highway 37 north of Meziadin Junction, the potential cumulative annual average daily traffic volume is expected to increase by 53% to 466 trips/day. However, the Project's incremental contribution to the increase remains relatively low, increasing the cumulative traffic volume by 1%. Similarly, Highway 37A has an annual average daily traffic volume of 238 trips per day, and the same present and reasonably foreseeable mining projects described above are anticipated to add 83 trips/day (Appendix 1-8, Traffic Volume Study). Considering the Project's anticipated contribution of up to 17 trips/day on Highway 37A, the potential cumulative annual average daily traffic volume is expected to increase by 42% to 338 trips/day (Appendix 1-8). However, the Project's incremental contribution to the increase remains relatively low, increasing the cumulative traffic volume by 5%.

Assuming Project-related transportation results in the same traffic volume increase as along Highway 37 north of Meziadin Junction, the Project will result in an annual average daily traffic volume increase of up to 25 trips/day along the Eskay Creek MAR, more than doubling the daily traffic volumes compared to the existing condition. Additionally, the only reasonably foreseeable future projects with the potential to contribute traffic along the Eskay Creek MAR is the KSM Mine project via the Coulter Creek Access Road, and while predicted traffic volumes are unknown, the cumulative contribution is anticipated to be low. The Eskay Creek MAR is a potential physical barrier to wildlife movement that is also subject to existing sensory disturbance from transportation activities and the speed limit is anticipated to reduce the extent of the sensory disturbance. Therefore, the Project's contribution to a residual adverse cumulative effect relating to transportation on wildlife movement resulting from transportation activities along Highway 37 and 37A, and the Eskay Creek MAR, is predicted to be low in magnitude and is reversible.

During the Closure and Reclamation and Post-closure phases, Project-related traffic will be reduced and eventually eliminated along with the corresponding sensory barriers. It is assumed that the same will be true for other present and reasonably foreseeable future projects and activities.

The residual cumulative effect of a change in movement is characterized as follows:

- Magnitude is low: a measurable change in the abundance of wildlife in the RAA is not anticipated, although temporary local shifts in distributions in the LAA might occur.
- Geographic extent is landscape: residual effects will overlap in time and space with those of other past, present, and reasonably foreseeable future projects within the LAA or TCAA.
- Duration is medium-term: wildlife movement is expected to return to the existing condition following the completion of the Closure and Reclamation phase, a period of 17 years.
- Frequency is continuous: physical and sensory barriers will persist continuously during the construction and operation of the Project, but only the physical barrier will remain into the Post-closure phase.
- Reversibility is reversible long-term: effects are reversible following the completion of the Closure and Reclamation phase, a period of 17 years.
- Resiliency is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative residual effect.
- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife movement have been identified as concerns by Indigenous Nations and government agencies.
- Probability is low: construction and operation of the Project is unlikely to result in an adverse residual effect on wildlife movement, but it may occur.

19.7.3.3 Change in Mortality Risk

Highway 37 north of Meziadin Junction has an annual average daily traffic volume of 305 trips/day and present and reasonably foreseeable mining projects for which data is available (i.e., Red Chris Mine, Brucejack Mine, KSM Mine, and Red Mountain Mine) are anticipated to add 136 trips/day (Appendix 1-8, Traffic Volume Study). Considering the Project's anticipated contribution of up to 25 trips/day on

Highway 37 north of Meziadin Junction, the potential cumulative annual average daily traffic volume is expected to increase by 53% to 466 trips/day. Applying the annual vehicle-wildlife collision rates of 3.6 and 4.1 collisions per year for moose and bears, respectively (Section 19.6.3.2, Residual Effects Assessment), it is predicted that the cumulative traffic increase will result in an increase in vehicle-wildlife collisions with moose by 1.6 collisions per year, and with bears by 1.8 collisions per year (Appendix 1-8, Traffic Volume Study). However, the Project's incremental contribution to the increase remains relatively low, with 0.3 collisions per year for both moose and bear (Section 19.6.3.2, Residual Effects Assessment).

Similarly, Highway 37A has an annual average daily traffic volume of 238 trips/day, and present and reasonably foreseeable mining projects for which data is available (i.e., Red Chris Mine, Brucejack Mine, KSM Mine, and Red Mountain Mine) are anticipated to add 83 trips/day (Appendix 1-8, Traffic Volume Study). Considering the Project's anticipated contribution of up to 17 trips/day on Highway 37A, the potential cumulative annual average daily traffic volume is expected to increase by 42% to 338 trips/day. Applying the annual vehicle-wildlife collision rates of 3.6 and 4.1 collisions per year for moose and bears, respectively (Section 19.6.3.2, Residual Effects Assessment), it is predicted that the cumulative traffic increase will result in an increase in vehicle–wildlife collisions with moose by 0.7 collisions per year, and with bears by 0.8 collisions per year. However, the Project's incremental contribution to the increase remains relatively low, with 0.1 collisions per year for both moose and bear (Section 19.6.3.2, Residual Effects Assessment).

While mortality events resulting from transportation have the potential to adversely affect wildlife populations, particularly for species such as moose that are experiencing regional population declines, the change in mortality risk remains low compared to existing mortality risks. For example, the predicted vehicle-wildlife collision increase of 1.6 moose per year resulting from the cumulative traffic increase represents 3.0% of the annual licenced moose harvest in WMU 6-12 (5-years average from 2018 to 2022 is 52 moose; Government of BC 2020b). Additionally, there are no known high-risk wildlife crossings within the TCAA, including for big game species, or for western toads that undergo pre- and post-breeding movements between wetland and upland habitats that at times can form mass-movement events (ECCC 2016).

Therefore, the Project's contribution to a residual adverse cumulative effect relating to transportation on wildlife mortality risk resulting from vehicle-wildlife collisions along Highway 37 and 37A is predicted to be low in magnitude and is reversible. While annual vehicle-collision rates are expected to be higher for other wildlife species (e.g., amphibians, birds, and small mammals), the relatively low increase in Project-related traffic is also predicted to result in an adverse residual cumulative effect is predicted to be low in magnitude and is reversible for these species. This is a prediction consistent with the extensive traffic effects assessment completed for the KSM Project, including moose population viability analyses (Rescan 2013d).

During the Closure and Reclamation and Post-closure phases, Project-related traffic will be reduced and eventually eliminated along will the corresponding wildlife mortality risk. It is assumed that the same will be true for other present and reasonably foreseeable future projects and activities.

The residual cumulative effect of a change in mortality risk is characterized as follows:

- Magnitude is low: a measurable change in the abundance of wildlife in the RAA or TCAA is not anticipated, although temporary local shifts in distributions in the LAA might occur.
- Geographic extent is landscape: mortality risks associated with Project transportation are not anticipated to extend beyond the LAA or TCAA.

- Duration is medium-term: mortality risk is expected to return to the existing condition following the completion of the Closure and Reclamation phase, a period of 17 years.
- Frequency is continuous: risks to wildlife will persist continuously during the construction and operation of the Project and will become reduced and eventually eliminated during the Post-closure phase.
- Reversibility is reversible long-term: effects are reversible following the completion of the Closure and Reclamation phase, a period of 17 years.
- Resiliency is moderate: all Sub-VCs and representative species are expected to have moderate natural resiliency to imposed stresses and will respond and adapt to the potential negative residual effect.
- Ecological context is high: Sub-VCs and representative species are considered unique and are important to stakeholders.
- Importance is high: adverse effects on wildlife mortality risk have been identified as concerns by Indigenous Nations and government agencies.
- Probability is low: construction and operation of the Project is unlikely to result in an adverse residual effect on wildlife mortality risk, but it may occur.

19.7.3.4 Summary of the Assessment of Residual Cumulative Effects

A summary of the characterization of residual cumulative effects for the Wildlife and Wildlife Habitat VC is provided in Table 19.7-2. The characterization criteria used for the effect descriptions are described in Section 10.6, Characterization of Residual Effects in Chapter 10, Valued Component Effects Assessment Methods.

Table 19.7-2: Characterization of Residual Cumulative Effects

Residual Cumulative Effect	Characterization Criteria				
Change in Habitat	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low	Regional	Far-Future	Continuous	High
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Irreversible	Moderate	High	High	
Change in Movement	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low	Landscape	Medium-Term	Continuous	Low
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Reversible Long-Term	Moderate	High	High	
Change in Mortality Risk	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Probability**
	Low	Landscape	Medium-Term	Continuous	Low
	Reversibility	**Resiliency**	**Context**	**Importance**	
	Reversible Long-Term	Moderate	High	High	

The confidence in the CEA is provided based on a consideration of the parameters described in Section 19.6.4, Summary of the Assessment of Residual Effects.

Residual cumulative effects and their characterization criteria and confidence evaluations are summarized in Table 19.7-3.

Table 19.7-3: Summary of Residual Cumulative Effects on the Wildlife and Wildlife Habitat Valued Component

Project Phase	Residual Effect	Residual Effect Characterization	Confidence
Construction	Direct loss or alteration of wildlife habitat through land clearing.	**Magnitude:** low **Geographical extent:** landscape **Duration:** far-future **Frequency:** continuous **Reversibility:** irreversible **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	High
Construction Operations	Indirect loss or alteration of wildlife habitat through sensory disturbance and edge effects.	**Magnitude:** low **Geographical extent:** regional **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	High
Construction Operations	Alteration of large-scale wildlife movement patterns or movement corridors.	**Magnitude:** low **Geographical extent:** landscape **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** high	Moderate
Construction Operations	Direct increase in mortality risk through vehicle-wildlife collisions.	**Magnitude:** low **Geographical extent:** landscape **Duration:** medium-term **Frequency:** continuous **Reversibility:** reversible long-term **Resiliency:** moderate **Context:** high **Importance:** high **Probability:** low	High

19.8 Tahltan Sustainability Requirements and Tahltan Risk Assessment Factors for Understanding Potential Effects to Current and Future Generations

For the Eskay Creek Revitalization Project, the *Declaration Act* Agreement (schedules D and E) identifies the Tahltan Risk Assessment Factors and Sustainability Requirements that Tahltan are using to determine whether the Project is sustainable and not resulting in impacts to Tahltan Values and Tahltan people now and for future generations.

Since the beginning of the environmental assessment regulatory process, Tahltan have provided guidance to aid in understanding Tahltan Knowledge and perspectives in several ways, including by providing the following priorities to be used as measuring tools when considering the current and future effects of the Project to Tahltan:

- **Priority 1.** Health of the land and water: maintaining the long-term health of the land (including all of its terrestrial and aquatic ecosystems) is a mandatory condition for any kind of land use in all areas within the Nation.
- **Priority 2.** Tahltan relationship and connections/Tahltan way of life: the land must be able to continue supporting Tahltan way of life while meeting the “health of the land” condition established under Priority 1. The Tahltan way of life includes maintaining connections with the land, being able to live off the land, sustaining harvesting and hunting patterns, engaging in cultural and spiritual practices (most of which are tied to the land), and earning a reliable living.
- **Priority 3.** Reclamation or restoration to support Tahltan way of life: land that has been degraded and polluted through industrial use must be healed, through reclamation, restoration, and ritual ceremony.
- **Priority 4.** Other uses will be considered, provided they meet all of the territory-wide and site-specific principles, objectives, and constraints under priorities 1, 2, and 3 (Technical Advisor, THREAT, pers. comm., 17 June 2024).

The Tahltan Assessment is led by Tahltan Knowledge and informed by science, and this is evident in the Hybrid AIR (EAO 2023b) where specific technical requirements are needed to inform Tahltan Knowledge and perspectives for key values such as water, wildlife, fish, quiet enjoyment of the land, and current and future uses for traditional land uses.

It is important to understand that knowledge streams can have relationships similar to tributaries entering a main stem (THREAT 2024), where there are still independent flows and flows where there is weaving of knowledge.

One way for western science practitioners to gain understanding is to see the Project components as barriers (THREAT 2024). Barriers are human activities and Project components that can restrict, limit, or permanently remove Tahltan Values or Tahltan way of life/connection to the values. Viewing the past (seven generations) to determine what barriers may or may not have been in place compared to today, and then viewing into the future will assist in seeing whether the proposed component will add to an existing barrier, remove the barrier, or stay as a barrier.

Viewing the past, current, and future barriers and Tahltan Values as identified in the Hybrid AIR (EAO 2023b), Section 4.7, Summary of Effects on Current and Future Generations, and Section 4.8, Summary of Eskay Creek's Ability to Meet Tahltan Sustainability Requirements, summarizes how this EAC Application must consider the Project's effects in relation to Tahltan objectives regarding balanced and sustainable development in a fashion that respects the *Declaration Act* Agreement (2022) requirements, the above priorities, guidance, and key Tahltan policy and governance documents, including the "1910 Tahltan Declaration" (Tahltan Tribe 1910), the 1987 "Tahltan Resource Development Policy" (Tahltan Tribal Council 1987), and the 2003 *Out of Respect* symposium (Tahltan [First] Nation and IISD 2004), as well as the "Tahltan Impact Assessment Policy" (TCG 2022a).

In addition to the above, the Tahltan Sustainability Requirements (EAO 2023b, 30–31) also specifically indicate avoiding significant impacts to Tahltan Values through residual or cumulative effects: by allowing Tahltan to maintain their way of life, and to continue conducting social, cultural, economic and environmental activities and practices, including those associated with meeting their food security needs. The Requirements also note that projects should support future use by returning the land to a level of environmental health that supports Tahltan title, rights, and land use across the Tahltan Continuum; avoiding the need for ongoing treatment to restore and maintain land and water to near normal condition; and supporting or assisting the creation of social, cultural, and environmental legacies. The Tahltan Sustainability Requirements thereby capture the Tahltan Continuum's implicit concern with continuity in land use from Tahltan today extending forward to future generations such that they are equally able to use, steward, and enjoy their lands.

As outlined above in relation to the Wildlife and Wildlife Habitat VC, potential effects from the Project were identified in relation wildlife habitat, movement, mortality risk and health; however, adverse effects are not expected for wildlife health. For wildlife habitat, movement and mortality risk; however, residual effects are expected, even with the application of mitigation. These residual effects are expected to be low to moderate in scientific magnitude for wildlife habitat and mortality risk, and low in scientific magnitude for wildlife. However, while considered low to moderate in a western science context, understanding the past, current, and future barriers to wildlife and Tahltan is important. These residual effects are predicted to be landscape to regional, local and landscape in extent for habitat, movement and mortality risk, respectively. It is anticipated that they will extend through the Project's Construction and Operations phases. However, duration and reversibility for wildlife habitat are predicted to be far-future (>50 years, or multigenerational) and irreversible, respectively. For wildlife movement and mortality risk, duration and reversibility are predicted to be medium-term (6 to 25 years, or one generation or less) and reversible in the long-term, respectively. Importance of these residual effects is identified as high for wildlife habitat, movement and mortality risk, in part because of concerns on the part of Indigenous groups regarding their implications for wildlife. This perspective is reflective of understandings on the relationship of wildlife and wildlife habitat with Indigenous Peoples. Because of this relationship, there can be higher or greater potential effects if key wildlife values are lost even at a Project or local scale. The relative importance of the value with affected people is critical, not just whether there is evidence of suitable habitats at broader scales.

These ratings, particularly regarding habitat, reflect the creation and maintenance of some cleared areas that were previously mature forest; these will take time to fully regenerate. At the same time, the generally low magnitude of these residual effects reflects the limited percentage of habitat area that will be cleared and the highly limited extent to which new linear features, specifically roads, will be required. Minimization of these residual effects is further supported by application of well-understood mitigation measures geared toward supporting and protecting wildlife species as needed (e.g., timing of clearing to avoid summer roosting season for bats and nesting season for waterbirds).

Similarly, the CEA presented in this chapter identifies low-magnitude cumulative effects for wildlife habitat, movement and mortality risk. Duration and reversibility for wildlife habitat are predicted to be far-future (>50 years, or multigenerational) and irreversible; for wildlife movement and mortality risk, duration and reversibility are predicted to be medium-term (6 to 25 years, or one generation or less) and reversible long-term, respectively. These time frames, particularly the longer ones for wildlife habitat, reflect the period needed for mature forest to become re-established in some cleared areas. Geographic extent is predicted to be regional for habitat and landscape for movement and mortality risk. Again, importance for wildlife habitat, movement and mortality risk is high, in part because all three are of concern to Tahltan.

While the Project has potential to affect current and future Tahltan land use, mitigation and management of its residual effects have been proposed to minimize these effects. The location and nature of the Project, which involves revitalization of a previously developed mine, is also helpful in this regard, as it involves development activities in an area that already has been subject to disturbance and restriction of access, instead of introducing disturbances to new places that may currently support Tahltan use based on their unaltered environmental character. To facilitate the Tahltan Central Government's development of Chapter 4, which lays the foundation for the Tahltan Assessment, information contained in this chapter and associated appendices have been shared with Tahltan prior to this EAC Application's submission. Chapter 4, which will be delivered during Application Review Phase, considers effects and barriers in relation to Tahltan Areas of Interest across the Tahltan Continuum, which will inform the application of Tahltan Risk Assessment Factors and Sustainability Requirements during the EAC Effects Assessment and Recommendation phase of the Project.

The Project also supports Tahltan social and economic legacies as they relate to local growth of and opportunities for business and employment without requiring development activity in extensive pristine environmental areas. While full regeneration of mature forest habitat in some cleared areas is anticipated to take decades to occur, the proposed reclamation and closure process and post-closure measures will work to support return of the mine site to the healthy environmental condition specified in the Tahltan Sustainability Requirements, and ongoing measures or treatments to sustain it in this state are not anticipated to be necessary. As such, the land will ultimately be returned to a self-sustaining natural condition suitable for use by future generations.

19.9 Follow-up Strategy

Overall, the prediction confidence in the assessment of effects on the Wildlife and Wildlife Habitat VC is considered moderate. This level of confidence is based on:

- The quantity and quality of data available;
- The conservative approach taken in the assessment;
- Professional judgment and experience with similar projects; and
- Effectiveness of mitigation measures, which reflect best industry practices and those used on similar mining projects in BC.

A WMP will be developed for the Project, as discussed in Appendix A-1, Summary of Management Plans and Mitigation Measures. The WMP will be implemented to address uncertainty, including an adaptive management framework, and monitoring activities to evaluate if mitigation measures are being implemented and are operating as proposed, to measure predicted effects on wildlife and wildlife habitat, and to detect any unforeseen effects on wildlife populations. These will include any additional monitoring in

accordance with permit terms and conditions. To improve prediction confidence, Table 19.9-1 outlines the follow-up measures that will be implemented relating to the negative residual effects.

Table 19.9-1: Proposed Monitoring and Follow-up Measures for Wildlife and Wildlife Habitat

Residual Effect	Proposed Monitoring or Follow-up Measures
Exposure of wildlife to COPC	Monitoring and managing mine contact water and discharge through implementation of the Mine Site Water Management Plan and the Aquatic Effects Monitoring Plan (refer to Appendix A-1, Summary of Management Plans and Mitigation Measures).
	A multi-media risk calculation will be completed for appropriate wildlife species if soil or vegetation concentrations increase over time beyond what has already been considered in the EAC Application.

Notes:

COPC = contaminant of potential concern; EAC Application = Application for an Environmental Assessment Certificate / Impact Statement; Eskay Creek MAR = Eskay Creek Mine Access Road; HSM = Habitat Suitability Model; LAA = Local Assessment Area; the Project = The Eskay Creek Revitalization Project.

19.10 Conclusions

Wildlife and Wildlife Habitat is identified as a VC because the Project has the potential to affect wildlife and wildlife habitat, which in turn could result in effects on Tahltan Values, including culture, human health, and land and resource use. The process for selecting VCs and Sub-VCs is described in Chapter 9, Valued Component Selection, and involved engagement with Indigenous Nations, government agencies, local governments, public, and other stakeholders. The potential effects and effect pathways resulting from the Project have been identified through engagement with Indigenous Nations, government agencies, and other stakeholders, as well as through BMPs, scientific literature, and technical expertise/professional judgment. The potential effects on wildlife and wildlife habitat are as follows:

- A change in habitat: direct loss or alteration of wildlife habitat (e.g., land clearing) and an indirect loss or alteration of wildlife habitat (e.g., sensory disturbance, edge effects);
- A change in movement: alteration of large-scale wildlife movement patterns or movement corridors;
- A change in mortality risk: direct increase in mortality risk or number of wildlife fatalities (e.g., land clearing activities, vehicular collisions, human–wildlife conflicts) and indirect increase in mortality risk or number of wildlife fatalities (e.g., altered predator-prey dynamics, harvest pressure); and
- A change in wildlife health: exposure to contaminants or other emissions that may affect the health of wildlife and wildlife habitat (e.g., through dust emissions).

Following the implementation of mitigation measures, the Project is predicted to result in low-magnitude negative residual effect on change in habitat for all Sub-VCs and seasonal habitats, with moderate magnitude effects for moose (growing season), mountain goat (growing season), grizzly bear (fall), wolverine (growing season), and hoary marmot (growing season). The Project is predicted to have a negligible effect on wildlife health and a low-magnitude negative residual effect on mortality risk and movement for all Sub-VCs, except for mortality risk on western toad for which the Project is predicted to

result in a moderate magnitude negative residual effect. A summary of the key findings of the assessment of residual effects are as follows:

- Change in habitat:
  - The Project will result in the direct and indirect loss or alteration of up to 2,123.7 ha wildlife habitat, a 10% decrease from the existing condition within the LAA and 1% within the RAA.
  - Construction of the Project is not anticipated to result in a disproportionate amount of habitat loss or alteration for species of conservation concern known or assumed to occur within the LAA, including for *SARA*-listed species (i.e., grizzly bear, wolverine, bat species, barn swallow, common nighthawk, olive-sided flycatcher, red-necked phalarope, western toad), and habitats for these species will remain relatively abundance in the LAA and RAA.
- Change in movement:
  - The Project will not result in the construction of infrastructure that could create physical barriers to wildlife movement and there are no documented wildlife corridors or large-scale movement patterns/ events near the Project, but follow-up activities are being undertaken to reduce uncertainty.
- Change in mortality risk:
  - The Project is predicted to result in a temporary low-magnitude incremental increase in direct mortality risk resulting from vehicle-wildlife collisions with Project transportation (e.g., increase in annual daily traffic volumes) that will be eliminated following Reclamation and Closure for all species except western toad.
- Change in wildlife health:
  - The effect of Project emissions, wastes, and discharges that may be deposited into the environment (e.g., dust, water) and adversely affect wildlife health are predicted to be negligible following the application of standard mitigation measures and the implementation of Project-specific plans used to eliminate or reduce the potential for deleterious substances to enter the environment (e.g., Mine Site Water Management Plan in Appendix A-1, Summary of Management Plans and Mitigation Measures).

19.11 References

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Wildlife Act, RSBC 1996, c 488.

Declaration on the Rights of Indigenous Peoples Act, SBC 2019, c 44.

Environmental Management Act, SBC 2003, c 53.

Forest and Range Practices Act, SBC 2002, c 69.

Migratory Birds Convention Act, SC 1994, c 22.

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