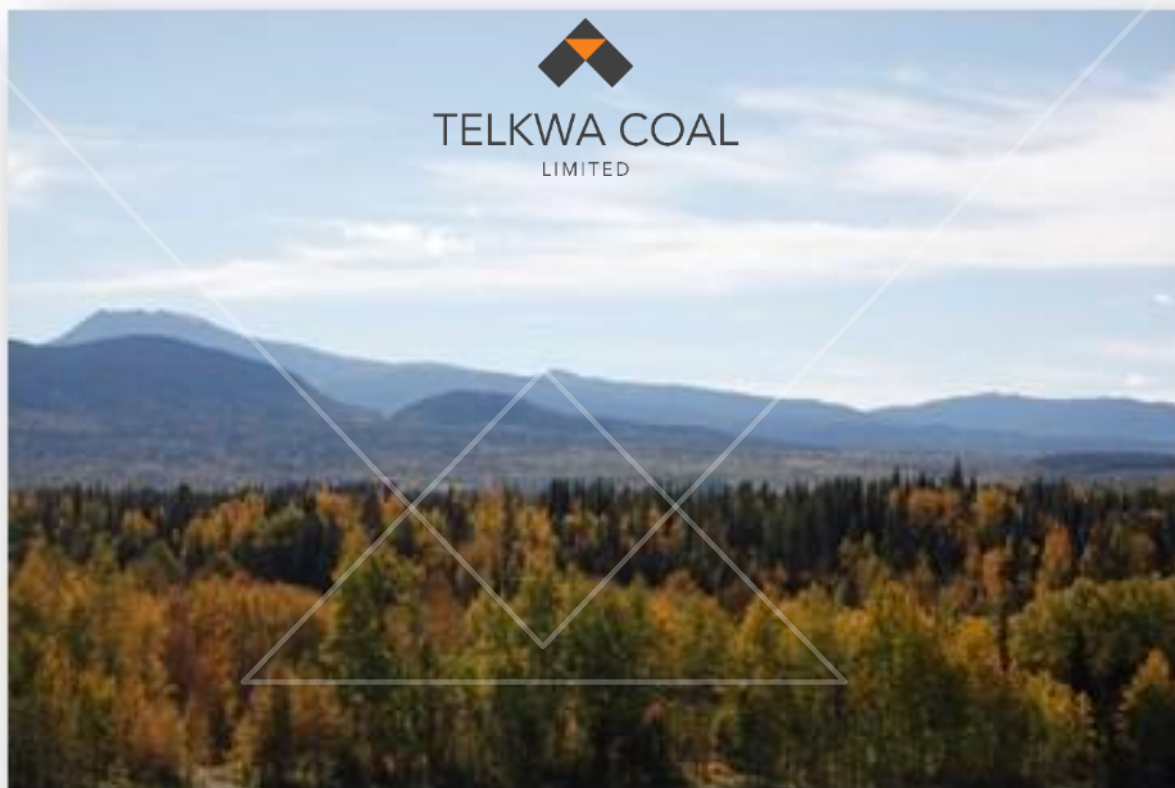




BC EAO EAC Application – Tenas Project

Section 4.0 Environmental Effects Assessment

Chapter 8 Wildlife Valued Component

May 2022

VERSION 1.0

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Submitted by:	Telkwa Coal Limited Suite 1410 – 409 Granville Street Vancouver, BC V6C 1T2

Tenas Project

Section 4.0 Environmental Effects Assessment Chapter 8 Wildlife Valued Component

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Appendix 4.8-A Wildlife Baseline Report

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
AIR	Application Information Requirements
AQMP	Air Quality Management Plan (S13.0-C2)
ARD	acid rock drainage
ARU	autonomous recording units
ATV	all-terrain vehicle
BAFA	Boreal Altai Fescue Alpine
BAFAun	Boreal Altai Fescue Alpine Undifferentiated
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BC EAO	British Columbia Environmental Assessment Office
BC MAL	British Columbia Ministry of Agriculture and Lands
BC MECCS	British Columbia Ministry of Environment and Climate Change Strategy
BC MELP	British Columbia Ministry of Environment, Lands and Parks
BC MEMLI	British Columbia Ministry of Energy, Mines and Low Carbon Innovation
BC MFLNRO	British Columbia Ministry of Forests, Lands and Natural Resource Operations
BC MFLNRORD	British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC MOE	British Columbia Ministry of Environment
BC MOF	British Columbia Ministry of Forests
BC MSRM	British Columbia Ministry of Sustainable Resource Management
BC MWLAP	British Columbia Ministry of Water, Land and Air Protection
BCG	Biogeoclimatic
BEC	Biogeoclimatic Ecosystem Classification
BMP	best management practice
C	Chapter
CCME	Canadian Council of Ministers of the Environment
CEA	cumulative effects assessment
CEAA	Canadian Environmental Assessment Agency
CEMP	Construction Environmental Management Plan (S13.0-C4)
CEPA	<i>Canadian Environmental Protection Act</i> (Government of Canada [GovCan] 1999)
CMA	Coastal Mountain-heather Alpine
CMAun	Coastal Mountain-heather Alpine Undifferentiated
CMSTHP	Chemicals and Materials, Storage, Transfer, and Handling Plan (S13.0-C3)
CNR	Canadian National Railway
COPC	contaminants of potential concern

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPP	Coal Processing Plant
Crossroads	Crossroads Cultural Resource Management
CRSA1	Caribou Regional Study Area 1
CRSA2	Caribou Regional Study Area 2
CUS	Cultural Use Study (Appendix 7.1-B)
CWH	Coastal Western Hemlock
CWHws2	Coastal Western Hemlock Montane Wet Submaritime
DMP	Discharge Management Plan (S13.0-C5)
EA	environmental assessment
EAA	<i>Environmental Assessment Act</i> , SBC 2002, c 43 (Government of British Columbia [GovBC] 2002)
EAC	Environmental Assessment Certificate
ECCC	Environment and Climate Change Canada
eDNA	environmental deoxyribonucleic acid
EMP	Explosives Management Plan (S13.0-C6)
EPIC	Environmental Assessment Project Information Centre
ESSF	Engelmann Spruce – Subalpine Fir
ESSFmc	Engelmann Spruce Subalpine Fir Moist Cold
ESSFmcp	Engelmann Spruce Subalpine Fir Moist Cold Parkland
ESSFmcw	Engelmann Spruce Subalpine Fir Moist Cold Woodland
ESSFmk	Engelmann Spruce Subalpine Fir Moist Cool
ESSFmkp	Engelmann Spruce Subalpine Fir Moist Cool Parkland
ESSFmkw	Engelmann Spruce Subalpine Fir Moist Cool Woodland
ESSFwv	Engelmann Spruce Subalpine Fir Wet Very Cold
ESSFwvp	Engelmann Spruce Subalpine Fir Wet Very Cold Parkland
ESSFwww	Engelmann Spruce Subalpine Fir Wet Very Cold Woodland
FEQG	federal environmental quality guideline
FMSCP	Fuel Management and Spill Control Plan (S13.0-C7)
FRPA	<i>Forest and Range Practices Act</i> , SBC 2002, c 69 (GovBC 2002b)
FSR	Forest Service Road
GBPU	Grizzly Bear population unit
GovBC	Government of British Columbia
GovCan	Government of Canada
GPS	Global Positioning System
HSI	habitat suitability index
IAAC	Impact Assessment Agency of Canada
ICH	Interior Western Hemlock

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ICHmc1	Interior Cedar Hemlock Nass Moist Cold
LRMP	Land and Resource Management Plan
LSA	Local Study Area
MERP	Mine Emergency Response Plan (S13.0-C9)
ML/ARDMP	Metal Leaching (ML)/Acid Rock Drainage (ARD) Management Plan (S13.0-C12)
MTCP	Minesite Traffic Control Plan (S13.0-C10)
MVC	Moose vehicle collision
MWMP	Minesite Water Management Plan (S13.0-C11)
NOEC	no observed effect concentration
non-PAG	non-potentially acid generating
OGMA	Old Growth Management Areas
PAG	potentially acid generating
PAMP	Public Access Management Plan (S13.0-C14)
PEM	Predictive Ecosystem Mapping
POC/COC	Parameters of Concern/Contaminants of Concern
POPC/COPC	Parameters of Potential Concern/Contaminants of Potential Concern
Project	Tenas Project
QP	Qualified Professional
RCP	Reclamation and Closure Plan (S13.0-C15)
RDBN	Regional District of Bulkley-Nechako
RIC	Resources Inventory Committee
ROW	right-of-way
RSA	Regional Study Area
S	Section
SARA	<i>Species at Risk Act</i> , SC 2002, c. 29 (Government of Canada [GovCan] 2002)
SBS	Sub-Boreal Spruce
SBSdk	Sub-Boreal Spruce Dry Cool
SBSmc2	Sub-Boreal Spruce Babine Moist Cold
SEPSCP	Surface Erosion Prevention and Sediment Control Plan (S13.0-C17)
SIL	Survey Intensity Level
SMNEA	Southern Mountain National Ecological Area
SPO	Site Performance Objective
TAC	Tenas Access Corridor
TCHRPA	Telkwa Caribou Herd Recovery Area
TCH-RSA1	Telkwa Caribou Herd Regional Study Area 1
TCL	Telkwa Coal Limited
TEM	Terrestrial Ecosystem Mapping

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
TK	Traditional Knowledge
TRV	toxicity reference values
TSA	Timber Supply Area
UV	ultraviolet
UWR	Ungulate Winter Range
VC	Valued Component
VMP	Vegetation Management Plan (S13.0-C18)
WCESA	Wildlife Cumulative Effects Study Area
WHA	Wildlife Habitat Area
WLSA	Wildlife Local Study Area
WMP	Wildlife Management Plan (S13.0-C21)
WMPRE	Waste Management Plan for Refuse and Emissions (S13.0-C20)
WQG	water quality guidelines
WRSA	Wildlife Regional Study Area
WR-WRSA	Wide-ranging Wildlife Regional Study Area

UNITS OF MEASURE

Abbreviation or Acronym	Long form of Abbreviation or Acronym
°	degrees
%	percent
<	less than
>	greater than
cm	centimetre
dB	decibel
dBA	A-weighted decibel
ha	hectare
kg/ha	kilograms per hectare
km	kilometre
km/hr	kilometres per hour
km ²	square kilometres
kV	kilovolt
m	metre
m ³	cubic metres
mg/L	milligrams per litre
V	volt

EXECUTIVE SUMMARY

This chapter addresses the potential effects of the Tenas Project (Project) on the Wildlife Valued Component (VC). Wildlife as a VC includes the collection of species that occur on the landscape, excluding avian species which are addressed as a separate VC. Wildlife was selected as a VC based on the collective species' likelihood of interaction with the Project, federal and provincial government management obligations, and its contributing role to biodiversity and ecosystem function. Wildlife contributes to environmental, socio-economic, and cultural values of Indigenous groups, the public, and stakeholders.

The assessment of Project-related effects and cumulative effects was conducted according to the methods set out in **Section (S) 3.0 Assessment Methodology** of the **Environmental Assessment Certificate Application (EAC Application)**. The Wildlife VC is represented by five (5) subcomponents:

1. Furbearers;
2. Caribou;
3. Grizzly Bear;
4. Moose;
5. Bats; and
6. Western Toad.

The assessment of subcomponents was based on evaluating three (3) indicators: change in habitat (i.e. due to direct or indirect disturbance), change in mortality, and change in movement patterns measured quantitatively where data allowed otherwise measured qualitatively.

Potential adverse effects of the Project on the Wildlife VC subcomponents include the following:

- ▶ alteration and/or loss of habitat;
- ▶ change in mortality; and
- ▶ change in movement patterns.

Habitat alteration and habitat loss are defined as indirect and direct changes to habitat (i.e., indirect includes habitat fragmentation, edge effects, and sensory disturbance) where suitable habitat for wildlife is rendered less suitable or not suitable for wildlife use. A change in mortality is defined as a change in the abundance of wildlife due to direct and indirect sources of mortality. A change in movement patterns is defined as a change in the daily and seasonal movement patterns of wildlife through the displacement of individuals due to direct (i.e., habitat loss) and indirect (i.e., habitat alteration) Project effects or the attraction of individuals to Project components that may support life requisites (e.g., food, shelter, reproduction).

Mitigation measures to address the potential adverse effects of the Project on the Wildlife VC are described herein. These include mitigation measures developed by Telkwa Coal Limited (TCL) that have been incorporated in the Project's design and/or operational procedures plus additional mitigation measures specific to the Wildlife VC. These mitigation measures are based on proven and accepted mitigation used on other similar approved projects in British Columbia (BC) (e.g., Red Mountain Underground Gold, Blackwater Gold) that had similar potential adverse effects on wildlife, as well as standard industry guidelines and best management practices. The mitigation measures implemented during all Project phases are expected to avoid and minimize the potential adverse effects of the Project on the Wildlife VC; however, these effects are not anticipated to be fully mitigated and residual effects (i.e., effects remaining

after consideration of mitigation measures and management strategies) of the Project on the Wildlife VC subcomponents are anticipated. These residual effects were carried forward in the assessment.

The Project-related residual effects on Furbearers, Caribou, Grizzly Bear, Moose, Bats, and Western Toad were predicted to be **Not Significant**. Considering this, the Project effects are not expected to alter the population viability, persistence, or integrity of the Wildlife VC beyond an acceptable level (i.e., remains sustainable and is available to contribute to ecological function).

Project-related residual effects were assessed in terms of their cumulative effect within the Wildlife Regional Study Areas (RSAs) based on available information and understanding of other reasonably foreseeable projects and activities. Following a review of projects and activities (past, present, and reasonably foreseeable) within the Wildlife RSAs, it was determined that cumulative effects are expected to occur but are not expected to alter wildlife population viability or persistence of the Wildlife VC and are predicted to be **Not Significant**. The Level of Confidence for these predictions is Moderate. No additional mitigation is deemed necessary. Follow-up programs (i.e., to verify the accuracy of the Project-related residual effects and cumulative effects predictions) specific to the Wildlife VC are not warranted at this time.

1. INTRODUCTION

This chapter presents the identification and assessment of the residual effects of the Tenas Project (Project) and the cumulative effects on the Wildlife Valued Component (VC) in a thorough, rigorous, and concise manner. For this Environmental Assessment Certificate (EAC) Application, the Wildlife VC is represented by six (6) subcomponents:

1. Furbearers (American marten [*Martes americana*], wolverine [*Gulo gulo*], fisher [*Pekania pennanti*]);
2. Caribou ([*Rangifer tarandus*] – Northern Mountain population – Telkwa herd);
3. Grizzly Bear (*Ursus arctos*);
4. Moose (*Alces americanus*);
5. Bats (little brown myotis [*Myotis lucifugus*], northern myotis [*Myotis septentrionalis*]); and
6. Western Toad (*Anaxyrus boreas*).

This assessment is comprised of the following steps:

- ▶ **Regulatory Context:** A description of the applicable legislation, policies, standards, and guidelines pertaining to the protection of the Wildlife VC;
- ▶ **Scope of the Assessment:** A description of the assessment scope including issues scoping, rationale for the selection of the Wildlife VC, subcomponents and indicators, and definition spatial and temporal boundaries of the assessment;
- ▶ **Existing Conditions:** A description of the baseline studies undertaken for the Project, other relevant information, and descriptions of the Wildlife VC within the defined spatial boundaries;
- ▶ **Assessment of Project-related Effects:** A description of the potential interactions between the Project and Wildlife, potential adverse effects, proposed mitigation measures, an evaluation of potential residual effects that remain following implementation of the proposed mitigation measures, and an assessment of residual effects including characterisation of significance;
- ▶ **Cumulative Effects Assessment (CEA):** A characterisation of the cumulative effects on the Wildlife VC and their significance considering the adverse residual effects of the Project in combination with the residual effects of past, present, and reasonably foreseeable future projects and activities and, (if/where necessary) the development of additional mitigation; and
- ▶ **Follow-up Strategy:** A presentation of monitoring programs to verify assessment predictions and evaluate mitigation effectiveness, and a discussion of adaptive management program(s) to be implemented to address any unexpected Project effects on the Wildlife VC.

2. REGULATORY CONTEXT

This EAC Application has considered applicable federal and provincial legislation, regulations, strategies, guidelines, plans, and best management practices (BMPs) relevant to the Wildlife VC, and includes information provided by Indigenous groups. Applicable recommendations in provincial land use plans and designations were also considered.

The Tenas Project Application Information Requirements (AIR) for the Project, approved by the British Columbia Environmental Assessment Office (BC EAO) in 2022, outlines the requirements of the EAC Application for the Wildlife VC to meet the provincial environmental assessment (EA) requirements under the BC *Environmental Assessment Act*, SBC 2002, c 43 (Government of British Columbia [GovBC] 2002a) (EAA). The EA for the Wildlife VC follows these guidelines and legislated requirements and is consistent with the requirements of the Project AIR. Legislation specific to the Wildlife VC and descriptions of the data requirements to assess the environmental effects are presented in the following subsections.

2.1 Federal Legislation and Regulations

The Pacific/Yukon Region of Environment and Climate Change Canada (ECCC) administers or shares responsibility for several Acts addressing legislation directly or indirectly applicable to the Wildlife VC. Federal legislation, regulations, and policy applicable to the Project and relevant to the Wildlife VC are described in **Table 2.1-1**.

Table 2.1-1: Summary of Federal Legislation, Regulations, and Policy Applicable to the Wildlife Valued Component (VC)

Name	Year	Description
<i>Canadian Environmental Protection Act</i> (Government of Canada [GovCan] 1999) (CEPA)	1999	The Act focuses on protecting environmental and human health by preventing, controlling, and managing pollutants, wastes, and other toxic substances and contributing to sustainable development. (GovCan 2019).
<i>Canada Wildlife Act</i> , RSC, 1985, c. W9 (GovCan 1985a).	1985	The Act allows for the creation, management, and protection of wildlife areas for wildlife research activities, or for conservation or interpretation of wildlife, particularly those that are at risk (ECCC 2017).
Federal Policy on Wetland Conservation (GovCan 1991).	1991	The Federal Policy on Wetland Conservation provides goals, guiding principles, and strategies to protect, promote, conserve, and enhance wetlands located on federal lands and waters in Canada, based on scientific evidence and cooperation.
<i>Fisheries Act</i> , RSC, c. F-14 (GovCan 1985b).	1985; amended 2019	The Act prohibits harmful alteration, disruption, and destruction of fish habitat, supports restoration of fish habitat and riparian areas, and regulates commercial fisheries and other industry and development, promoting a biodiversity- and ecosystem-based approach.
<i>Species at Risk Act</i> , SC 2002, c. 29 (GovCan 2002) (SARA).	2002	SARA protects species listed on Schedule 1 as Extirpated, Endangered and Threatened, and affords species listed as Special Concern the benefits of management planning. Species included in Schedule 1 are established by the federal Cabinet and are based on recommendations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and consultation with government, Indigenous

Name	Year	Description
		groups, and the public. SARA focuses on establishing and implementing plans to protect listed species and their critical habitat, reduce threats, and foster recovery. Recovery strategies and management plans have been developed or proposed for the following SARA-listed wildlife species that have the potential to occur. ▪ Northern/Southern Mountain populations of woodland caribou (<i>Rangifer tarandus caribou</i>) (Environment Canada 2012, 2014); ▪ Western toad (<i>Anaxyrus boreas</i>) (ECCC 2016); and ▪ Little brown myotis (<i>Myotis lucifugus</i>) and northern myotis (<i>Myotis septentrionalis</i>) (Environment Canada 2015)

2.2 Provincial Legislation and Regulations

The British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC MFLNRORD) is responsible for managing wildlife within the region containing the Project. The spatial assessment boundaries (see **3.2.4**) for the Wildlife VC are located within the Regional District of Bulkley-Nechako (RDBN) in the Skeena Region (Region 6). Provincial legislation, regulations, and policy applicable to the Project and relevant to the Wildlife VC are described in **Table 2.2-1**.

Table 2.2-1: Summary of Provincial Legislation, Regulations, and Policy Applicable to the Wildlife Valued Component (VC)

Name	Year	Description
<i>Ecological Reserve Act</i> , RSBC 1996, c. 103 (Government of British Columbia [GovBC] 1996b)	1996	The Act provides for the establishment and administration of ecological reserves, which may be created to protect and preserve species at risk and their habitats (BC Parks 2019). No ecological reserves delineated by the Government of British Columbia (GovBC 2019) exist within the study areas for the Wildlife VC.
<i>Environmental Assessment Act</i> , SBC 2002, c. 43 (GovBC 2002a) (EAA)	2002	The Act provides a mechanism for the Province of BC to review all major projects proposed in the province to assess for any potentially adverse environmental, economic, social, heritage, or health effects (GovBC 2020a). This Project requires an assessment of potential adverse environmental effects under the Reviewable Projects Regulations, BC Reg 370/2002 (GovBC 2002) of the EAA because the Project exceeds the production capacity of 250,000 tonnes per year.
<i>Environmental Management Act</i> , SBC 2003, c. 53 (GovBC 2003)	2003	The Act regulates pollution, hazardous waste, contaminated site remediation, and the discharge of municipal and industrial waste to the environment while ensuring the protection of human health and the environment (GovBC 2020b). The Contaminated Sites Regulations, BC Reg 375/96 (GovBC 1996a) of the Act provide quantitative standards to

Name	Year	Description
		define site contamination and to evaluate reclamation success. This Project is expected to require an effluent permit to authorize discharge of liquid effluent under the Act. This is relevant to wildlife species, as water is a pathway to potential effects on wildlife.
<i>Forest and Range Practices Act, SBC 2002, c 69 (GovBC 2002b) (FRPA)</i>	2002	The <i>FRPA</i> outlines standards and requirements for how forest and range practices and natural resource activities should be conducted on Crown land in BC in a manner that safeguards protection of natural resources, including wildlife (GovBC 2020c). The <i>FRPA</i> regulates forest clearing and applies protection to old growth forests, riparian areas, and wildlife species. Mechanisms within the <i>FRPA</i> that protect ungulates and species at risk include the Identified Wildlife Management Strategy and the establishment of Ungulate Winter Ranges (UWR) and Wildlife Habitat Areas (WHA). An UWR is an area of habitat that is critical to meeting winter habitat requirements for an ungulate species (BC MOE 2021). A WHA is an area of habitat that is critical to meeting the habitat requirements of an Identified Wildlife species (BC MOE 2020a). Identified Wildlife are species designated as Species at Risk or Regionally Important Wildlife (BC MOE 2020b). Within a WHA, activities are managed to minimize any adverse effects to Identified Wildlife (BC MOE 2020a). The study areas overlap with a WHA for northern caribou (GovBC 2019) and with an UWR for mountain goat.
<i>Land Act, RSBC 1996, c 245 (GovBC 1996c)</i>	1996	Crown land is partly managed under the authority of the Act, which is the primary legislation the Province of BC uses to convey land to the public for community, business, or industrial use (GovBC 2019b). Sustainable management of Crown land and natural resources is guided in part by the Act and associated Land Use Objectives Regulation in addition to land use plans, which protect species at risk and their habitats within certain geographical regions (GovBC 2020d). Reserves to protect wildlife habitat can be established under Section 16 and Section 17 of the Act. No reserves overlap with the study areas of the Project.
<i>Mines Act, RSBC 1996, c 293 (GovBC 1996e)</i>	1996	The Act describes how mines in BC are to be operated, including administration, permitting, acquisition, delegation of power, inspection, health and safety, penalties, abandonment, and enforcement. The British Columbia Ministry of Energy, Mines and Low Carbon Innovation (BC MEMLI) requires completion of a wildlife assessment and development of an environmental management and reclamation plan to support the mitigation, decommissioning and closure of a project. The project will require a permit under the Act to authorize development, operations, closure and reclamation and abandonment.

Name	Year	Description
<i>Wildlife Act</i> , RSBC 1996, c 488 (GovBC 1996f)	1996	The Act, and associated regulations, define wildlife as all native (and some non-native) amphibians, birds, mammals, and reptiles that live in BC (BC MFLNRO 2020). The Act provides for the protection, conservation, and management of wildlife populations and wildlife habitats within BC, by enabling penalties for killing or harming wildlife, the establishment of Critical Wildlife Habitats in Wildlife Management Areas, and designating species as endangered or threatened.
<i>Water Sustainability Act</i> , SBC 2014, c 15 (GovBC 2014b)	2014	The Act manages the licensing, diversion, and use of water resources in BC. This includes regulation of changes made in and around watercourses, and provision of directives to protect water quantity, water quality and aquatic ecosystems. This is relevant to wildlife species, amphibians in particular.

Notes: BC=British Columbia; COSEWIC=Committee on the Status of Endangered Wildlife in Canada; WHA=Wildlife Habitat Area; UWR=Ungulate Winter Range; VC=Valued Component

2.3 Strategies, Guidelines, Plans and Best Management Practices (BMPs)

Strategies, guidelines, plans, and BMPs applicable to the Project and relevant to the Wildlife VC are summarized in **Table 2.3-1**. These documents were considered when identifying the potential effects of the Project, developing appropriate mitigation measures, and characterising Project residual effects and cumulative effects.

Table 2.3-1: Summary of Strategies, Guidelines, Plans, and Best Management Practices (BMPs) Applicable to the Wildlife Valued Component (VC)

Name	Year	Description
A Compendium of Wildlife Guidelines for Industrial Development Projects in the North Area, British Columbia – Interim Guidance (BC MFLNRO 2014)	2014	These guidelines provide direction for considering and mitigating threats to wildlife and wildlife habitat in the North Area (i.e., Peace, Omineca, and Skeena regions) related to potential effects of industrial activities and development.
A Future for Grizzly: British Columbia Grizzly Bear Management Strategy (British Columbia Ministry of Environment, Lands and Parks [BC MELP] 1995a)	1995	The government of BC developed this strategy to ensure the continued existence of grizzly bears and their habitats, with four (4) goals: maintain the diversity and abundance of grizzly bears and the ecosystems on which they depend; improve the management of grizzly bears and the ecosystems on which they depend; increase public knowledge and involvement in management; and increase international cooperation in management and research.
A Strategy to Help Restore Moose Populations in British Columbia (Gorley 2016)	2016	This strategy provides recommendations to restore moose populations and increase moose populations across BC.
Best Management Practices for Amphibian and Reptile Salvages in British Columbia (British Columbia Ministry of Forests,	2016	The purpose of these best management practices (BMPs) is to provide guidance on how to plan and implement amphibian and reptile salvages while minimizing adverse effects to the translocated and recipient amphibian and/or reptile populations.

Name	Year	Description
Lands and Natural Resource Operations [BC MFLNRO] 2016)		
Best Management Practices for Bats in British Columbia (British Columbia Ministry of Environment [BC MOE] 2016)	2016	The purpose of these BMPs is to provide information on the potential effects of different natural resource development activities on bats and their habitats, and guidance on how to minimize these potential effects.
British Columbia Conservation Framework: Conservation Priorities for Species and Ecosystems (BC MOE 2009)	2009	A science-based framework designed to prioritize species and ecosystems for conservation, select effective conservation actions, and coordinate management actions. Results can be used to advise conservation programs for a variety of stakeholders and organizations (BC MOE 2009).
Canadian Biodiversity Strategy (Government of Canada [GovCan] 1995)	1995	The three (3) objectives of the Canadian Biodiversity Strategy are the conservation of biodiversity, the sustainable use of biological resources, and the fair and equitable sharing of benefits that result from the use of genetic resources.
Conservation of Grizzly Bears in British Columbia. Background Report (BC MELP 1995b)	1995	This report describes the status, historic and current, of grizzly bears in BC, reviews the knowledge about grizzly bears, and discusses what grizzlies and their ecosystems must have for their continued survival.
Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia: Section 4 (GovBC 2014a)	2014	The purpose of these guidelines is to provide province-wide direction for maintaining environmentally valuable resources during urban and rural land development in BC. Environmentally valuable resources include species, features, or Environmentally Valuable Resources locations that enhance the biodiversity of an area; these may include common or rare species or habitats.
Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada (Environment Canada 2004)	2004	This best practice guide for considering plant and wildlife species at risk in environmental assessment provides best practice guidelines, key sources of information, policy commitments and laws and a discussion of the implications of the federal <i>Species at Risk Act</i> , SC 2002, c. 29 (GovCan 2002) (SARA)
Furbearer Management Guidelines: Marten (BC MFLNRO 2003)	2003	The Guidelines instruct the trapper on techniques that will ensure populations remain productive and healthy. Management guidelines contain figures, statistics, and information on species biology and management, as well as recommendations regarding such management techniques as habitat enhancement, use of refuges, avoidance of non-target captures, and monitoring of population levels to allow trappers to adjust their harvest accordingly (BC MFLNRO 2003).
Grizzly Bear Population Inventory and Monitoring Strategy for British Columbia (Apps 2010)	2010	This document provides: a review of approaches, methods, and design considerations; a review of the population inventory and monitoring to date; and methods for determining geographic priorities for inventory and monitoring.
Grizzly Bears in British Columbia: Ecology, Conservation and Management (BC MELP 2002)	2002	This document is a summary report on the ecology, conservation, and management of grizzly bears in BC.

Name	Year	Description
Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (GovBC 2014c)	2014	The purpose of these guidelines is to help maintain amphibian and reptile populations and their habitats during urban and rural land development in BC (BC MOE 2014a). The document is a companion document to Develop With Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (GovBC 2014a).
Handbook for Mineral and Coal Exploration in BC (Association for Mineral Exploration British Columbia et al. 2008)	2008	This handbook compiles existing knowledge and recommended management practices for coal exploration and mining, including practices for water management and reclamation
Health, Safety and Reclamation Code for Mines in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation; [BC MEMLI] 2021) (Code)	2021	The Code guides mining operations to minimize associated risks to human and environmental health and safety and provide standards for reclamation. The Code focuses on mine operation and personnel. Reclamation standards include land use, revegetation, watercourse, and monitoring specifications.
Identified Wildlife Management Strategy – Accounts and Measures for Managing Identified Wildlife: Northern Interior Forest Region (GovBC et al. 2004)	2004	The Accounts and Measures for Managing Identified Wildlife summarize the status, life history, distribution, and habitat requirements of identified species and plant communities; they also outline specific guidelines for habitat conservation and management.
Identified Wildlife Management Strategy – Procedures for Managing Identified Wildlife (BC MWLAP 2004)	2004	The Procedures for Managing Identified Wildlife describe the procedures for establishing, modifying, and rescinding a Wildlife Habitat Area (WHA), and for implementing strategic and landscape level planning recommendations.
Interim Assessment Protocol for Old Growth Forest in BC (GovBC 2017)	2017	This report outlines the protocol for two types of assessments of old growth forest objectives in BC: old and mature forest retention, and incursions into Old Growth Management Areas (OGMAs).
Management Plan for the Northern Mountain Population of Woodland Caribou (<i>Rangifer tarandus caribou</i>) in Canada (Environment Canada 2012)	2012	The goal of the management plan is to prevent the Northern Mountain population of woodland caribou from becoming threatened or endangered, by having responsible agencies cooperatively work together to carefully manage these caribou and their habitat. The purpose of the plan is to summarize the threats facing Northern Mountain Caribou, set out management goals and objectives, and recommend a series of recovery measures for consideration by the responsible authorities for the management of the population's herds.
Management Plan for the Western Toad (<i>Anaxyrus boreas</i>) in British Columbia (BC MOE 2014b)	2014	This management plan identifies conservation actions and land use measures necessary to ensure western toad do not become threatened or endangered in BC. The management plan summarizes the best available scientific information regarding the biology of western toad and any known threats to the species. The management plan also identifies goals, objectives, and recommended actions to achieve conservation.
Management Plan for the Western Toad (<i>Anaxyrus boreas</i>) in Canada (ECCC 2020)	2020	This management plan identifies conservation actions and land use measures necessary to ensure western toad do not become threatened or endangered in Canada. The management plan summarizes the best available scientific information regarding the biology of western toad and any

Name	Year	Description
		known threats to the species. The management plan also identifies goals, objectives, and recommended actions to achieve conservation.
Order Establishing Provincial Non-Spatial Old Growth Objectives (GovBC 2004)	2004	This Order Establishing Provincial Non-Spatial Old Growth Objectives identifies the age and amount of old growth forest (in percent) to be maintained in various natural disturbance types, biogeoclimatic (BGC) zones, and landscape units to maintain target biodiversity values, and subsequently the amount available for timber harvesting.
Policy for Mitigating Impacts on Environmental Values (BC MOE 2014c)	2014	The purpose of this policy is to improve the quality, transparency, and consistency of information to support provincial staff, decision makers, and proponents when there is an identified need for environmental mitigation under existing legislation. The policy applies to the identification of VCs, the assessment of potential effects, the development of mitigation measures, and the preparation of mitigation plans.
Procedures for Mitigating Impacts on Environmental Values (BC MOE 2014d)	2014	These procedures outline recommended guidance and approaches for implementing the policy described above. The procedures include considerations for the selection of environmental values (i.e., VCs), for application of the hierarchy of mitigation levels, and for monitoring including reporting.
Protecting Vulnerable Species: A Five-Year Plan for Species at Risk in British Columbia (GovBC 2014d)	2014	This document is a five (5)-year plan to manage and protect species at risk in BC while balancing economic, environmental, and community values. This plan outlines five (5) main goals of the plan and recommends strategic action items to achieve these goals.
Provincial Caribou Recovery Program. 2017/18 Annual Report (BC MELP 2019)	2019	This document is an annual report on the BC caribou recovery program, with information on the background, guiding principles, program progress and succession, and concluding remarks.
Provincial Framework for Moose Management in British Columbia (BC MFLNRO 2015b)	2015	The purpose of this framework is to provide guidance on moose management in BC. In particular, the framework focuses on the preparation of regional moose action plans and the establishment of a scientific foundation for moose harvest management decisions.
Recovery Strategy for the Little Brown Myotis (<i>Myotis lucifugus</i>), the Northern Myotis (<i>Myotis septentrionalis</i>), and the Tri-colored Bat (<i>Perimyotis subflavus</i>) in Canada (ECCC 2018)	2018	This recovery strategy establishes the strategic direction to arrest and reverse the decline of little brown myotis and identify critical habitat to the extent possible.
Recovery Strategy for the Woodland Caribou, Southern Mountain Population (<i>Rangifer tarandus caribou</i>) in Canada (Environment Canada 2014)	2014	The recovery strategy goal is for all Southern Mountain subpopulations to be self-sustaining resulting in local caribou populations large enough to eventually support traditional Indigenous harvesting activities. To guide recovery efforts, the recovery strategy identifies objectives, performance indicators, critical habitat, and a disturbance threshold. It establishes the strategic direction to arrest and reverse the decline of the Woodland Caribou, Southern

Name	Year	Description
		Mountain Population and identify critical habitat to the extent possible.
Standard for Terrestrial Ecosystem Mapping in BC (Resources Inventory Committee [RIC] 1998g)	1998	This document outlines established standards for ecosystem unit characterisation, symbology, sampling, mapping procedures, interpretation and legends. Terrestrial Ecosystem Mapping (TEM) is the basis for Wildlife Habitat Mapping, which was used to define baseline habitat conditions for numerous wildlife species.
Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in BC. Wetland Stewardship Partnership (GovBC 2009)	2009	This document provides recommended practices on wetland protection and conservation to land managers and land users, with the goal of maintained or increased wetland quality and quantity. The document includes specific guidelines for various sectors, including mining.

Notes: BC=British Columbia; WHA=Wildlife Habitat Area; OGMA=Old growth management area; BGC=Biogeoclimatic; VC=Valued Component

2.4 Land Use Plans

The spatial assessment boundaries for the Wildlife VC overlap with lands governed by the Bulkley Land and Resource Management Plan (GovBC 1998), the Bulkley Valley Sustainable Resource Management Plan (British Columbia Ministry of Agriculture and Lands [BC MAL] 2005), the Morice Land Resource Management Plan (GovBC 2007), Telkwa Land Use Plan (GovBC 1999), Kalum Land and Resource Management Plan, and the Kalum Sustainable Resource Management Plan (BC MAL 2006). Together, these plans describe resource management for wildlife (e.g., moose, caribou, grizzly bear, wildlife in general) and wildlife habitat. Wildlife-related management goals in these plans relevant to this assessment are described in **Table 2.4-1**, and were considered in the development of mitigation measures identified in **5.3 Mitigation Measures**.

Table 2.4-1: Management Goals and Objectives Established in Land Use Plans Applicable to the Wildlife Valued Component (VC)

Plan	Species	Management Goals and Objectives
Bulkley Valley Sustainable Resource Management Plan (British Columbia Ministry of Agriculture and Lands [BC MAL] 2005).	Moose	Maintain forage and cover (i.e., for security, visual screening, thermal cover, and snow interception) within identified key Moose habitat
	Caribou	- Emulate natural disturbance patterns while providing forage and screening within the sub-boreal spruce BGC zone in the Telkwa Caribou Herd Recovery Area (TCHRP) - Avoid Caribou displacement and reduce opportunities for Caribou interaction with humans and predators in the TCHRP
Bulkley Land and Resource Management Plan (Government of British Columbia [GovBC] 1998).	Wildlife	- Conserve the wide abundance of wildlife habitats and populations - Manage critical wildlife habitats to maintain habitat values

Plan	Species	Management Goals and Objectives
Morice Land and Resource Management Plan (BC MAL 2007).	Grizzly Bear	- Protect spring foraging locations and salmon foraging sites - Limit timber harvest near identified spring and salmon foraging sites - Develop and implement strategies to manage access related mortality
	Moose	Develop and implement BMPs for management of habitats providing thermal cover, screening, and forage production
	Caribou	- Protect seasonal high value foraging and calving habitats - Limit timber harvest in Caribou herd habitats
Kalum Land and Resource Management Plan (British Columbia Ministry of Sustainable Resource Management (BC MSRM] 2002)	Wildlife	- Maintain naturally occurring species and their habitats - Conserve vulnerable (blue listed), rare, threatened and endangered (red listed) species and their habitat - Maintain a diversity of habitats - Maintain linkages and connectivity within and between watersheds - Maintain consumptive and non-consumptive uses of wildlife
Kalum Sustainable Resource Management Plan (GovBC 2006)	Wildlife	Maintain the quantity and quality of wildlife populations and habitats
	Grizzly Bear	Maintain natural levels of forage supply
Telkwa Land Use Plan (GovBC 1999)	Moose	- Ensure forage is retained and available in identified moose winter range - Provide for security, visual, thermal and snow interception cover within identified moose winter range
	Caribou	- Provide for security cover, forage and large areas of inactivity over a rotation within the TCHRPA - Within a managed forest setting, provide for critical caribou habitat and forage by retaining Key Forested Caribou Habitat with mature and old characteristics - Within the ESSF BGC zone in the TCHRPA, emulate natural disturbance patterns by creating small openings with irregular edge configurations - Within the SBS Biogeoclimatic zone in the TCHRPA, emulate natural disturbance patterns by creating large aggregate blocks while providing for caribou forage and screening - Avoid caribou displacement, reduce human, caribou and predator interaction, and encourage caribou use of the TCHRPA - Limit access to protect caribou habitat (alpine and subalpine) surrounding Mooseskin Johnny Lake and its wetlands

Notes: BGC=Biogeoclimatic; BMP=best management practice; ESSF=Engelmann Spruce – Subalpine Fir

3. SCOPE OF THE ASSESSMENT

The assessment of the Wildlife VC, including the assessment of Project-related effects and cumulative effects, was conducted according to the methods set out in **Section (S) 3.0 Assessment Methodology** of this **EAC Application**.

The subsection outlines the scope of the assessment, including the rationale for the inclusion of Wildlife as a VC along with its subcomponents, the selection of indicators, and the definition of spatial and temporal boundaries. The assessment is informed by the **Wildlife Baseline Report (Appendix 4.8-A)**, as well as input from Indigenous groups, the public and government agencies through working groups and comment solicitation, which identified the importance of the wildlife and aided in identifying specific species and mechanisms of effects. This assessment is organized into six (6) subcomponents (**3.2.2 Subcomponents**):

1. Furbearers;
2. Caribou;
3. Grizzly Bear;
4. Moose;
5. Bats; and
6. Western Toad.

3.1 Issues Scoping

Telkwa Coal Limited (TCL) has undertaken an engagement and consultation process to support the scoping of issues for the Project. Refer to **S11.0 Wet'suwet'en Rights and Interests Assessment** and **S12.0 Public Consultation** of this **EAC Application** for details. The consultation and engagement process has included technical working groups established with Indigenous groups and government departments, community meetings, one-on-one and small group meetings, regarding key themes of interest and discussion of candidate VCs to represent the themes of interest.

3.2 Rationale for Selection of the Wildlife Valued Component (VC)

The Wildlife VC and associated subcomponents were selected during the pre-application phase of the Project following the VC selection process outlined in **S3.0-Chapter (C) 1-2.4.1 Selection of Valued Components** of the **EAC Application** and used the methodology provided in the Guideline for Selection of Valued Components and Assessment of Potential Effects (BC EAO 2013). The goal was to focus on relevant issues, concerns, and components of the natural and human environment that may be affected by the Project. Baseline study findings; conservation status; review of applicable government legislation, policies, and plans; effects assessments for other relevant projects; and professional judgement of the Project team were used to inform selection of the VC and its subcomponents. Inputs from Working Group members including government agencies and Indigenous groups, and input from the public and other interested parties during consultation were used to inform the selection of the VC and its subcomponents.

3.2.1 Valued Component (VC)

Wildlife species were selected as a VC based on the likelihood of interaction with the Project, as well as the contributing role of wildlife to biodiversity and ecosystem function. Wildlife also contributes to environmental, socio-economic, and cultural values.

The Wildlife VC is dependent on, and supports, the following VCs:

► **Dependent on:**

- **Aquatic Resources VC (S4.0-C5):** Aquatic resources can provide habitat for feeding, reproduction, rearing, and/or cover for Wildlife;
- **Atmospheric Environment VC (S4.0-C1):** Air quality and noise can affect the suitability of any habitat that is used by Wildlife;
- **Avian Species VC (S4.0-C9):** Avian species can provide or compete for resources used for feeding, reproduction, rearing, and/or cover by wildlife;
- **Fish and Fish Habitat VC (S4.0-C6):** Fish and fish habitat can provide or compete for resources used for feeding, reproduction, rearing, and/or cover by wildlife;
- **Groundwater VC (S4.0-C4):** Groundwater can be linked to wildlife through aquatic resources and fish and fish habitat depending on hydrological connectivity;
- **Land and Resource Use VC (S6.0-C4):** Wildlife are a component of land and resource use through hunting and trapping;
- **Surface Water VC (S4.0-C3):** Wildlife can interact with surface water, which can provide habitat for feeding, reproduction, rearing, and/or cover for wildlife;
- **Terrain and Soils VC (S4.0-C2):** Terrain and soils are important components of the habitat types used by wildlife;
- **Vegetation VC (S4.0-C7):** Vegetation provides habitat for feeding, reproduction, rearing, and/or cover for wildlife; and
- **Visual Resources VC (S6.0-C2):** Effects on visual resources can result in indirect effects on habitat, thereby affecting its suitability for use by wildlife.

► **Supporting:**

- **Avian Species VC (S4.0-C8):** Some Wildlife VC subcomponents can be a food source for certain avian species, either seasonally or year-round;
- **Heritage Resources VC (S7.0-C1):** Lands traditionally used are expected to include areas supporting wildlife that were harvested for food, either seasonally or year-round;
- **Human Health VC (S8.0-C1):** Wildlife have been, and continue to be, harvested for food, and as such, are part of the exposure pathway from environment to wildlife to humans; and
- **Land and Resource Use VC (S6-C4.0):** Wildlife are harvested for food, either seasonally or year-round.

3.2.2 Subcomponents

Subcomponents have been selected to focus the assessment of the Wildlife VC on key themes of interest identified through consultation, and reviews of other information. These ecologically important and/or sensitive wildlife species, communities, and habitats are expected to reflect Project effects on the Wildlife VC. Subcomponents of the Wildlife VC are: Furbearers (American marten, wolverine, fisher); Caribou (Northern Mountain population – Telkwa herd); Grizzly Bear; Moose; Bats (little brown myotis, northern myotis); and Western Toad (**Table 3.2-1**).

Table 3.2-1: Summary of Rationale for Selection of Valued Components (VCs) and Subcomponents and Their Linkages

Subcomponent	Rationale for Selection	Source of Information	VC Linkages	
Furbearers - American marten¹ - Wolverine - Fisher	- Potential for Project interaction - Federal and provincial species of management concern - Cultural importance - Contributes to biodiversity - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (Government of British Columbia [GovBC] 1966f) - Federal <i>Species At Risk Act</i>, SC 2002, c. 29 (Government of Canada [GovCan] 2002) (SARA) - BC Conservation Data Centre (BC CDC) - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Avian Species - Vegetation - Visual Resources	Supporting: - Avian Species - Land and Resource Use - Heritage Resources - Human Health
Caribou	- Potential for Project interaction - Federal and provincial species of management concern - Cultural importance - Contributes to biodiversity - Sensitive to disturbance - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (GovBC 1966f) - Federal SARA - BC CDC - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Vegetation - Visual Resources	Supporting: - Land and Resource Use - Heritage Resources - Human Health
Grizzly Bear	- Potential for Project interaction - Federal and provincial species of management concern - Cultural importance - Contributes to biodiversity - Sensitive to disturbance - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (GovBC 1966f) - Federal SARA - BC CDC - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Vegetation - Avian Species - Visual Resources	Supporting: - Land and Resource Use - Heritage Resources - Human Health

Subcomponent	Rationale for Selection	Source of Information	VC Linkages	
Moose	- Potential for Project interaction - Provincial species of management concern - Cultural importance - Contributes to biodiversity - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (GovBC 1966f) - Federal SARA - BC CDC - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Vegetation - Visual Resources	Supporting: - Land and Resource Use - Heritage Resources - Human Health
Bats - Little brown myotis - Northern myotis	- Potential for Project interaction - Federal and provincial species of management concern - Cultural importance - Contributes to biodiversity - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (GovBC 1966f) - Federal SARA - BC CDC - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Vegetation - Visual Resources	Supporting: Land and Resource Use
Western Toad	- Potential for Project interaction - Federal and provincial species of management concern - Cultural importance - Contributes to biodiversity - Historically addressed for previous projects with similar conditions	- BC <i>Wildlife Act</i>, RSBC 1996, c 488 (GovBC 1966f) - Federal SARA - BC CDC - Issues scoping	Dependent on: - Atmospheric Environment - Terrain and Soils - Surface Water - Groundwater - Aquatic Resources - Fish and Fish Habitat - Vegetation - Visual Resources	Supporting: - Avian Species - Land and Resource Use

Notes: BC=British Columbia; VC=Valued Component

1=American marten and Pacific marten (*Martes caurina*) may overlap in range and/or hybridize within the study areas, American marten was selected for assessment.

3.2.3 Indicators

Indicators are quantitative or qualitative parameters used to describe existing VC or VC subcomponent conditions and trends, and to evaluate potential Project effects and cumulative effects on the Wildlife VC subcomponents. Indicators identified in the AIR and used in the assessment of the Wildlife VC are summarized in **Table 3.2-2**.

Table 3.2-2: Indicators for the Wildlife Valued Component (VC) and Subcomponents

Indicator	Rationale for Selection
Furbearers, Caribou, Grizzly Bear, Moose, Bats, Western Toad	
Change in habitat, including direct and indirect disturbance (including sensory disturbance)	The Tenas Project (Project) has the potential to reduce the amount of suitable habitat available for Furbearers, Caribou, Grizzly Bear, Moose, Bats, and Western Toad subcomponents through direct habitat loss. The Project also has the potential to alter the suitability of habitat available for Furbearers, Caribou, Grizzly Bear, Moose, Bats, and Western Toad subcomponents through indirect habitat alteration (i.e., habitat fragmentation, edge effects, and sensory disturbance). The Project has the potential to reduce the amount of suitable habitat available for Furbearers.
Change in mortality	The Project has the potential to reduce the abundance of Furbearers, Caribou, Grizzly Bear, Moose, Bats, and Western Toad subcomponents through direct and indirect mortality.
Change in movement patterns	The Project has the potential to alter the daily and seasonal movement patterns of Furbearers, Caribou, Grizzly Bear, Moose, Bats, and Western Toad subcomponents through the displacement of individuals due to direct (i.e., habitat loss) and indirect (i.e., habitat alteration) effects or the attraction of individuals to Project components that may support life requisites (e.g., food, cover, breeding, migration).

3.2.4 Assessment Boundaries

The spatial and temporal boundaries encompass the area within, and times during which, the Project is expected to interact with the Wildlife VC. The administrative and technical boundaries represent any constraints that may be placed on the EA due to political, social, and economic realities (i.e., administrative boundaries), or limitations in predicting or measuring changes (i.e., technical boundaries).

3.2.4.1 Spatial Boundaries

The spatial boundaries delineated for the Wildlife VC are described in **Table 3.2-3** and shown in **Figure 3.2-1 and Figure 3.2-2**. The Project Area is where ground-disturbance and Project activities will occur, and within which the Project will be constructed and operated, including the Minesite and access routes. It includes 1,853 hectares (ha) and is a conservative estimate of the area of direct disturbance effects on the Wildlife VC within this assessment. The Project Area is described in detail in **S3.0-C1-3 Assessment of Boundaries** of the **EAC Application**. The Wildlife Study Areas include the Wildlife Local Study Area (WLSA), Wildlife Regional Study Area (WRSA), Wide-ranging Wildlife Regional Study Area (WR-WRSA), Caribou Regional Study Area (CRSA1), and the Caribou Regional Study Area 2 (CRSA2).

The Wildlife LSA (WLSA) is 35,726 ha in size and encompasses a minimum 5-kilometre (km) buffer around the Project Area. The WLSA was chosen to be identical for all six (6) subcomponents and represents the area within which 1) potential Project effects (i.e., direct and indirect) are expected to occur on wildlife species and 2) most fine-scale baseline data were collected for analyses. The WLSA includes the Village of Telkwa and part of Tyhee Lake to the north; Round Lake to the east; the lower slopes of Hunter Basin to the south; and the lowest reaches of Pine Creek to the west. It overlaps portions of the Telkwa and Bulkley rivers, as well as Tenas and Goathorn creeks. The WLSA has a notable anthropogenic footprint including the Village of Telkwa and overlap with the Highway 16 corridor. Agricultural development and rural residences are common at lower elevations within the Wildlife LSA, while higher elevation areas show a history of forestry activities.

The WRSA is 194,651 ha in size and encompasses the WLSA plus the intersection of all watersheds that overlap within a 10 km buffer around the Project Area, with the exception of major watersheds (i.e., the Telkwa River and the Bulkley River). The WRSA is used to provide regional context on the spatial distribution and abundance of the Wildlife VC subcomponents Furbearers, Bats and Western Toad, and is the area within which potential Project effects (i.e., direct and indirect) are expected to interact with the effects of other past, present, and reasonably foreseeable future projects or activities. The WRSA is characterised by a mixed landscape of Crown and private lands. Pre-existing habitat loss and fragmentation due to road development, forestry activities, and mineral exploration activities have altered habitats within the WRSA over time. The WRSA includes the Village of Telkwa (as part of the WLSA) and part of the Town of Smithers. Elevation within the WRSA ranges from 470 to 2,300 metres (m).

The WR-WRSA is 357,587 ha in size and encompasses the WLSA plus the Bulkley watershed excluding biogeoclimatic (BGC) zones that are associated with coastal ecosystems. The WRSA is used to provide regional context on the spatial distribution and abundance of the Wildlife VC subcomponents Grizzly Bear and Moose and is the area within which potential Project effects (i.e., direct and indirect) are expected to interact with the effects of other past, present, and reasonably foreseeable future projects or activities. It has been delineated because Grizzly Bear and Moose subcomponents have larger home ranges than other Wildlife subcomponents.

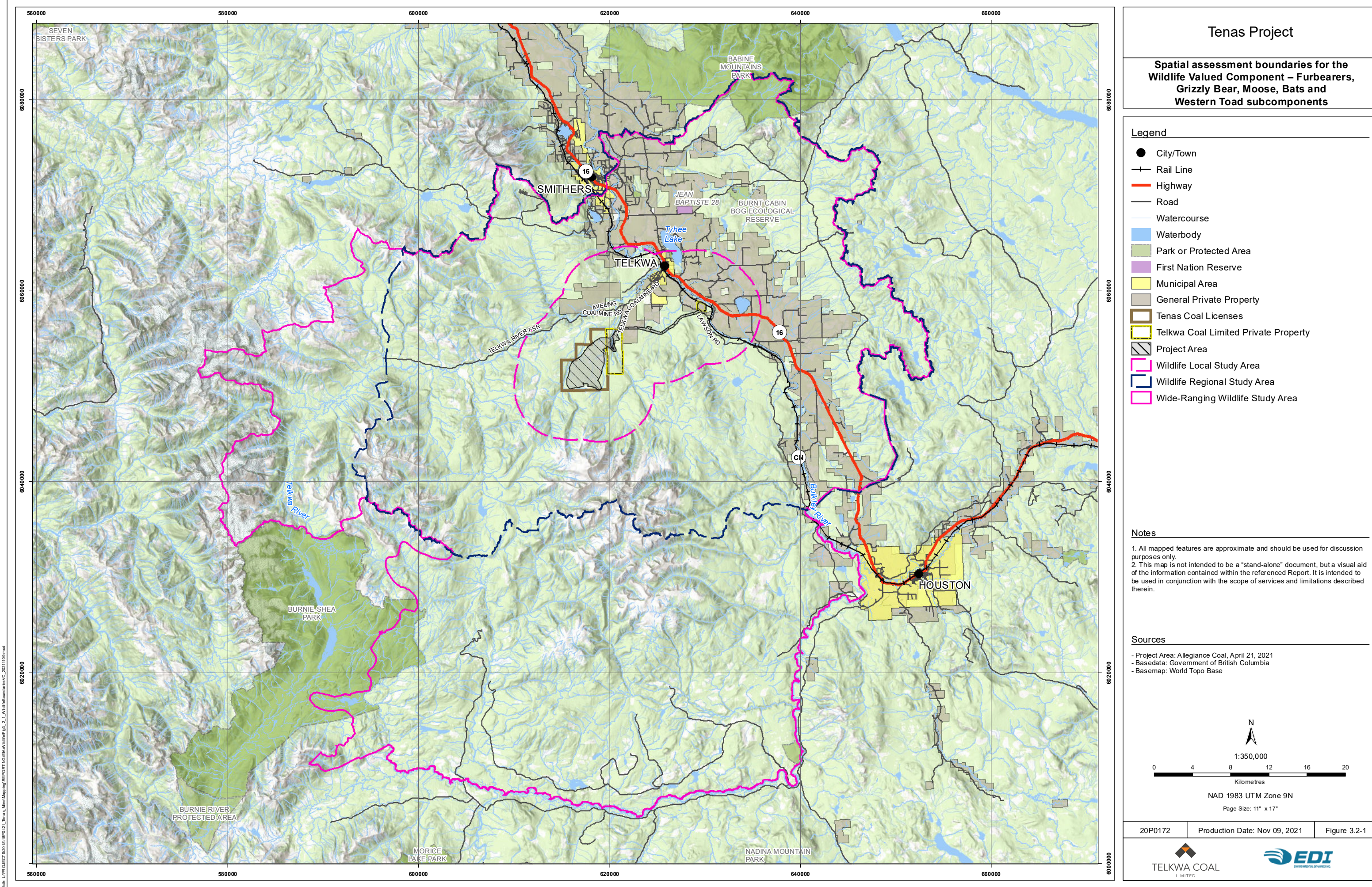
The CRSA1 is 260,611 ha in size and encompasses the area defined as critical habitat by the population recovery strategy for Southern Mountain Caribou (Environment Canada 2014). The Telkwa Caribou Herd currently falls under this recovery strategy. The Province of British Columbia (BC) recently delineated the herd's habitat into core and matrix habitat areas based on guidance from the federal recovery strategy. The study areas CRSA2 Core and CRSA2 Matrix encompass the Telkwa Caribou Herd core and matrix habitat delineations provided by the Province of BC (Dodd and Carswell 2019). The potential effects to Caribou are evaluated for three (3) regional study areas, CRSA1, CRSA2 Core and CRSA2 Matrix, to inform the assessment of potential effects on the Telkwa Caribou Herd. Refer to **4.2.2 Caribou** for additional details on the Wildlife Study Areas for caribou.

The study areas used in the **Wildlife Baseline Report (Appendix 4.8-A)**, namely the Telkwa Caribou Herd Regional Study Area 1 (TCH-RSA1), TCH-RSA2 core, and TCH-RSA2 matrix are equivalent to the CRSA1, CRSA2 Core, and CRSA2 Matrix, respectively.

Table 3.2-3: Spatial Boundary Definitions for the Wildlife Valued Component (VC) and Subcomponents

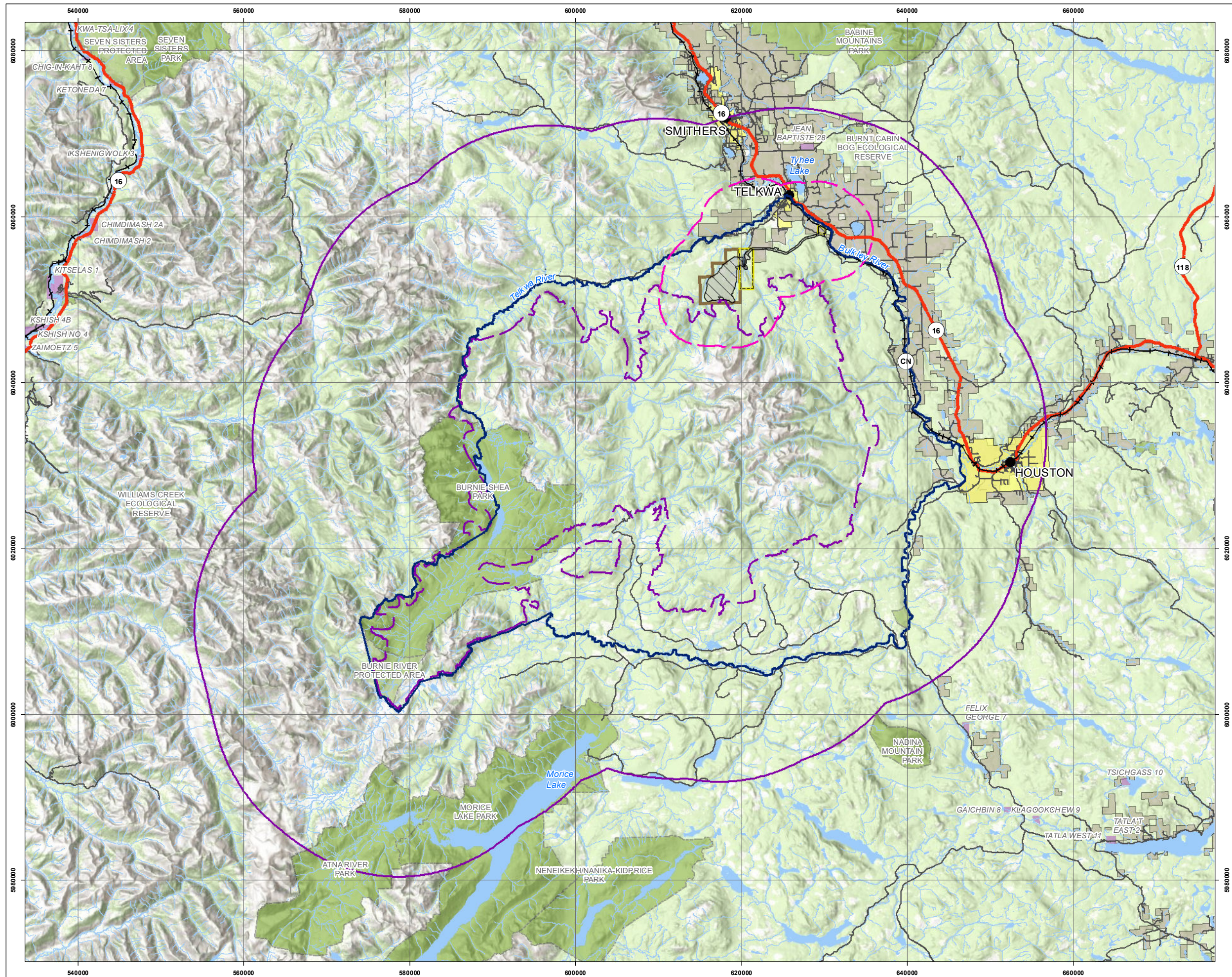
Spatial Boundary	Description of Study Area
Project Area	Encompasses the area that would potentially be directly disturbed by Project activities.
Wildlife Local Study Area (WLSA)	Encompasses a minimum 5 km buffer around the Project Area.
Wildlife Regional Study Area (WRSA)	Encompasses the WLSA plus the intersection of watersheds that overlap with a 10 km buffer around the Project Area. It is used for the assessment of Furbearers, Bats, and Western Toad.
Wide-ranging Wildlife Regional Study Area (WR-WRSA)	Encompasses the WLSA and contiguous ecosystems within the Bulkley River watershed similar to the ecosystems found in the Project Area. It is used for the assessment of Moose and Grizzly Bear.
Caribou Regional Study Area (CRSA1)	Encompasses the WLSA and the area defined by the Southern Mountain Caribou recovery plan as critical habitat (Environment Canada 2014).
Caribou Regional Study Area 2 (CRSA2)	Encompass the WLSA and CRSA1. The area was delineated by the Province of British Columbia (BC) (Dodd and Carswell 2019). The CRSA2 Core reflects the annual range of the herd, while the CRSA2 Matrix habitat includes a 30 km buffer of around the CRSA2 Core.
Wildlife Cumulative Effects Study Area (WCESA)	Encompasses the WLSA, WRSA, WR-WRSA, CRSA1, CRSA2 Core and CRSA2 Matrix.

Notes: CRSA=Caribou Regional Study Area; ha=hectares; km=kilometre; WCESA=Wildlife Cumulative Effects Study Area; WLSA=Wildlife Local Study Area; WR-WRSA=Wide-ranging Wildlife Regional Study Area; WRSA=Wildlife Regional Study Area



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Path: L:\PROJECT\82018\BP\0421_Tenas_MinMap\map\REPORTING\EA\Wildref\fig_2_2_WildlifeBoundariesVC_Caribou_20211109.mxd



Tenas Project

Spatial assessment boundaries for the Wildlife Valued Component – Caribou subcomponent

Legend

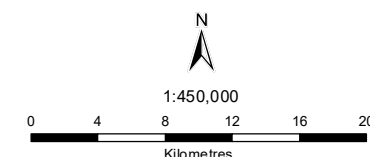
- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Waterbody
- Park or Protected Area
- First Nation Reserve
- Municipal Area
- General Private Property
- Tenas Coal Licenses
- Telkwa Coal Limited Private Property
- Project Area
- Wildlife Local Study Area
- Telkwa Caribou Herd Regional Study Area 1
- Telkwa Caribou Herd Regional Study Area 2 Core
- Telkwa Caribou Herd Regional Study Area 2 Matrix

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base



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Production Date: Nov 09, 2021

Figure 3.2-2

TELKWA COAL
LIMITED

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ENVIRONMENTAL DESIGN INC.

3.2.4.2 Temporal Boundaries

As described in **S3.0 Assessment Methodology** of the **EAC Application**, the temporal boundaries for the assessment of potential Project effects on the Wildlife VC encompass the time periods during which the Project is expected to interact with Wildlife. These include Construction, Operation, Decommissioning and Reclamation, and Post-closure phases (**Table 3.2-4**).

Table 3.2-4: Temporal Boundaries for the Tenas Project

Phase	Year	Duration (years)	Description of Activities
Construction	-0.5 to 0	1.5	Site clearing, soil salvage, open pit development, building construction, service and haul road development, Rail Infrastructure construction, bridge construction and development of onsite utilities and services. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for storage of potentially acid generating (PAG) materials.
Operation	1 to 21	21	Development of the open pit through drilling, blasting, loading, and hauling functions. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for PAG storage. Conducting coal processing, stockpiling of raw coal prior to processing, and stockpiling of processed coal prior to shipping. Progressive reclamation will be accomplished during operation including, where available, reclamation activities such as sloping, topsoil placement and revegetation.
Decommissioning and Reclamation	22 to 25	4	Tear-down of infrastructure onsite plus reclamation activities, including sloping of storage piles, backfill materials, and placement of reclamation materials including growth media, overburden and non-PAG rock for management pond covers and revegetating surfaces that are planned to be reclaimed.
Post-closure	26 to 50	10	Active: This involves the filling of the open pit with water, monitoring of vegetation growth and water quality for both groundwater and surface water and wildlife. Control and sedimentation ponds may still be needed for settling of total suspended solid levels. The management ponds are left as dry land reclamation except for portions that will be left as open water.
		15	Passive: This stage is when the control and sedimentation ponds are no longer required for settling of total suspended solid (TSS) levels and the management ponds are left as dry land reclamation except for portions that will be left as open water. Telkwa Coal Limited (TCL) is now simply monitoring the site.

3.2.4.3 Administrative Boundaries

The Wildlife Study Areas are situated within the RDBN, the Bulkley Timber Supply Area (TSA), and the Skeena Stikine Natural Resource District of the Skeena Natural Resource Region, within which forest resources are managed by the BC MFLNRORD. They are located within the jurisdiction of the Bulkley Land and Resource Management Plan (LRMP). Within the LRMP, the eastern extent of the Wildlife Study Areas

overlaps with the Bulkley Valley Landscape Unit, and the western extent of the Wildlife Study Areas overlaps with the Telkwa Landscape Unit.

Landscape Units are assigned a biodiversity emphasis, which provides a target for biodiversity conservation. Both the Bulkley Valley and Telkwa Landscape Units have an intermediate biodiversity emphasis option, where biodiversity conservation and timber production are equivalently valued (British Columbia Ministry of Forests [BC MOF] 1995).

3.2.4.4 Technical Boundaries

The Wildlife Study Areas overlap portions of six (6) BGC zones (Engelmann Spruce – Subalpine Fir [ESSF], Sub-Boreal Spruce [SBS], Coastal Western Hemlock [CWH], Interior Western Hemlock [ICH], Coastal Mountain-heather Alpine [CMA], and Boreal Altai Fescue Alpine [BAFA]), and 14 Biogeoclimatic Ecosystem Classification (BEC) subzones/variants (**Table 3.2-5**) (**Figure 3.2-3**).

Table 3.2-5: Biogeoclimatic (BGC) Zones, Subzones, and Variants within the Wildlife Study Areas

Biogeoclimatic Subzone/Variant Code	Biogeoclimatic Zone	Biogeoclimatic Subzone/Variant
ESSFmc	Engelmann Spruce Subalpine Fir	Moist Cold
ESSFmcp	Engelmann Spruce Subalpine Fir	Moist Cold Parkland
ESSFmcw	Engelmann Spruce Subalpine Fir	Moist Cold Woodland
ESSFmk	Engelmann Spruce Subalpine Fir	Moist Cool
ESSFmkp	Engelmann Spruce Subalpine Fir	Moist Cool Parkland
ESSFmkw	Engelmann Spruce Subalpine Fir	Moist Cool Woodland
ESSFwv	Engelmann Spruce Subalpine Fir	Wet Very Cold
ESSFwvp	Engelmann Spruce Subalpine Fir	Wet Very Cold Parkland
ESSFwww	Engelmann Spruce Subalpine Fir	Wet Very Cold Woodland
SBSdk	Sub-Boreal Spruce	Dry Cool
SBSmc2	Sub-Boreal Spruce	Babine Moist Cold
CMAun	Coastal Mountain-heather Alpine	Undifferentiated
BAFAun	Boreal Altai Fescue Alpine	Undifferentiated
CWHws2	Coastal Western Hemlock	Montane Wet Submaritime
ICHmc1	Interior Cedar Hemlock	Nass Moist Cold

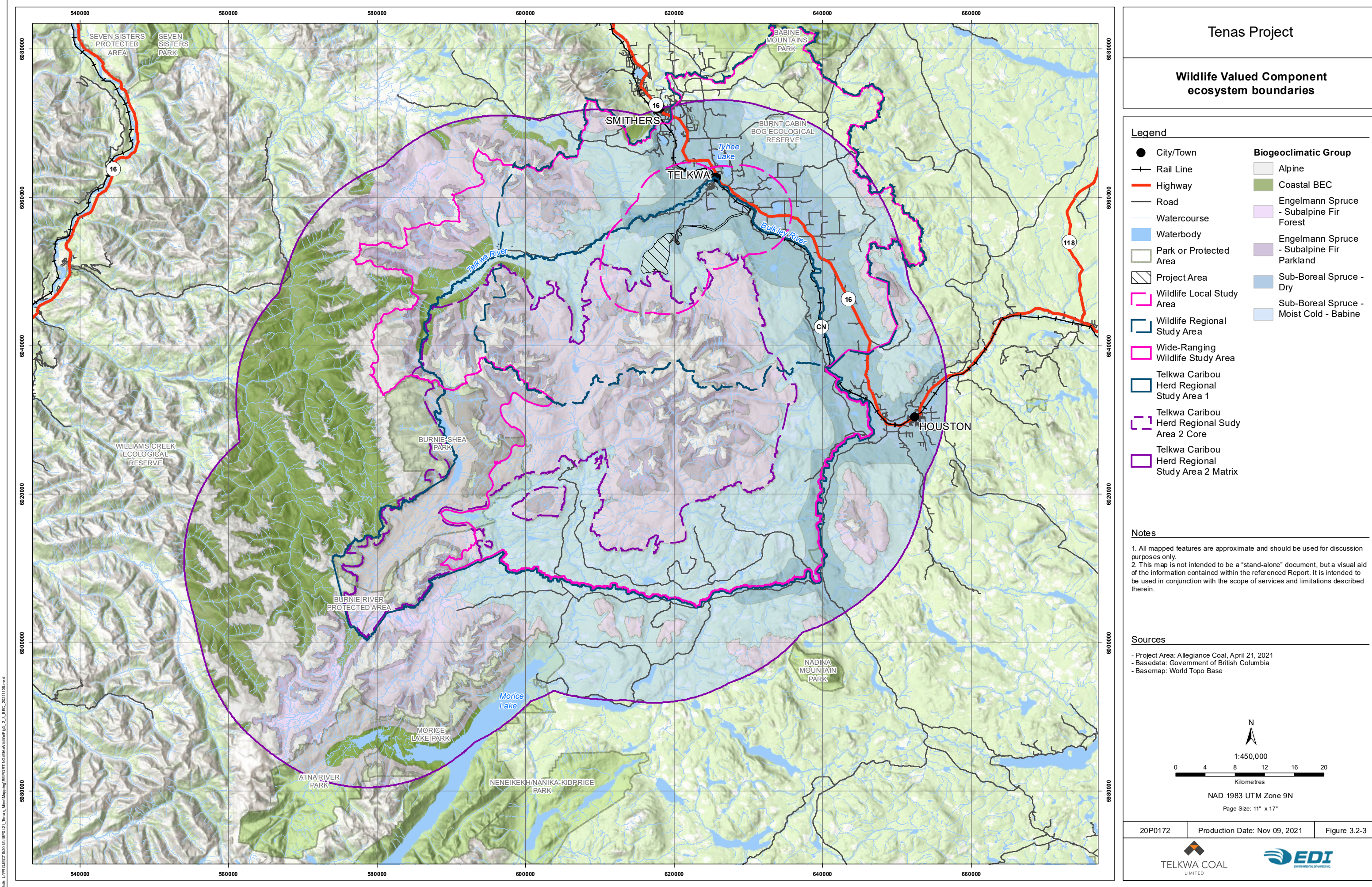
Knowledge of wildlife and wildlife habitats within the Wildlife Study Areas is based on a review of existing studies, baseline studies, available ecosystem mapping products, and Traditional Knowledge (TK). Ecosystem mapping within the Wildlife Study Areas consisted of a compilation of the following products:

- ▶ Project-specific Terrestrial Ecosystem Mapping (TEM) completed within the Vegetation LSA at a 1:5,000 scale and a Survey Intensity Level (SIL) 1/2 within the open pit area and Rail Loadout, and a 1:10,000 scale at SIL 2 for the haul road (Ardea Biological Consulting 2020);

- ▶ Historic TEM completed for previous mine proposals at this site (Oikos TEM), completed at a 1:15,000 scale with a SIL 3. This historic TEM was updated to reflect current conditions (Oikos Ecological Services 1999, Ardea Biological Consulting 2020); and
- ▶ Existing Predictive Ecosystem Mapping (PEM) from the Bulkley TSA (Timberline Natural Resource Group Ltd. 2010), updated to reflect current conditions (Ardea Biological Consulting 2020);

Technical boundaries that may impose constraints on the ability to predict effects of the Project on the Wildlife VC include:

- ▶ limited information on certain species ranges and population numbers in the region;
- ▶ limited knowledge of habitat requirements for species at risk and species that rarely occur in the region;
- ▶ limited knowledge of species and individual response to disturbance and the relationship to potential population-level effects;
- ▶ limited knowledge of the effects of climate change on the Wildlife VC;
- ▶ use of predictive habitat suitability models to assess potential adverse Project effects; and
- ▶ limited existing data (e.g., provincial forest data, [PEM, imagery) in terms of coverage, level of detail across the WRSA, WR-WRSA, CRSA1, and CRSA2 and absence of field verification.



Tenas Project

Wildlife Valued Component ecosystem boundaries

Legend

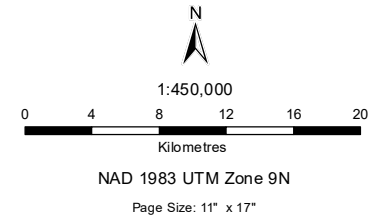
- City/Town
 - Rail Line
 - Highway
 - Road
 - Watercourse
 - Waterbody
 - Park or Protected Area
 - Project Area
 - Wildlife Local Study Area
 - Wildlife Regional Study Area
 - Wide-Ranging Wildlife Study Area
 - Telkwa Caribou Herd Regional Study Area 1
 - Telkwa Caribou Herd Regional Study Area 2 Core
 - Telkwa Caribou Herd Regional Study Area 2 Matrix
- | Biogeoclimatic Group | |
|---|---|
| Alpine | Coastal BEC |
| Engelmann Spruce - Subalpine Fir Forest | Engelmann Spruce - Subalpine Fir Parkland |
| Sub-Boreal Spruce - Dry | Sub-Boreal Spruce - Moist Cold - Babine |

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base



4. EXISTING CONDITIONS

This subsection describes the existing conditions of the Wildlife VC based on TK, scientific and other information, and baseline studies completed for the Project.

4.1 Background Information and Studies

This subsection describes the contribution of TK to the description of the existing conditions, the availability of existing scientific and other information, and the baseline studies completed for the Project.

4.1.1 Traditional Knowledge (TK)

The purpose of this section is to demonstrate awareness of TK and describe how it influenced the assessment of the Wildlife VC.

The **Cultural Use Study (Appendix 7.1-B) (CUS)** prepared by Crossroads Cultural Resource Management (Crossroads) in 2021 compiled a baseline inventory of cultural heritage resources pertaining to Wet'suwet'en communities by examining pre-existing cultural, social, historic, and economic data. The **CUS** and other relevant sources of TK were reviewed for information relating to wildlife species (Warner 1983, Rescan Environmental Services Ltd 2008, Ardea Biological Consulting 2014). The review found limited information specific to wildlife, although the recognition of the value of the natural environment, including wildlife, is intrinsic throughout the available TK:

"The Wet'suwet'en continue to maintain a substantial connection to their hereditary lands by way of Yintah. For the Wet'suwet'en, Yintah is a central factor in their culture; it is the physical and spiritual connection that everything has to their territories (Morris et al. 2006:27; OW 2013a:14) ... [Yintah is] a concept in which all environmental components—from plants and animals to waterways and mountains—are all interconnected and linked with the human world (OW 2011:111)." (Crossroads 2021)

Available information specific to wildlife is primarily related to harvest species and the importance of hunting and trapping and the feast system in Wet'suwet'en culture:

"The Wet'suwet'en maintain a special relationship with the wildlife that inhabit their territories. This relationship manifests in the traditional activities of hunting and trapping, as well as in the prominent use of wildlife in the feast system... Respect for animals and territories is among the traditional values and methods of hunting that are integrated into oral histories and are part of the transmission of knowledge between elders and children (Jenness 1943:522)." (Crossroads 2021)

"... the feast system is of paramount importance to Wet'suwet'en life-ways. Central to this system is the sharing of territorial foods at feasts, such as moose, bear, deer, and beaver. In addition, animal hides and hide goods from mink, marten, beaver, bear, moose, and other fur-bearing animals were distributed in the feast hall. For the Wet'suwet'en, the ability to gather these goods from house territories is vital to the continued authority of House Chiefs. As a result, the sharing of territorial foods and prestigious hides during feasts is just as important today as it was in the past ... (OW 2011:104)." (Crossroads 2021)

"Hunting and trapping were—and continue to be—significant economic and subsistence activities in Wet'suwet'en culture ... The Wet'suwet'en can currently hunt and trap year-round,

though most hunting and trapping takes place between April and December. In addition to supplying an important source of food and cultural goods, trapping of fur-bearing animals remains an economically viable activity (CSTC 2006:71).” (Crossroads 2021)

Central to Wet’suwet’en values and methods of hunting are conservation measures that work to assure *continued hunting and trapping success within their territories:*

“Wet’suwet’en values and methods of hunting were traditionally integrated into their oral histories and were part of the transmission of knowledge between elders and children. Central to these teachings was the assurance of future success in hunting (Jenness 1943:541). The traditional management systems still in use today include conservatory measure, such as rotating hunting and trapping areas based on seasonality and population health of animals.” (Crossroads 2021)

The Wet’suwet’en use game animals for food, cultural goods (e.g., furs, hides, and goods made from furs and hides), and food preservation (i.e., bear grease was used as a preservative) (Warner 1983, Rescan Environmental Services Ltd 2008, Ardea Biological Consulting 2014, Crossroads 2021). Game animals harvested by the Wet’suwet’en for subsistence include, but are not limited to, American black bear (*Ursus americanus*), caribou, coyote (*Canis latrans*), grizzly bear, moose, mountain goat (*Oreamnos americanus*), mule deer (*Odocoileus hemionus*), grey wolf (*Canis lupus*), American beaver (*Castor canadensis*), hoary marmot (*Marmota caligata*), groundhog (*Marmota monax*), lynx, marten, American mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), North American porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*), squirrel (*Sciuridae* species), and weasel (*Mustela* species) (Warner 1983, Rescan Environmental Services Ltd 2008, Ardea Biological Consulting 2014, Crossroads 2021). The most frequently harvested wildlife species for food by the Wet’suwet’en are moose and snowshoe hare (Rescan Environmental Services Ltd 2008).

The WRSA includes several hunting areas important to the Wet’suwet’en, such as the Telkwa Pass. Caribou were historically an important source of food and cultural goods for the Wet’suwet’en. The caribou population in the Bulkley Valley has experienced a significant decline in recent decades and the Telkwa herd is currently considered at risk (Crossroads 2021). They once occurred throughout the Bulkley Valley in relatively large numbers and were known to gather in abundance in the Telkwa Pass:

“Wet’suwet’en elders describe herds of up to 150 caribou moving, wintering, and calving throughout the region (e.g., near present-day Smithers, Telkwa, and Witset). The Telkwa Pass in particular was known for its abundance of caribou (Morris et al. 2006).” (Crossroads 2021)

4.1.2 Scientific and Other Information

The purpose of this subsection is to demonstrate awareness of existing scientific and other information, and its applicability to the assessment of the Wildlife VC.

A desktop review was conducted and included an examination of available and relevant published and unpublished scientific data, local knowledge, federal and provincial legislation, regulations, strategies, guidelines, plans, BMPs, and land use plans applicable to wildlife within the Wildlife Study Areas. Baseline information from previous environmental assessments conducted near the Project were also reviewed and evaluated. Online resources were used to help identify the information on wildlife species at risk, available research and monitoring, as well as any additional baseline information from projects involved in environmental assessments or other ecological studies related to wildlife (**Table 4.4-1**).

Table 4.1-1: Summary of Data Sources Reviewed as Part of Baseline Reporting for the Wildlife Valued Component (VC)

Title	Content	Reference
BC Conservation Data Centre (BC CDC)	Status reports and designations for at risk wildlife species in British Columbia (BC).	BC CDC 2010; 2015 a, b
Species at Risk Public Registry	Status reports and designations for at risk wildlife species in BC.	Government of Canada (GovCan) 2018
Canadian Impact Assessment Registry; Canadian Environmental Assessment Archives	Status and available documents for projects undergoing an environmental assessment with the Impact Assessment Agency of Canada (IAAC). Projects initiated but suspended or completed prior to 2016 are in the archive.	IAAC 2020; Canadian Environmental Assessment Agency (CEAA) 2018
EcoCat: The Ecological Reports Catalogue	Map application and catalogue to identify available ecological reports completed in BC.	British Columbia Ministry of Environment (BC MOE) 2018
e-Fauna BC Electronic Atlas of the Wildlife of British Columbia	Descriptions and distribution maps of wildlife species in BC	Klinkenberg 2021
Environmental Assessment Project Information Centre (EPIC)	Status and available documents for projects undergoing an environmental assessment with the British Columbia Environmental Assessment Office (BC EAO)	BC EAO 2019
iMap Incident Mapping Application	Locations for listed wildlife species in BC.	Government of British Columbia (GovBC) 2019b
Species Inventory Web Explorer	Reports, data files, and digital data from wildlife species inventories	BC MOE 2020d
DataBC	Search tool for BC Government spatial and aspatial digital data products	GovBC 2019a

Historically proposed coal mining projects within the Wildlife Study Areas have had environmental reports prepared in support of their applications for approval. A summary of the reports that contain wildlife and wildlife habitat information is outlined **Table 4.1-2**.

Table 4.1-2: Summary of Previous Environmental Reports within the Wildlife Study Area

Study Name	Study Content
Telkwa Project Vegetation - Forestry - Wildlife. Stage II Report for Crows Nest Resources Ltd. (TAESCO Consultants Ltd. 1984).	A Stage II report prepared in 1984 to provide background information on wildlife within their project area.
Wildlife North of the Telkwa River: A Stage II Assessment for the Proposed Telkwa Project (Hatler 1990).	A Stage II report prepared in 1984 to provide an assessment for the proposed Telkwa project on wildlife within their project area.
Telkwa Coal Project Application for a Project Approval Certificate (Manalta Coal Ltd. 1997)	Initial project application in 1997 that summarized the TAESCO (1984) for the area and included a wildlife assessment (Wildlife Assessment. Telkwa Coal Project (Manalta Coal Ltd. 1998) and Moose capability/suitability mapping (Moose Habitat

Study Name	Study Content
	Capability/Suitability Mapping. Telkwa Coal Project (Manalta Coal Ltd. 1997c); for the Telkwa Coal Project (Edie 1998a)
Habitat selection and calf survival in the Telkwa caribou herd, British Columbia (Stronen 2000)	A report on the habitat selection and calf survival of the Telkwa Caribou Herd (Edie 1998b)

Additional sources of information related to specific assessments and studies completed during the baseline program for the Project are outlined within the subsections below, as appropriate.

4.1.3 Baseline Studies

Project-specific wildlife baseline studies were conducted by Ardea Biological Consulting (Smithers, BC) from 2017 to 2019 to characterise the baseline conditions of wildlife within the Wildlife Study Areas. The wildlife baseline program was completed under the oversight and coordination of Laurence Turney, R.P.Bio. with the support of several local consulting firms. Carlie Quinn and Oliver Holt, B.I.T. (Ardea) conducted wildlife habitat assessments, bat roost assessments, and amphibian and reptile surveys. Lis Rach (Terraniche Environmental Solutions) led amphibian and reptile surveys. Frank Doyle, R.P.Bio. (Wildlife Dynamics) conducted wildlife habitat assessments, bat roost assessments, and winter snow tracking. Lynn Westcott (Westcott Environmental Services) led terrestrial invertebrate surveys. Theresa White, R.P.Bio. (Cedrus Consulting) conducted terrestrial invertebrate surveys and amphibian surveys. Amanita Coosemans, R.P.Bio. (Balanced Ecological Management Co.) conducted snow tracking. Seán Sharpe, R.P.Bio. (Seán Sharpe Environmental Consulting) contributed to grizzly bear habitat modelling. Doug Steventon, R.P.Bio. completed marten habitat modelling. Anne MacLeod, R.P.Bio. (Environmental Dynamics Inc., EDI) completed review of habitat assessments. Todd Mahon, R.P.Bio. (EDI) contributed to caribou baseline. Julia Krizan (EDI) led caribou baseline and grizzly bear habitat modelling. The **Wildlife Baseline Report (Appendix 4.8-A)** provides additional details on these studies.

Focal species identified for the wildlife baseline studies included those species that have potential to interact with the Project and are either species of conservation concern or species with distinct social, cultural, or economic values. Consideration for the selection of focal species or species groups included:

- ▶ species occurrence or habitat overlap with the Wildlife Study Areas;
- ▶ species of conservation concern including federal and provincial listings;
- ▶ species of interest to Indigenous groups, regulatory agencies or the public; and
- ▶ species raised as a concern during Project consultation.

Where possible, historic data from available sources were included in the review of baseline conditions (see **Table 4.1-3**). Methodological details and comprehensive results and data summaries are presented in the Project-specific **Wildlife Baseline Report (Appendix 4.8-A)**.

Table 4.1-3: Summary of Desktop and Field Studies Related to Wildlife Valued Component (VC)

Study Name	Study Purpose, Duration and Spatial Boundaries
Amphibian Field Surveys	Aquatic, terrestrial, and eDNA amphibian surveys were conducted in 2017 and 2018 within the WLSA to determine species presence and habitat use. Wildlife Baseline Report (Appendix 4.8-A) .

Study Name	Study Purpose, Duration and Spatial Boundaries
Reptile Hibernacula and Terrestrial Surveys	Terrestrial reptile surveys were conducted in 2017 and 2018 within the WLSA to determine species presence and habitat use. (Appendix 4.8-A)
Bat Ultrasonic Monitoring Surveys	Ultrasonic bat surveys were completed from 2017 to 2019 to determine species presence within the WLSA. (Appendix 4.8-A)
Review of Wildlife Harvest Data	Trapper harvest data were obtained for 1975 to 2017 from traplines within the WRSA to determine the species and amounts of Furbearers harvested. (Appendix 4.8-A)
Wildlife Habitat Assessments	Wildlife habitat assessments were used to test and refine the habitat suitability models, while the habitat use information defined the distributions of species and their habitat use. Assessments were completed from 2017 to 2019 within the WLSA. (Appendix 4.8-A)
Wildlife Trail Assessments	Wildlife trail assessments were used to determine the spatial location of wildlife trails and their species-specific use. Assessments were completed from 2017 to 2019 within the WLSA. (Appendix 4.8-A)
Wildlife Camera Trap Survey	Wildlife cameras were used from 2017 to 2018 to collect data on the presence of wildlife species within the WLSA. (Appendix 4.8-A)
Snow Track Surveys	Snow track surveys were completed in 2018 within the WLSA to document the presence and habitat use by Furbearers and ungulates. (Appendix 4.8-A)
Arboreal and Terrestrial Lichen Assessments	Lichen assessment surveys were completed between 2017 and 2019 within the Caribou study areas to determine the biomass of lichen potentially available to Caribou. (Appendix 4.8-A)
Review of Ungulate Population Survey Data	Population survey data from 1992 to 2018 were obtained from the BC MOE for moose, caribou, and elk to determine regional populations. (Appendix 4.8-A)
Ungulate Collar Data Analysis	Ungulate radio collar data from 1994 to 2018 were obtained from the BC MOE for moose, caribou, and elk to determine annual and seasonal trends in movement patterns and habitat use. (Appendix 4.8-A)
Habitat Suitability Modeling	Quantitative habitat suitability models were created to rate available habitat suitability for American marten, Grizzly Bear, Caribou, Moose, Western Toad, and Bats. The habitat suitability models for American marten, Bats, and Western Toad were developed using a four (4)-class rating system (i.e., Nil, Low, Moderate, and High suitability). The habitat suitability models for Grizzly Bear and Moose were developed using a six-class rating system (i.e., Nil, Very Low, Low, Moderate, Moderately High, High). A habitat disturbance model was developed for caribou determine the amount of disturbed habitat with the Caribou RSAs. (Appendix 4.8-A)

Notes: BC MOE=British Columbia Ministry of Environment; eDNA=environmental deoxyribonucleic acid; WLSA=Wildlife Local Study Area; WRSA=Wildlife Regional Study Area

Assessments, surveys, and mapping were all conducted in accordance with federal, provincial, and other accepted standards and guidebooks including:

- ▶ A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region (Banner et al. 1993);
- ▶ British Columbia Wildlife Habitat Rating Standards, Version 2.0 (Resources Inventory Committee [RIC] 1999a);
- ▶ Environmental DNA Protocol for Freshwater Aquatic Ecosystems. Version 2.2. (Hobbs and Goldberg 2017);

- ▶ Field Manual for Describing Terrestrial Ecosystems, 2nd edition (BC MOFR and BC MOE 2010);
- ▶ Ground-based Inventory Methods for Selected Ungulates: Moose, Elk and Deer. Standards for Components of British Columbia's Biodiversity No. 33. Version 2.0. (RIC 1998b);
- ▶ Inventory Methods for Marten and Weasels. Standards for Components of British Columbia's Biodiversity No. 24. Version 2.0. (RIC 1998c);
- ▶ Inventory Methods for Medium-sized Terrestrial Carnivores: Coyote, Red Fox, Lynx, Bobcat, Wolverine, Fisher & Badger. Standards for Components of British Columbia's Biodiversity No.25. Version 2.0 (RIC 1999a);
- ▶ Inventory Methods for Plethodontid Salamanders. Standards for Components of British Columbia's Biodiversity No. 36. Version 2.0 (RIC 1999b);
- ▶ Inventory Methods for Pond-breeding Amphibians and Painted Turtle. Standards for Components of British Columbia's Diversity No. 37. Version 2.0. (RIC 1998d);
- ▶ Inventory Methods for Terrestrial Arthropods. Standards for Components of British Columbia's Biodiversity No. 40. Version 2.0. (RIC 1998e);
- ▶ Live Animal Capture and Handling Guidelines for Wild Mammals, Birds, Amphibians and Reptiles. Standards for Components of British Columbia's Biodiversity No. 3. Version 2.0. (RIC 1998f); and
- ▶ Standard Operating Procedures: Hygiene Protocols for Amphibian Fieldwork. (British Columbia Ministry of Environment, Lands and Parks [BC MELP] 2008).

Habitat suitability models were developed for species that were identified during the baseline studies as potentially interacting with the Project. Models were developed using the RIC standards as described above. Caribou habitat modelling followed methods developed since the RIC standards and was based on current scientific literature. The habitat suitability model for American marten model was developed using methods developed by Steventon (2014) to identify suitable habitat as well as identify potential female marten home ranges. Models were based on species-specific life history information and used a combination of spatial datasets that included ecosystems, forest attributes, and anthropogenic features to identify suitable habitat. Additional information on the habitat suitability models is provided under the appropriate species sections, with the detailed model methodologies provided in the **Wildlife Baseline Report (Appendix 4.8-A)**.

The Caribou section of the **Wildlife Baseline Report (Appendix 4.8-A)** is based on survey reports prepared by the Province BC biologists, two (2) graduate theses, an extensive review completed by Cichowski (2014), other published literature, and the available Telkwa Caribou collar locations. To supplement and update the compiled information in support of this EAC Application, additional analyses were completed to characterise habitat disturbance, habitat selection, mortality, and movement of Telkwa Caribou. The results of these analyses are included in the **Wildlife Baseline Report (Appendix 4.8-A)** and are summarized in **4.2.2 Caribou**.

4.2 Description of Existing Conditions

This subsection provides a description of pre-Project conditions (i.e., conditions prior to interaction with the Project) based on TK (where available), scientific and other information, and baseline studies completed for the Project.

The Wildlife Study Areas provide a variety of aquatic (e.g., wetlands, lakes, riparian areas) and terrestrial habitat (e.g., forests, alpine, scree slopes) for wildlife. These study areas have an anthropogenic footprint that includes the Village of Telkwa, part of the Town of Smithers, and overlap with the Highway 16 corridor

and associated road access system. Agricultural land use and rural residences are common at lower elevations, while higher elevation areas have a history of forestry activities and other natural resource exploration and development.

Most of the Project Area lies within the Sub-Boreal Spruce Dry Cool (SBSdk) and the Sub-Boreal Spruce Babine Moist Cold (SBSmc2) BGC subzones; however, the Wildlife Study Areas also overlap the Boreal Altai Fescue Alpine Undifferentiated (BAFAun), Coastal Mountain-heather Alpine Undifferentiated (CMAun), Coastal Western Hemlock Wet Submaritime Montane variant (CWHws2), Engelmann Spruce – Subalpine Fir Moist-Cold (ESSFmc), Engelmann Spruce – Subalpine Fir Moist-Cold Parkland (ESSFmcp), Engelmann Spruce – Subalpine Fir Moist-Cool (ESSFmk), Moist-Cool Parkland (ESSFmkp), Engelmann Spruce – Subalpine Fir Wet-Very Cold (ESSFwv), Engelmann Spruce – Subalpine Fir Wet-Very cold Parkland (ESSFwvp), and Interior Cedar – Hemlock Moist-Cold – Nass variant (ICHmc1) BGC subzones and variants. The SBSdk occurs at lower elevations and valley bottoms and transitions into the SBSmc2 and then into the ESSFmc as elevation increases (Banner et al. 1993).

The regional climate is reflected in the BEC, with the SBS zone having a mostly continental climate with some coastal influences in the Bulkley Valley (Banner et al. 1993). Wildfire, which is climate driven and more frequent in the SBSdk than the SBSmc2, has contributed to the development of deciduous stands in the valley bottoms (Banner et al. 1993). These forested ecosystems have experienced various levels of historic disturbance associated with road development and commercial forestry (i.e., cutblocks and access roads).

Baseline reporting summarized habitat for wildlife within the Wildlife Study Areas by mine feature (i.e., Minesite), linear feature (i.e., Tenas Access Corridor (TAC) and powerline and substation), and rail feature (i.e., Rail Infrastructure):

- ▶ The Minesite is located almost entirely within the SBSmc2, with only small portions in the north located in the SBSdk and in the south located in the ESSFmc. Past forestry activities have influenced the surrounding landscape, creating a mosaic of regenerating coniferous forest (in a shrub or pole/sapling structural stage) interspersed with remnant patches of mature and old growth forests. Smaller areas of deciduous forest, mixed forest, shrub habitat, and wetland habitat (predominantly small, forested bogs) are scattered throughout;
- ▶ The TAC and powerline and substation are located primarily within the SBSdk. These linear features cross a variety of natural habitat types, including coniferous, deciduous, and mixed forest habitat (ranging from pole/sapling to mature and old growth forests); tall/low shrub habitats; floodplain ecosystems (particularly along Goathorn Creek and the Telkwa River); and wetland habitat (predominantly small marshes and swamps). Anthropogenic disturbance is present and includes agricultural development (e.g., cultivated fields, pasture), rural residences, and rights-of-way (ROWs) associated with transmission lines, natural gas pipelines, and various access roads and trails; and
- ▶ The Rail Infrastructure is located within 200 m of the Bulkley River within the SBSdk. Rural and agricultural activities have influenced the surrounding landscape, creating a patchy distribution of young to mature forests, cultivated fields, and pastures. The forested areas typically contain dry or mesic ecosystems, although upland and floodplain deciduous forests are present.

Refer to **Appendix 4.8-A** for details regarding the ecosystem and climate characteristics of and vegetation communities within the Wildlife Study Areas.

4.2.1 Furbearers

Furbearers were surveyed for species presence and habitat use within the Wildlife Study Areas using winter tracking, wildlife cameras, and wildlife trail assessments. Track transects were conducted 24 to 48 hours after snow, recording the date, time, all the tracks that bisected and were within 2 m of the transect line, the habitat in which each track was located, snow conditions (depth), and current weather conditions. Cameras were placed along roads and trails with known or expected areas of Furbearer use within representative habitat types (e.g., mature, and early seral forests). Wildlife trails were assessed using encounter transect methods to identify trails that crossed or ran parallel to the TAC, and the physical characteristics of each trail, the type of sign detected, and a rating of use was recorded. Refer to **Appendix 4.8-A** for additional details about the methodologies and results of the wildlife baseline studies.

A total of 14 Furbearer species were detected within the WRSA, including one (1) detection of wolverine, two (2) detections of fisher; American marten were detected throughout the WLSA. The wolverine tracks were detected within a mature coniferous forest in the SBSmc2 variant within the Minesite area. Fisher tracks were detected within a young mixed forest and a mature riparian forest, both within the SBSdk portion of the Goathorn Creek area. American marten track densities were highest in mixed forests and mature forest stands within the SBSdk, and lowest in riparian forests; they were infrequently detected on the wildlife trail assessments.

4.2.1.1 American Marten Habitat Suitability Modelling

The American marten habitat suitability model developed by Steventon (2014) with a four (4)-class rating structure was used in combination with mapped ecosystem data from the Vegetation Resource Inventory to identify suitable Living habitat during the winter season. The model was also used to estimate the potential number of available female territories based on average territory sizes.

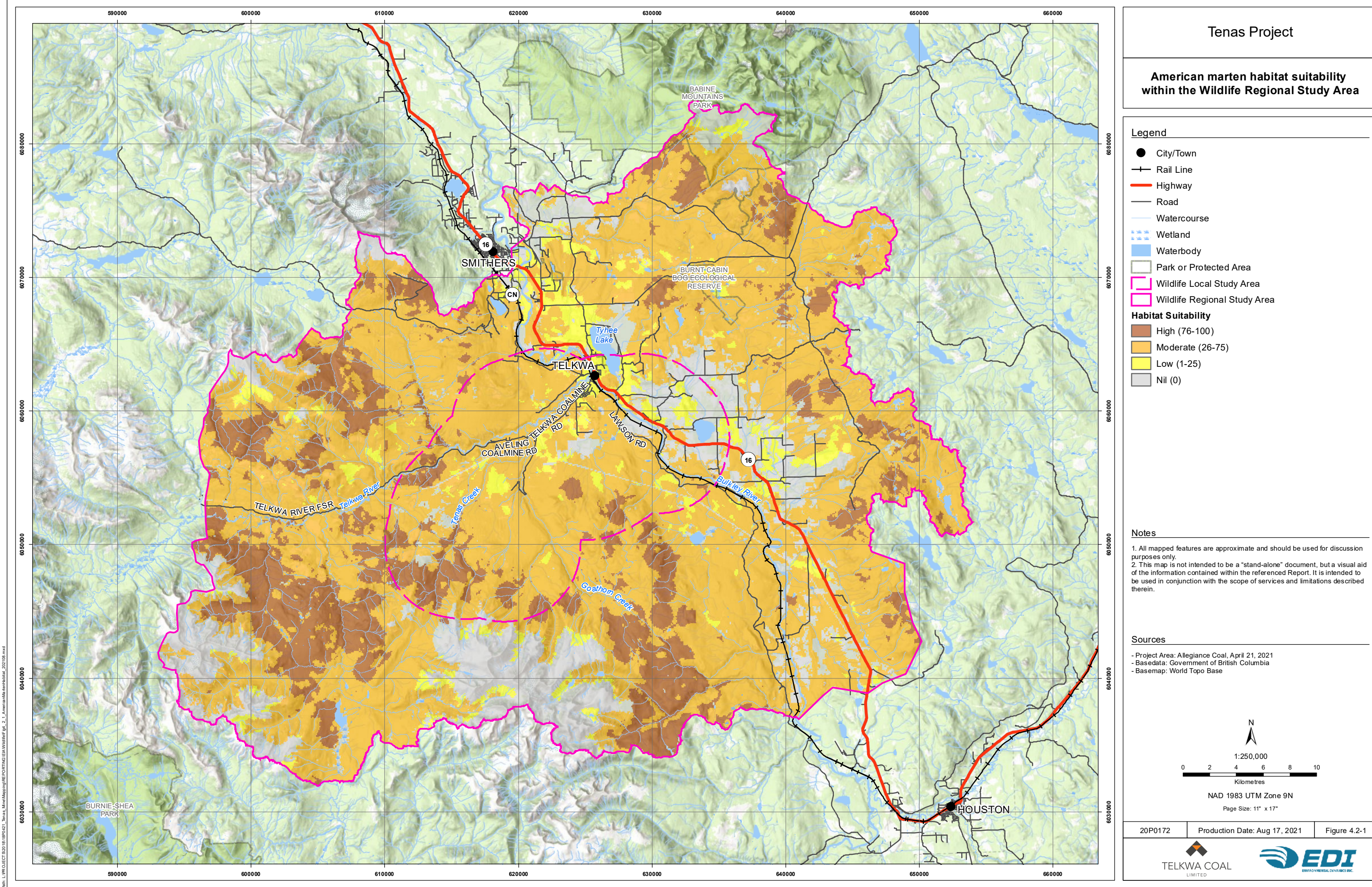
The model identified similar amounts of the WLSA (61 percent [%]) and WRSA (62%) as moderate or high rated suitable American marten habitat (suitable marten habitat) (**Table 4.2-1**). Most of the identified suitable marten habitat was distributed at higher elevations and outside of the valleys, due to more intact mature forests in those areas, and within the SBSmc2 and ESSFmc subzones (**Figure 4.2-1**). Habitat data from the model were then used to estimate 37 to 48 American marten territories within the WLSA and 262 to 277 territories for the WRSA. Refer to **Appendix 4.8-A** for additional details about the methodologies and results of the American marten habitat suitability model.

Table 4.2-1: Area and Percent of the Wildlife Local Study Area (WLSA) and Wildlife Regional Study Area (WRSA) for each Rating Class of the American Marten Living Habitat Suitable Model

Living Habitat Suitability Rating	Amount of Suitable Habitat in Wildlife Local Study Area (ha)	Percent of Suitable Habitat in Wildlife Local Study Area (%)	Amount of Suitable Habitat in Wildlife Regional Study Area (ha)	Percent of Suitable Habitat in Wildlife Regional Study Area (%)
High	3,767	11	31,249	16
Moderate	24,183	68	121,852	63
Low	2,914	8	10,582	5
Nil	4,860	14	30,973	16
Total	35,724	100	194,656*	100

Notes: %=percent; ha=hectare

*There is a minor difference between baseline model analysis sum of area and total WRSA area due to geoprocessing



Path: L:\PROJECT\S2018\BP02421_Tenas_MinMap\map\REPORTING\IEA\Wildref\Fig_2_1_AmericanMartenHabitat_202108.mxd

4.2.2 Caribou

This subsection describes the current state of the Telkwa Caribou Herd and their range based on the most recent and relevant information available. The following text is a synopsis of the detailed review, methods, and analyses that are provided in the **Wildlife Baseline Report (Appendix 4.8-A)**.

The Telkwa Caribou Herd is a small and relatively isolated herd that is part of Canada's Northern Mountain population of woodland caribou, whose distribution spans from central BC to central Yukon and includes the mountainous region of the western Northwest Territories. The Telkwa Caribou Herd resides near the southern extent of the Northern Mountain population range.

The Telkwa Caribou Herd was originally classified as part of the Southern Mountain caribou population by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2002 because the herd occurs within the Southern Mountain National Ecological Area (SMNEA) (COSEWIC 2002). Southern Mountain caribou herds within the SMNEA were further classified into three (3) groups based on their ecological differences. The Telkwa Caribou Herd was included in the Northern Group of the Southern Mountain population. More recently, COSEWIC (2011) delineated new designatable units for caribou across Canada that resulted in the Telkwa Caribou Herd being designated as part of 'Designatable Unit 7', or the Northern Mountain population.

The Southern Mountain population of woodland caribou was assessed as threatened in 2002 (COSEWIC 2002) and listed on Schedule 1 of *Species at Risk Act*, SC 2002, c. 29 (GovCan 2002) (SARA) in 2003. As required under SARA for species listed as threatened, a recovery strategy was developed, then approved in 2014. The Recovery Strategy for the Woodland Caribou, Southern Mountain population in Canada (Environment Canada 2014), hereafter referred to as the "Recovery Strategy", identifies population targets with the overall purpose of making sure that each of the subpopulations within the Southern Mountain population are self-sustaining. Also in 2014, COSEWIC reassessed the three (3) mountain caribou populations in Canada based on the updated designatable units; the Northern Mountain population, including the Telkwa Caribou, was assessed as special concern (COSEWIC 2014a). The conservation status based on the new designatable units is currently awaiting listing under SARA. The federal Recovery Strategy (Environment Canada 2014) remains the guiding document for the Telkwa Caribou Herd recovery and management until the herd is relisted as part of the Northern Mountain population.

The critical habitat for the Telkwa Caribou Herd identified in the 2014 Recovery Strategy informed the boundaries of the CRSA1 (**Figure 3.2-2**). The CRSA1 is primarily based on the regional administrative boundaries that are involved in the management of the Telkwa Caribou Herd's habitat. The critical habitat for Telkwa Caribou Herd was updated to include core and matrix habitat in late 2019 (Dodd and Carswell 2019). The CRSA2 Core reflects the annual range of the Telkwa Caribou Herd, while the CRSA2 Matrix habitat includes a 30 km buffer around the CRSA2 Core. The updated critical habitat is based on the current ecology of the Telkwa Caribou Herd and is mostly aligned with the hierarchy of range descriptions used in the 2014 Recovery Strategy. To provide the assessment of potential effects of the Project on the Telkwa Caribou Herd at herd management and biologically meaningful scales, baseline analyses were completed for both the CRSA1 and CRSA2 (Core and Matrix), respectively. They are summarized in the following subsections and are described in detail in **Appendix 4.8-A**.

4.2.2.1 Range Use and Distribution

The Telkwa Caribou Herd's range is currently centred on the Telkwa and the Howson ranges and bounded by three broad river valleys that isolate the Caribou range from adjacent alpine terrain. The Telkwa, Bulkley, and Morice river valleys are the main landscape features that bound the herd in the north, east, and south, respectively (**Figure 4.2-2**). The current range likely reflects a contraction compared to the herd's historic

ranges. TK and scientific observations of the Telkwa Caribou Herd during the early 1900s suggests that the herd's range included areas outside of the CRSA1, such as the Hudson Bay and Babine mountains, and possibly ranged as far north as Hazelton (Cichowski 2014).

Caribou use of areas beyond the current 'normal' annual distribution may have been a common occurrence when there were more Caribou in the region. Historical records exist from the early to mid-1900s of Caribou using lower elevation forested habitats during some seasons. These lower elevation forested habitats are rarely used now (Cichowski 2014). An analysis of collar data acquired since 1997 showed that locations are primarily concentrated at higher elevations within the CRSA1, and more specifically, the CRSA2 Core (**Table 4.2-2**). The small number of locations outside the CRSA1 and CRSA2 Core are almost exclusively from Caribou translocated from another herd and the data were acquired during 1998 to 2002 (when the translocation occurred; described in **Appendix 4.8-A**). Only 0.2 percent (%) of resident Telkwa Caribou collar locations occur outside the Caribou study areas (**Table 4.2-2**).

The annual distribution of Telkwa Caribou collar locations indicated that Caribou were concentrated on the northern parts of the Telkwa and Howson ranges, and primarily within the alpine and subalpine habitat in the area (**Figure 4.2-2**). Seasonal ranges are not defined for the Telkwa Caribou Herd as it is generally distributed throughout its annual range during all seasons. The Telkwa Caribou collar data show that Caribou consistently use similar areas within their range during all seasons (**Figure 4.2-2**). However, the range used increases during the summer, compared to other seasons, shown by the more widespread distribution of Caribou using more of the subalpine habitat across their range, including areas that are not used during other seasons. An increased distribution of Caribou during summer is expected because Caribou movements are not limited by snow cover and abundant forage is available. The increase in distribution is similar to results from Roberts et al. (2003), who found that the Telkwa Caribou Herd summer range was more than twice the size of other seasonal ranges. **Table 4.2-2** provides an overview of Caribou collar locations within the Caribou study areas.

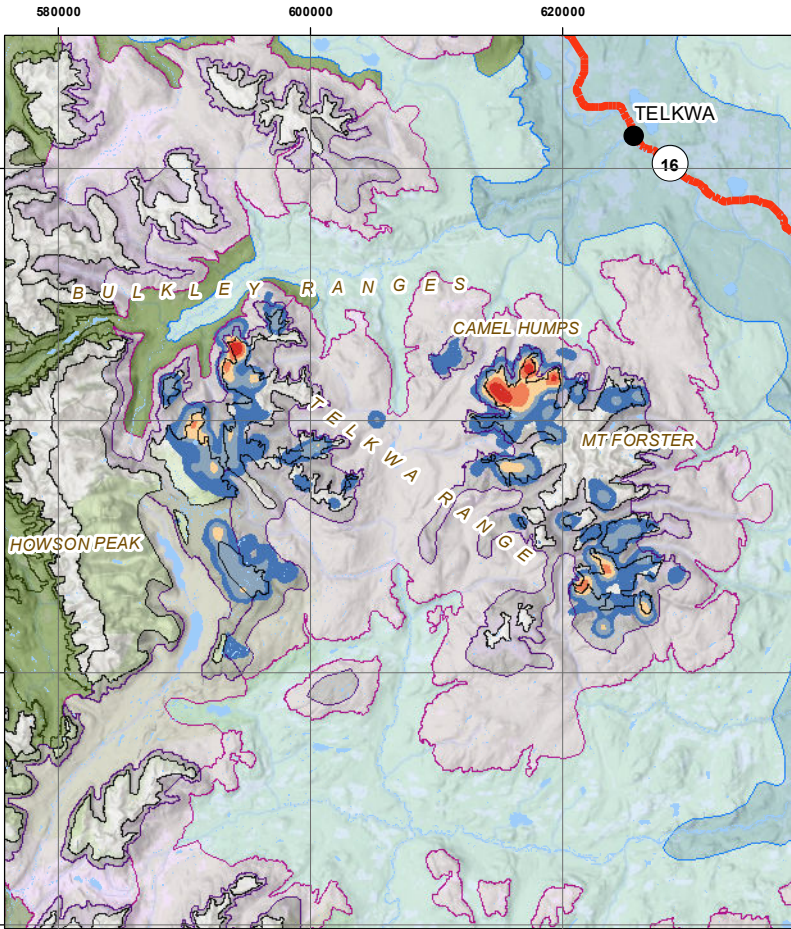
Table 4.2-2: Percentage of Telkwa Caribou Collar Locations (between 1994 and 2018) within the Wildlife Local Study Area (WLSA), Caribou Regional Study Area (CRSA) 1, CRSA2 Core, and CRSA2 Matrix for Resident and Translocated Caribou*

Study Area	Resident Caribou Locations	Translocated Caribou Locations
WLSA	1.7%	10.3%
CRSA1	99.8%	92.2%
CRSA2 Core	99.8%	88.0%
CRSA2 Matrix	0.2%	6.8%
Outside of Study Areas	0.0%	5.3%
Total Number of Locations	29,785	3,239

Notes: %= percent; CRSA= Caribou Regional Study Area; WLSA= Wildlife Local Study Area

*Resident Caribou are from the Telkwa Caribou Herd, translocated Caribou were introduced to the Telkwa Caribou Herd from the Chase-Sustut Caribou herd from 1997 to 1999 (Stronen 2000).

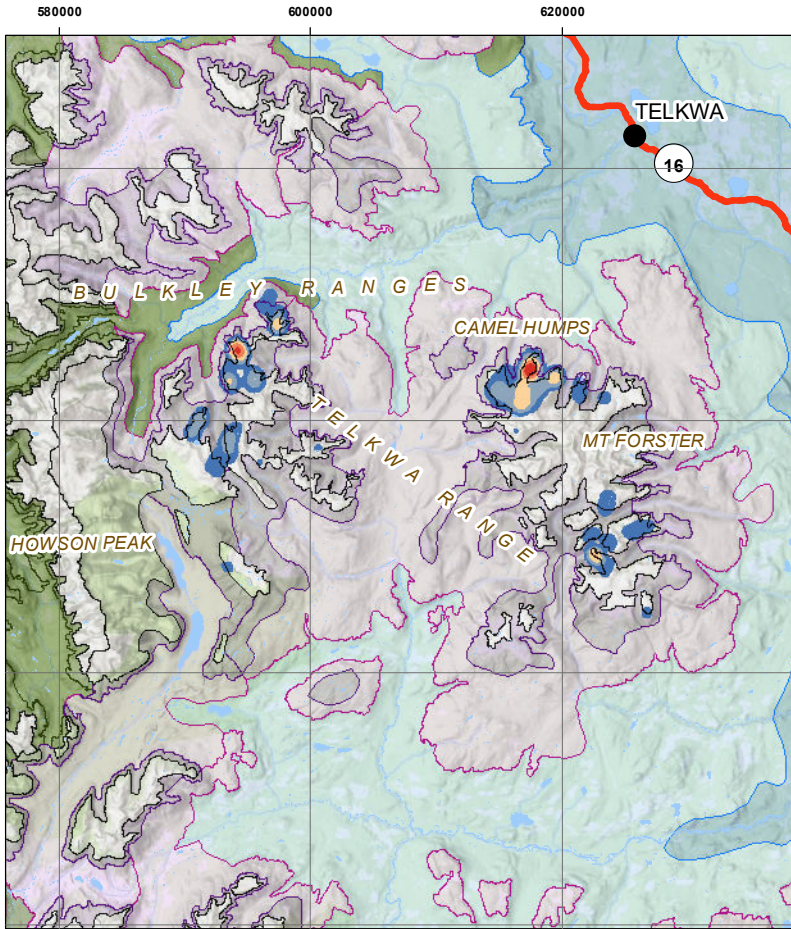
All Seasons



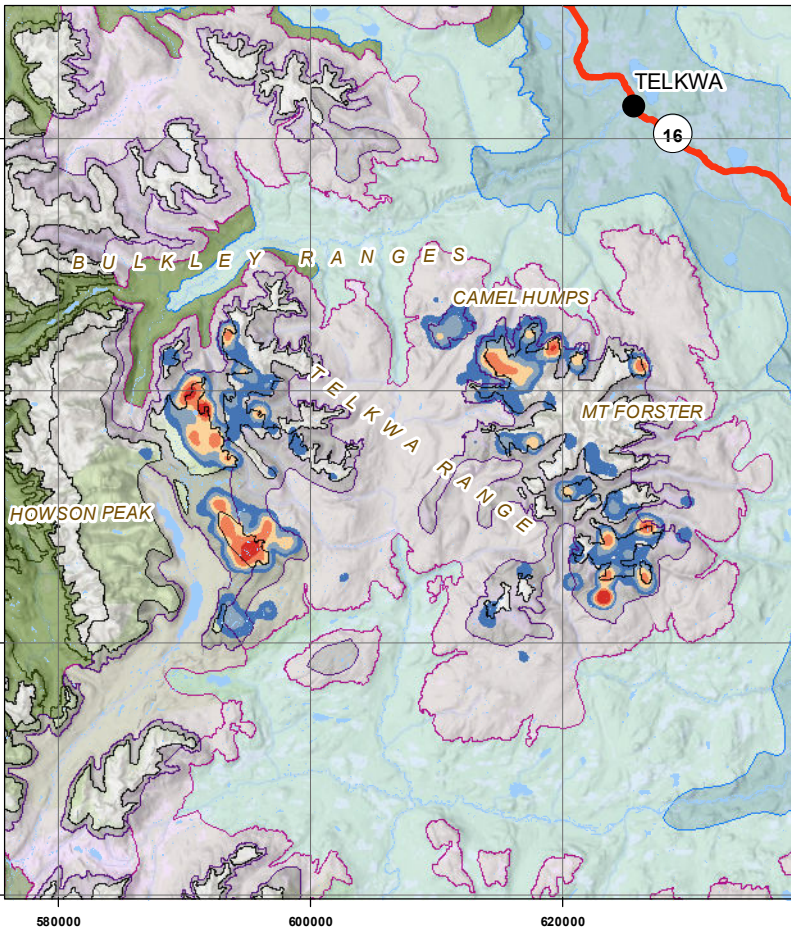
Calving



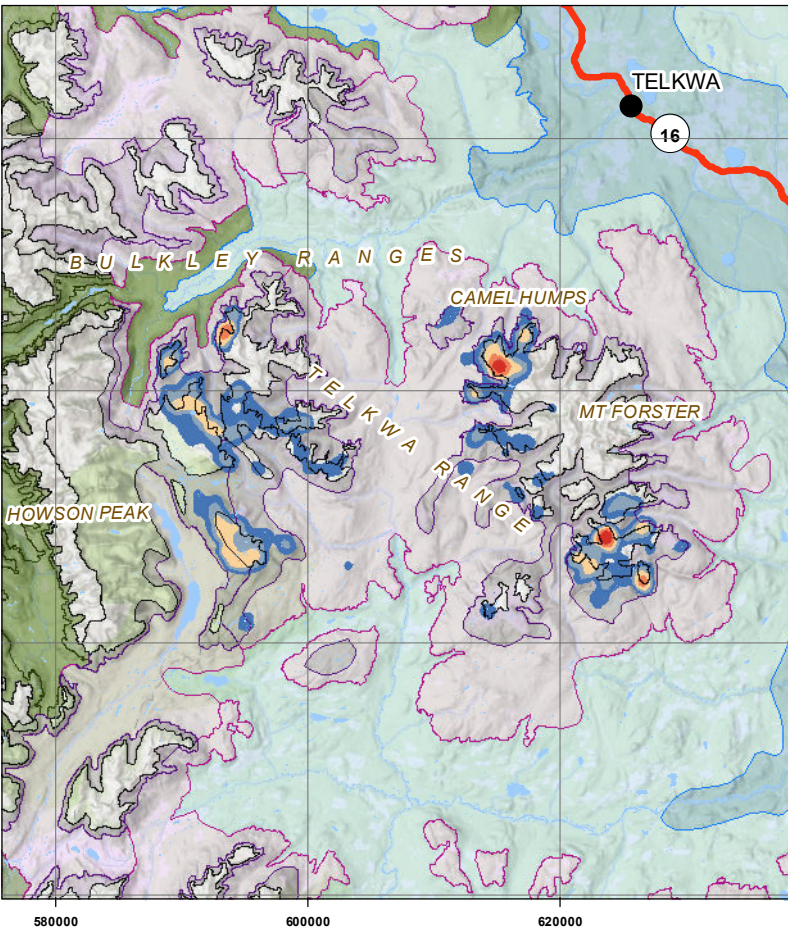
Spring



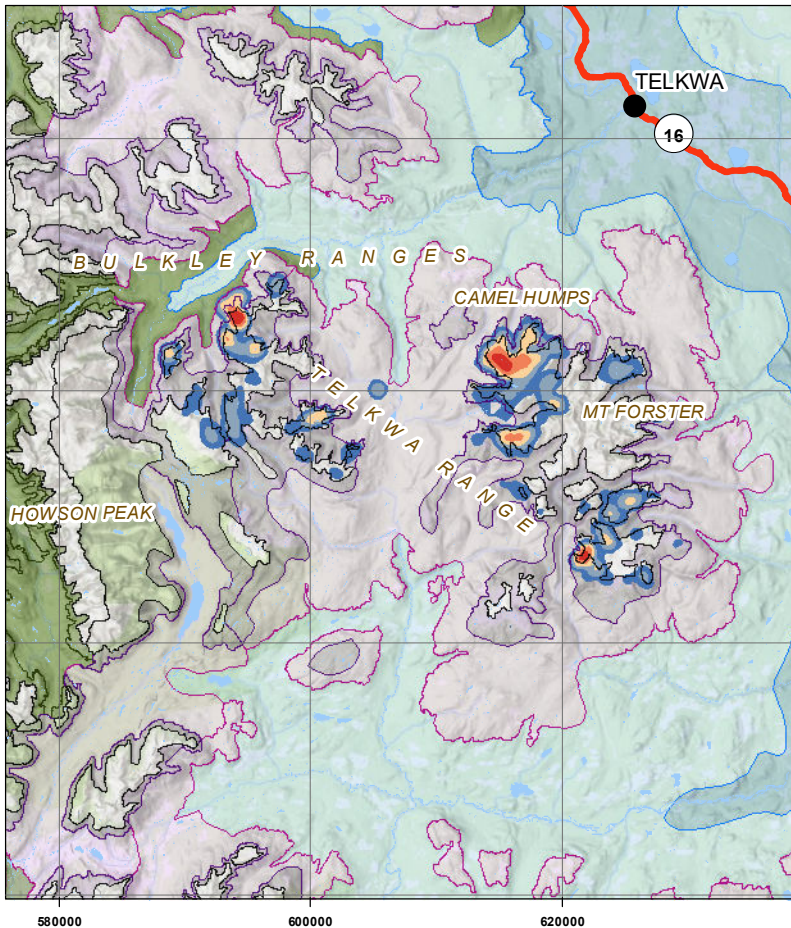
Summer



Fall



Winter



Tenas Project

Annual and seasonal distribution of Telkwa caribou collar locations, 1994-2018.

Legend

Location Density

- negligible
- very low
- low
- moderate
- high
- very high

BEC Group

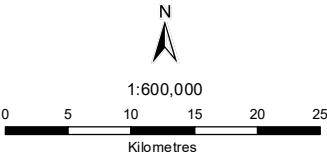
- Alpine (BAFA, CMA)
- Subalpine (ESSF Parkland variants)
- ESSF Forested (ESSFmc, ESSFmk, ESSFwv)
- SBSmc2
- SBSdk
- Coastal (CWH, ICH, MH variants)
- City/Town
- Highway
- Watercourse
- Waterbody

Notes

1. All mapped features are approximate and should be used for discussion purposes only.
2. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Basedata: Government of British Columbia
- Basemap: World Topo Base



NAD 1983 UTM Zone 9N
Page Size: 11" x 17"

20P0172 Production Date: Aug 05, 2021 Figure 4.2-2



4.2.2.2 Habitat Selection

Previous studies of seasonal habitat selection by Telkwa Caribou show little change in the types of habitat used during any season, consistent with the lack of changes in seasonal distributions described previously. Telkwa Caribou have been documented selecting both alpine and subalpine habitats during the entire year (Cichowski 2014), but selecting forested habitats during some years and seasons (Stronen 2000, Roberts et al. 2003). Analyses of early collar data (1998 to 2002) of the translocated Caribou showed some selection for forested habitats (Stronen 2000, Roberts et al. 2003), but the more recent collar data indicated that Caribou were selecting, almost exclusively, alpine, and subalpine habitats during summer and winter (Grant 2017).

As described in the **Wildlife Baseline Report (Appendix 4.8-A)**, an analysis of habitat selection using the available collar locations for Telkwa Caribou indicated that Caribou used alpine habitat during all seasons and years more than expected based on habitat availability within the CRSA1. BEC variants were grouped into similar habitats (BEC variant groups; **Table 4.2-3**) and the analysis compared Caribou use of each BEC variant group to its availability within the CRSA1. Alpine was the most strongly selected habitat during all seasons (**Table 4.2-3**). The selection of the subalpine ESSF-parkland varied by year and season and was always selected less than the alpine habitat. The baseline habitat selection analysis showed that Telkwa Caribou were almost exclusively selecting alpine habitats during the winter, indicating that the higher elevation habitat contained adequate winter forage (i.e., lichen) to support the herd (more details are provided in **Appendix 4.8-A Wildlife Baseline Report**). These analyses identified that Telkwa Caribou did not move to lower elevation forested habitat during winters to access winter forage, unlike many mountain Caribou herds in other areas; however, there is evidence that this might be a more recent trend. Available TK documented that Caribou historically occurred near the treeline in winters, presumably because Caribou had a harder time finding food in the alpine areas (Stronen 2000). A collaring program from 1985 to 1986 included four cow Caribou and found that Caribou used subalpine and lower elevation pine forests from December through February (Cichowski 2014).

Table 4.2-3: Telkwa Caribou Relative Seasonal Habitat Selection as a Function of Habitat Biogeoclimatic Ecosystem Classification (BEC) Variant Group within the Caribou Regional Study Area (CRSA) 1

BEC Variant Group	Winter	Spring	Calving	Summer	Fall
Alpine	7.51	8.58	6.02	5.43	6.11
Engelmann Spruce – Subalpine Fir parkland	1.20	-1.18	1.89	2.51	2.45
Engelmann Spruce – Subalpine Fir forest	-3.81	-11.66	-2.47	-2.75	-4.42
Sub-boreal Spruce – moist cold	-10.63	-6.74	-4.92	-11.09	
Sub-boreal Spruce – dry cool	-30.10	-23.73			-426.91
Coastal BEC					

Notes: BEC=Biogeoclimatic Ecosystem Classification

The value of the selection ratio indicates the strength of selection and quantifies how much more or less a BEC variant group is used compared to availability;

Blank cells indicate seasons and habitats that did not include collar locations.

Bold positive numbers indicate selection of BEC variant group.

Negative numbers indicate avoidance of the BEC variant group.

4.2.2.3 Disturbed Habitat Analysis

The amount of disturbed habitat (using the actual footprint and a 500 m buffer around the existing human disturbance plus unbuffered natural disturbances [e.g., forest fires]), as defined by the Recovery Strategy (Environment Canada 2014), currently exceeds the 35% disturbance threshold in most Caribou study areas, except for the CRSA2 Core (**Table 4.2-4**). As outlined in the **Wildlife Baseline Report (Appendix 4.8-A)**, two (2) types of human features accounted for most of the disturbed habitat within the CRSA1 and CRSA2 Matrix: roads/trails and forestry cutblocks. These features are extensively distributed throughout these study areas but are most concentrated in the lower elevation forested areas (**Figure 4.2-3**). Together roads/trails and cutblocks accounted for more than 60% of the human disturbance in the Caribou regional study areas.

Anthropogenic disturbance features are also widespread in the lower elevation habitats surrounding the CRSA2 Core, the study area that best represents the current annual distribution of the Telkwa Caribou Herd (**Figure 4.2-3**). Within the CRSA2 Core, the primary human disturbance features are roads/trails, followed by recreational snowmobiling and forestry cutblocks. Cutblocks account for proportionately less disturbance in the CRSA2 Core compared to the CRSA1 because this study area includes mostly alpine and subalpine BEC variant groups that are less suitable for forestry operations. Snowmobiling is a seasonal activity; therefore, any potential effects are considered temporary as they only occur during winter and do not cause long-term changes to the landscape; however, packed trails are known to facilitate predator movement and, thus, increase predation risk for Caribou (Keim et al. 2019a).

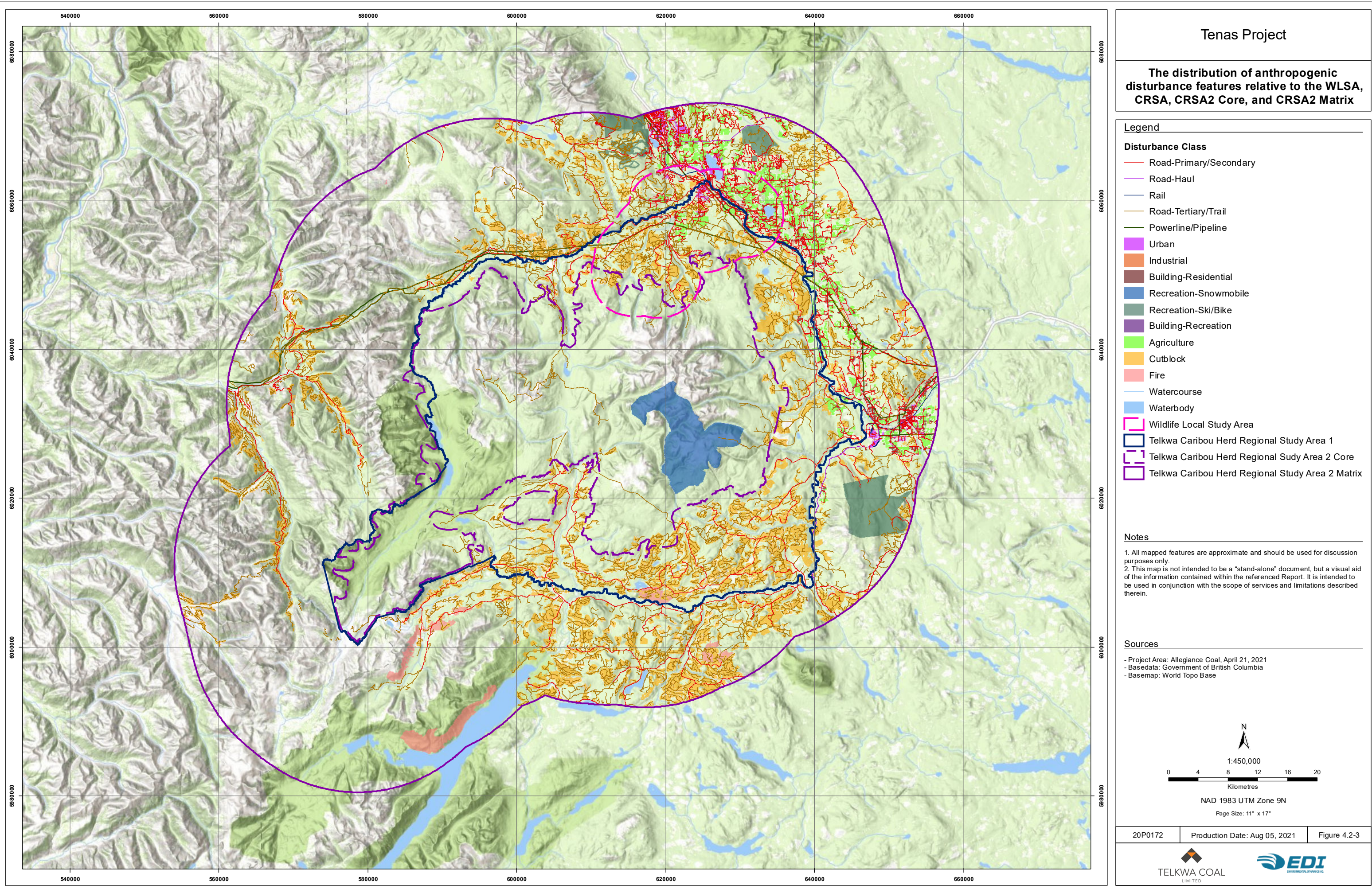
Roads and trails (including snowmobile trails) are the primary disturbance features created by humans within the study areas that are the most likely to influence Caribou mortality through facilitated predator movements and apparent competition with alternative prey species. Roads and trails (including snowmobile trails) are known to facilitate predator movement across landscapes. The benefits of linear features, such as roads and trails, to predators are most pronounced on intermittently used features during the winter (Dickie et al. 2020) when the lack of regular human activity does not deter use of the features by predators and the activity packs snow, making movement easier (Keim et al. 2019a). Areal disturbances, such as forestry cutblocks, create early seral forests that provide high quality forage supporting higher densities of other prey species, particularly moose (Anderson et al. 2018). Increasing evidence exists that higher moose numbers drive changes in Caribou populations through apparent competition (Serrouya et al. 2017). Apparent competition occurs when the density of an alternative prey species increases so that it supports higher density of predators. Within the Telkwa Caribou Herd range, these two (2) predation processes are likely supported by human disturbances and are indirectly affecting the mortality of Telkwa Caribou.

Table 4.2-4: Total Anthropogenic Disturbance within the Wildlife Local Study Area (WLSA), Caribou Regional Study Area (CRSA) 1, CRSA2 Core and CRSA2 Matrix Habitats

	WLSA	CRSA1	CRSA2 Core	CRSA2 Matrix
Total Area (ha)	35,382	260,611	160,272	531,706
Total Percentage Disturbed Area	90%	48%	23%	58%

Notes: ha=hectares; CRSA=Caribou Regional Study Area; WLSA=Wildlife Local Study Area

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4.2.2.4 Movement

Telkwa Caribou did not exhibit any clear regular movement patterns between or within seasonal habitats based on the analysis of Global Positioning System (GPS) collar locations (**Figure 4.2-4**). The movement of Telkwa Caribou within the CRSA1 and CRSA2 Core was consistent with the other metrics of Caribou distribution: range use and habitat selection. In general, Caribou moved through the alpine and subalpine habitats, their movement was more limited during winter and spring, and least restricted during the summer through fall (details are provided in **Appendix 4.8-A**).

Consecutive locations of Caribou GPS collar locations (2001 to 2004 and 2013 to 2016) were connected by lines (i.e., movement steps) and the consecutive lines in the timeseries dataset were connected to visualize individual Caribou movement paths. The resulting spatial dataset includes 6,555 movement steps across the different Caribou study areas (**Table 4.2-5 4.2-5**). Caribou paths indicated a high degree of overlap of seasonal ranges and movement steps primarily within alpine and subalpine BEC variants, consistent with the habitat selection and distribution analyses (described in **Section 4.2.2.1**). No predictable fast directional movements within or across seasons or years were documented. Paths outside the alpine and subalpine BEC variant groups most often occurred in the forested pass (ESSFmc), at the headwaters of Thautil River and Howson Creek, which separates the Telkwa and Howson mountain ranges (**Figure 4.2-4**). The Howson-Thautil pass is the one (1) forested area that the Telkwa Caribou Herd is known to regularly travel across between seasonal use areas in the Telkwa and Howson plateaus.

As described in the **Wildlife Baseline Report (Appendix 4.8-A)**, the movement steps of Caribou appeared to be related to snow accumulation and melt. The daily movement rate of Caribou was greatest during July through November when snow depth and coverage was limited within the CRSAs, and Telkwa Caribou had much more of their range available. Movement, like range use and habitat selection, appeared to be more restricted during the snow rich winter months. Movement steps were overlayed with the Project Area, WLSA, CRSA1, CRSA2 Core, and CRSA2 Matrix. The movement of resident collared Caribou was almost exclusively in the higher elevation habitats and south of the Project Area within the CRSA1 and CRSA2 Core (**Figure 4.2-4**); only 19 movement steps were documented outside these study areas in the CRSA2 Matrix (**Table 4.2-5**).

Note that the larger CRSA1 study area does not contain more Caribou movement steps than CRSA2 Core, but includes areas that Caribou were not using. Few collared Caribou moved through the Project Area or the WLSA, with only 145 Caribou steps from four collared Caribou observed within the WLSA. The movement steps that were within the WLSA represented 2.2% of the steps in the Caribou movement dataset (**Table 4.2-5**). One (1) collared resident Caribou was documented moving through the Project Area on November 27, 2001; the movement is represented by two (2) steps within the Project Area. The Caribou moved north from alpine habitat to the forested habitat where the Minesite will be located, then immediately returned to the alpine habitat (**Figure 4.2-4**).

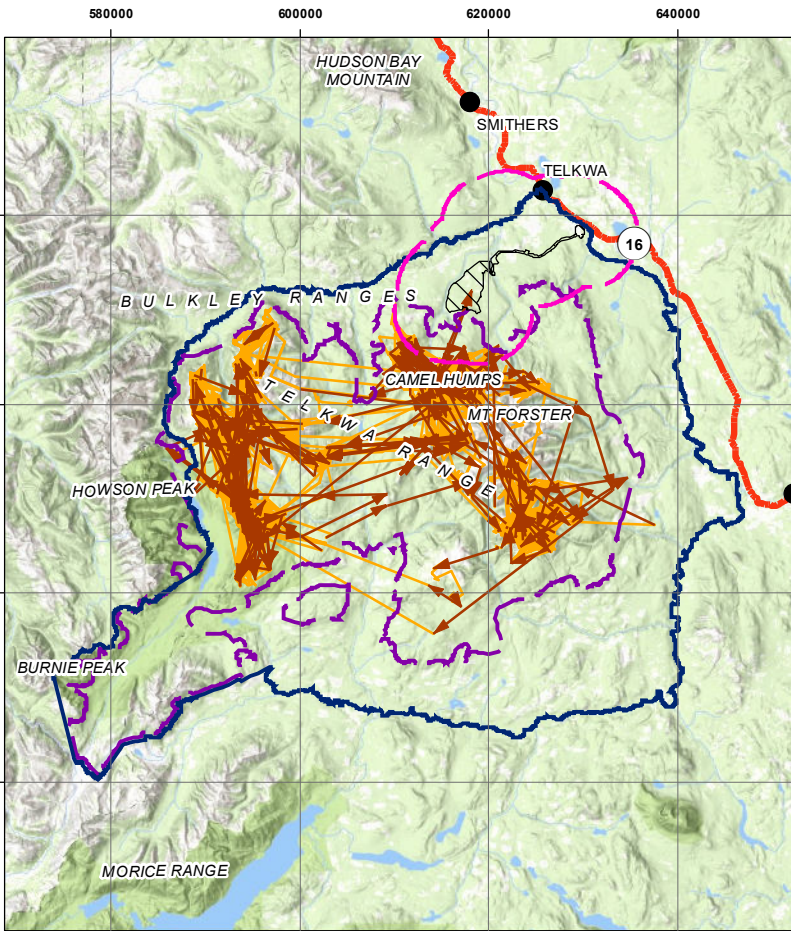
Movement paths and steps are modelled Caribou movements and may include some error in describing the exact path travelled by a Caribou, resulting in a potential underestimate of the true interaction with the Project Area. However, all movement steps in the movement dataset occurred along the southern edge of the WLSA; it is therefore unlikely that any of these Caribou travelled into the Project Area. In summary, the movement analysis of resident GPS collared Caribou indicated that Caribou are unlikely to use the Project Area and would move through the WLSA infrequently. The analysis also showed that CRSA2 Core encompasses the movements of Telkwa Caribou better than the CRSA1.

Table 4.2-5 **Number of Collared Caribou and Movement Steps (Count and Percent) Observed Within the Project Area, Wildlife Local Study Area (WLSA), Caribou Regional Study Area (CRSA) 1, CRSA2 Core, and CRSA2 Matrix**

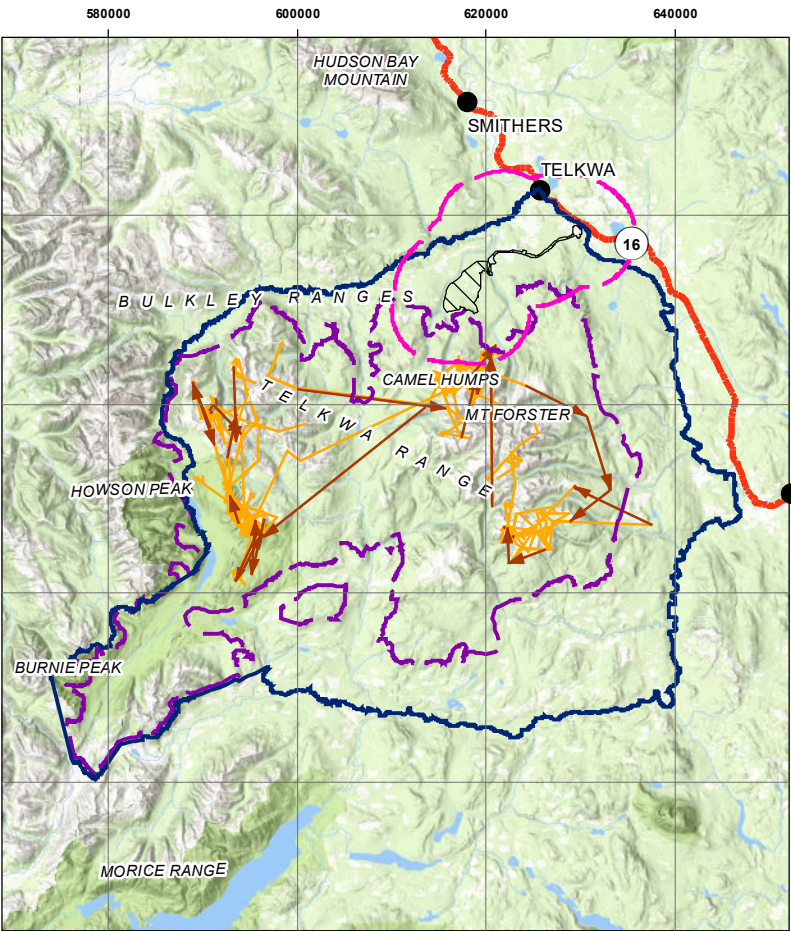
	Count of Collared Caribou	Count of Movement Steps	Percent of Total Movement Steps
Total:	15	6,555	100%
Number within each study area:			
Project Area	1	2	0.03%
WLSA	4	145	2.21%
CRSA1	15	6,554	99.98%
CRSA2 Core	15	6,554	99.98%
CRSA2 Matrix	7	19	0.29%

Notes: The 'Total' row indicates the number of collared caribou and movement steps in the dataset, not the sum of the columns.

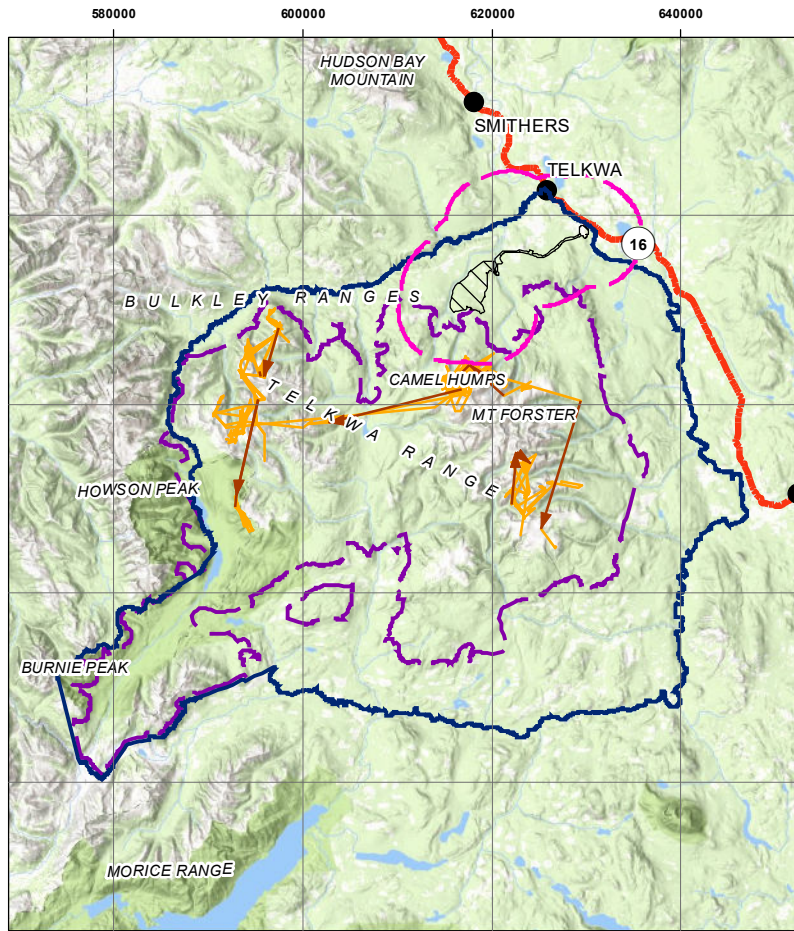
All Seasons



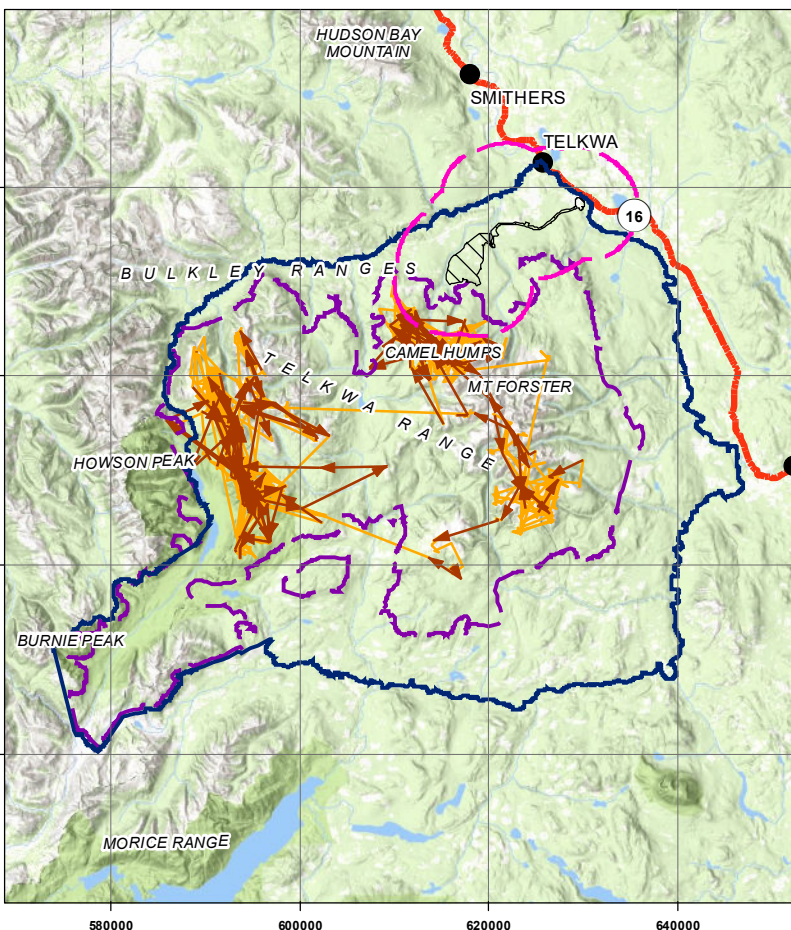
Calving



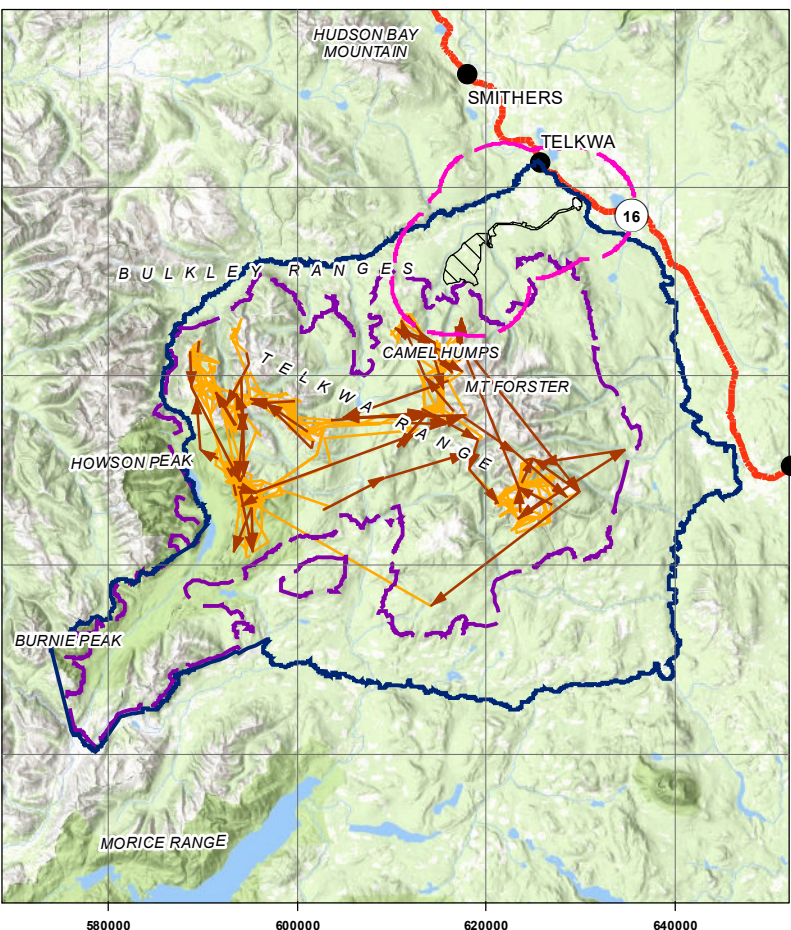
Spring



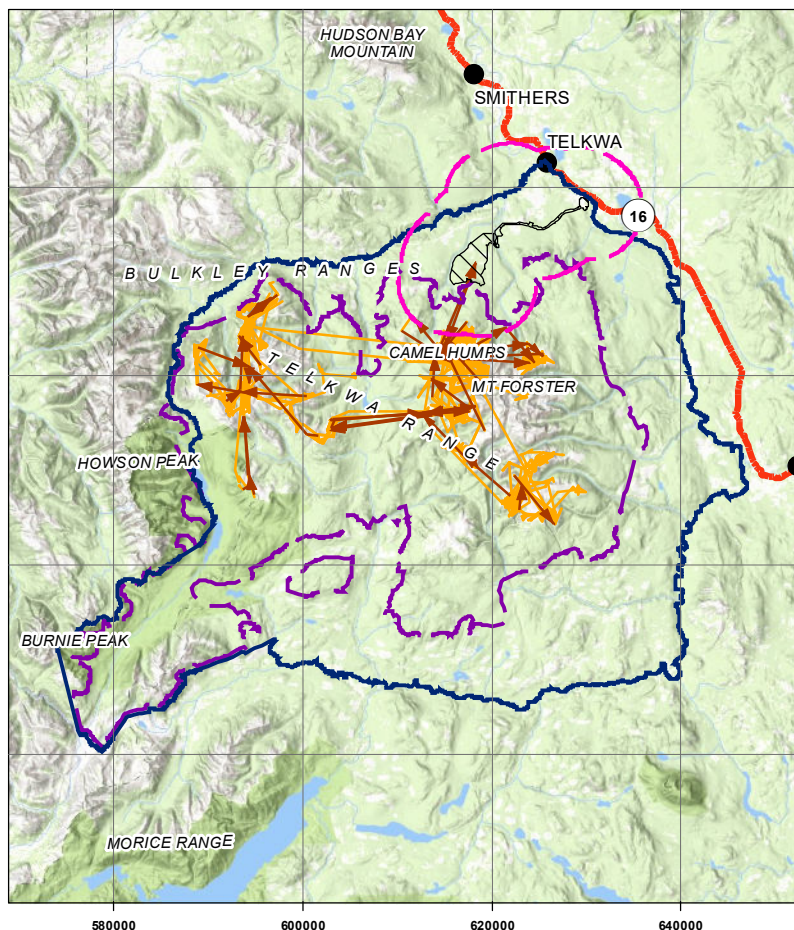
Summer



Fall



Winter



Tenas Project

Telkwa caribou movement paths
by season 2001-2004, 2013-2016, and 2018.

Legend

- Project Area
- Wildlife Local Study Area
- Telkwa Caribou Herd Regional Study Area 1
- Telkwa Caribou Herd Regional Study Area 2 Core

Caribou steps

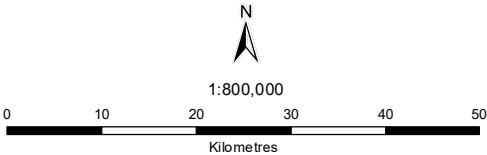
- ≥ 3.99 km/day
- < 3.99 km/day
- City/Town
- Highway
- Watercourse
- Waterbody

Notes

- All mapped features are approximate and should be used for discussion purposes only.
- This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

- Project Area: Allegiance Coal, April 21, 2021
- Basedata: Government of British Columbia
- Basemap: World Topo Base



NAD 1983 UTM Zone 9N
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20P0172 Production Date: Aug 17, 2021 Figure 4.2-4



4.2.2.5 Abundance and Mortality

Population monitoring and anecdotal observations indicate that the Telkwa Caribou Herd has experienced at least three (3) declines in the past century (Cichowski 2014). The first documented decline occurred in the 1950s and was associated with a regional decline of caribou in northern BC (Bergerud and Elliot 1986). After restricting harvest and implementation of a regional predator control program, the herd size recovered by the mid 1960s (Cichowski 2014). In the late 1970s, the herd size was in decline again, and by the 1990s, no more than 13 Caribou were observed in any given aerial survey (Stronen 2000).

In response to the low numbers of Caribou, the Province of British Columbia developed the Telkwa Mountains Caribou Herd Recovery Plan (BC MELP 1998) and supplemented the herd through the translocation of 30 caribou from a nearby herd (the Chase-Sustut caribou herd). Supplementing the herd increased the size of the Telkwa Caribou Herd to about 100 in 2007 (Cichowski 2014), which was followed by another decline starting in 2009 (**Figure 4.2-5**). As of 2021, population growth of the Telkwa Caribou Herd had not provided the numbers needed to be considered a self-sustaining herd — the goal of the federal Recovery Strategy (Environment Canada 2014). The herd has grown continuously since its latest low of 14 Caribou in 2013 (**Figure 4.2-5**). The most recent available survey information for the Telkwa Caribou Herd reported a minimum count of 25 Caribou in the spring of 2019 (Hoffman and Grant 2019).

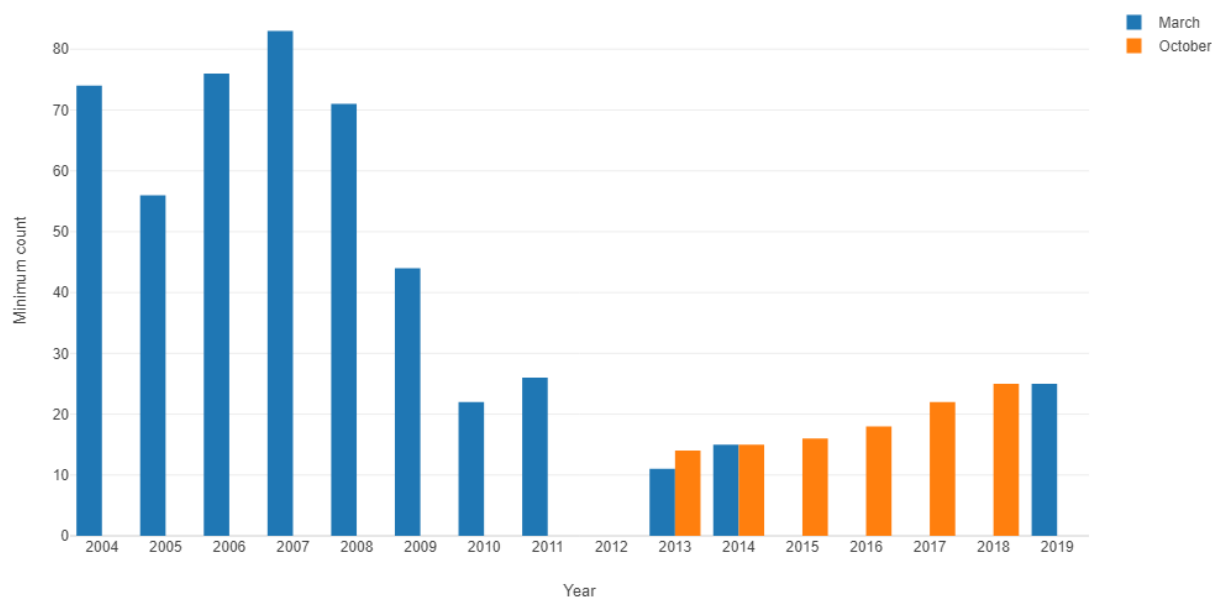


Figure 4.2-5: Telkwa Caribou Herd minimum counts from late-winter (March) and rut (October) recruitment surveys, 2004 to 2019 (Cichowski 2014)

Telkwa Caribou mortality from predation is likely the factor most limiting herd growth (Grant 2017). To assess the mortality risk for Caribou in relation to BEC variant groups that occur within the Caribou study areas, an analysis compared the locations where collars were recovered (i.e., mortality locations) to the locations acquired while those Caribou were alive (described in more detail in the **Wildlife Baseline Report Appendix 4.8-A**). The BEC variants were grouped into the same habitat categories used in the habitat selection analysis (described in **4.2.2.2**). Mortality rates were found to differ across BEC variant groups. Mortality rates of caribou were lowest in alpine habitat and increased across BEC variant groups corresponding to decreasing elevation (**Table 4.2-6**). In the lowest elevation BEC variant group, Sub-boreal

Spruce – dry cool, the mortality rate was 46 times higher than in the alpine BEC variant. Combined across BEC variant groups, 59% of the Caribou mortalities occurred in forested, lower elevation BEC variant groups relative to 22% of the overall telemetry locations of these animals occurring in these variant groups.

The pattern of higher mortality rates in lower elevation BEC variant groups is consistent with predicted outcomes associated with exposure to increased predation risk through apparent competition and facilitated predation (described in detail in **Appendix 4.8-A**), because the amounts of altered forested habitat provide better habitat for wolves. Apparent competition with more productive alternative prey species occurs when the density of an alternative prey species increases so that it supports higher density of predators (Serrouya et al. 2017). Facilitated predation occurs when linear developments, such as roads and trails provide easier movement for predators (Dickie et al. 2017).

This pattern of localized mortality rates may explain the pattern of relative distribution, where Caribou are currently selecting for alpine and subalpine habitat types and avoiding the forested, lower elevation habitat types.

Table 4.2-6: Telkwa Caribou Mortality Locations and Associated Mortality Rates by Biogeoclimatic Ecosystem Classification (BEC) Variant Group for 34 Collared Caribou (1996 to 2012)

BEC Variant Group	Live Caribou Locations	Mortality Locations	Mortality Rate	Relative Mortality ¹
Alpine	1230	3	0.002439	1
Engelmann Spruce – Subalpine Fir parkland	568	11	0.019366	7.94
Engelmann Spruce – Subalpine Fir forest	449	14	0.03118	12.78
Sub-boreal Spruce – moist cold	51	4	0.078431	32.16
Sub-boreal Spruce – dry cool	18	2	0.111111	45.56
Coastal BEC	14	0	n/a	n/a
Total	2330	34		

Notes: BEC=Biogeoclimatic Ecosystem Classification; n/a=not applicable

¹Relative mortality was calculated by dividing the mortality rate for each BEC variant group by the lowest mortality rate (i.e., alpine)

4.2.2.6 Arboreal and Terrestrial Lichen Assessment

An assessment of arboreal and terrestrial lichen within the Caribou study areas was completed using publicly available historic information and recent (i.e., 2017 to 2019) baseline assessment results. Details on methods and the results of the assessment are provided in the **Wildlife Baseline Report (Appendix 4.8-A)**. The goal of the assessment was to evaluate potentially available forage for Caribou in the Caribou study areas. Lichen abundance was assessed as biomass (kilograms per hectare [kg/ha]). Both arboreal and terrestrial lichen were documented to occur in all Caribou study areas and in the Project Area. Arboreal and terrestrial lichen abundance was highest in the ESSFmc, followed by the SBSmc2, and was lowest in the and SBSdk BEC variant groups. Terrestrial lichen biomass exceeded arboreal lichen biomass by over 20 times in the areas sampled (**Appendix 4.8-A**). However, the historic and recent (i.e., 2017 to 2019) sample locations for the assessment were outside the current range of the Telkwa Caribou Herd and, therefore, the results do not reflect lichen abundance in the subalpine and alpine habitat types currently used by the herd (**Appendix 4.8-A**).

4.2.2.7 Wildlife Habitat and Wildlife Trail Assessments

The **Wildlife Baseline Report (Appendix 4.8-A)** outlines the methods and results of the completion of wildlife habitat assessment plots within the Project Area and WLSA with no evidence of Caribou habitat use within any of the plots in these areas. Throughout the wildlife baseline studies between 2017 and 2019 no evidence of Caribou or Caribou sign was observed during any of the studies (**Appendix 4.8-A**).

4.2.3 Grizzly Bear

4.2.3.1 Grizzly Bear Detections

Remote triggered wildlife cameras, Reconyx PC800, and wildlife trail assessments were used to evaluate the presence and habitat use of Grizzly Bear within the WLSA. Up to five (5) wildlife cameras were deployed during 2017 and 2018 and were placed along roads and trails with known or expected Grizzly Bear use within representative habitat types (i.e., mature and early seral forests). Wildlife trails were evaluated using encounter transect survey methods to identify trails that crossed or ran parallel to the TAC. Surveys recorded the physical characteristics of each trail, the type and amount of sign detected, and a rating of use.

Grizzly Bears were detected infrequently, and most were detected incidentally through sign (e.g., scat), although one was observed in 2017 and one was detected on a wildlife camera in 2018. No Grizzly Bear use was detected on the wildlife trail assessments. Refer to **Appendix 4.8-A** for details on the methodologies and results for the Grizzly Bear surveys.

4.2.3.2 Grizzly Bear Habitat Suitability Modeling

Three (3) Grizzly Bear habitat suitability models using a six (6)-class rating structure were developed for the Living during the Spring, Summer, and Fall seasons due to differences in seasonal habitat use. A literature review of suitable habitat characteristics was used to create the initial models with mapped ecosystem data from the Vegetation Resource Inventory. An insufficient number of Grizzly Bears were detected during baseline surveys to validate the model performance; as a result, a desktop model evaluation was conducted. This consisted of iterative reviews of model outputs and adjustment of parameter ratings during model development. Information used during evaluation and calibration exercises included a review of satellite imagery, field conditions observed by biologists conducting wildlife surveys, and knowledge of local biologists on the habitat present within the WLSA and WR-WRSA. The calibration exercises were conducted to determine model parameters that would include all, or almost all, areas with potential habitat while avoiding ratings that were too liberal, which would result in overestimating the amount of habitat present.

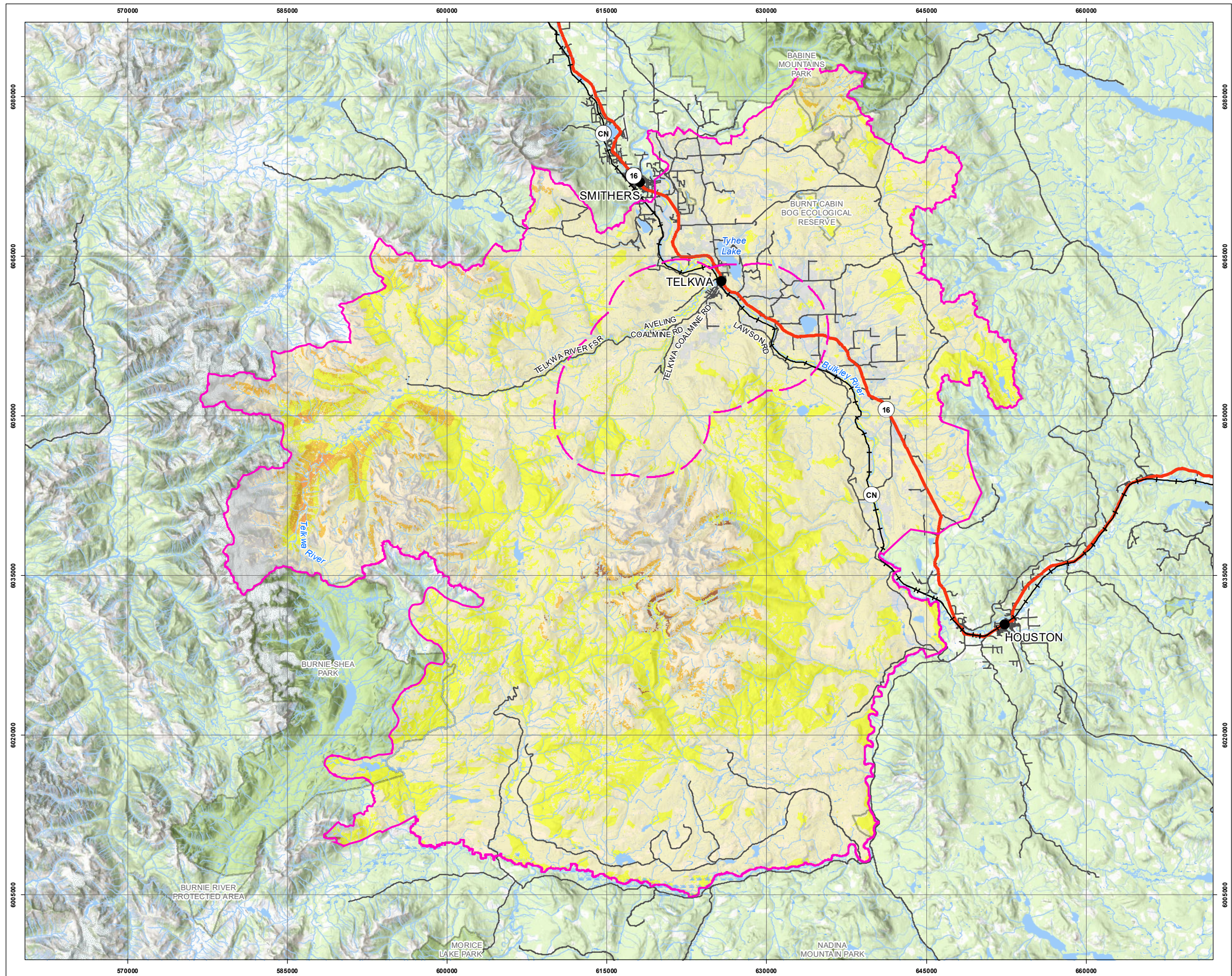
The results of the modelling identified that more suitable habitat was present in the WR-WRSA than the WLSA (**Table 4.2-7**). No suitable Spring habitat was modelled within the WLSA and limited amounts (less than [$<$] 3%) were identified in the western portion of the WR-WRSA (**Figure 4.2-6**). The Summer model indicated that most suitable habitat was located at mid to upper elevations, with concentrations in the centre and western portions of the WR-WRSA (**Figure 4.2-7**). Mapping indicated that most suitable Fall habitat was in the western portion of the WR-WRSA in the Telkwa River valley and along other known salmon-bearing rivers and creeks (**Figure 4.2-8**). A few patches of moderate rated habitat were located throughout the lower elevations of the WR-WRSA, with less located in upper elevations compared to the other seasons.

Refer to **Appendix 4.8-A** for details on the methodologies and results of the Grizzly Bear habitat suitability model.

Table 4.2-7: Area and Percent of the Wildlife Local Study Area (WLSA) and Wide-ranging Wildlife Regional Study Area (WR-WRSA) for each Rating Class of the Grizzly Bear Living Spring, Summer, and Fall Habitat Suitable Models

Season	Habitat Suitability Rating	WLSA (ha)	WLSA (%)	WR-WRSA (ha)	WR-WRSA (%)
Spring	High	0.0	0.0	537.0	0.2
	Moderately High	0.0	0.0	387.4	0.1
	Moderate	54.3	0.2	8,096.3	2.3
	Low	4,254.8	11.9	76,833.5	21.5
	Very Low	25,024.7	70.1	230,000.0	64.3
	Nil	6,392.1	17.9	41,732.8	11.7
	Total	35,725.9	100.0	357,587.0	100.0
Summer	High	5.2	0.0	4,024.2	1.1
	Moderately High	355.7	1.0	8,861.6	2.5
	Moderate	4,317.1	12.1	65,196.1	18.2
	Low	10,246.9	28.7	113,475.2	31.7
	Very Low	14,724.5	41.2	130,851.0	36.6
	Nil	6,076.5	17.0	35,178.9	9.8
	Total	35,725.9	100.0	357,587.0	100.0
Fall	High	0.0	0.0	0.0	0.00
	Moderately High	606.6	1.7	3,104.1	0.9
	Moderate	2,411.3	6.8	19,343.3	5.4
	Low	8,205.9	23.0	138,717.7	38.8
	Very Low	18,114.4	50.7	154,807.3	43.3
	Nil	6,387.6	17.9	41,614.6	11.6
	Total	35,725.9	100.0	357,587.0	100.0

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Tenas Project

Grizzly bear spring habitat suitability within the Wide-ranging Wildlife Regional Study Area

Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Wildlife Local Study Area
- Wilde-Ranging Wildlife Regional Study Area

Habitat Rating

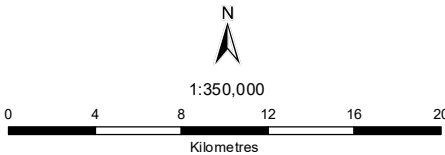
- High
- Moderately High
- Moderate
- Low
- Very Low
- Nil

Notes

- All mapped features are approximate and should be used for discussion purposes only.
- This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

Sources

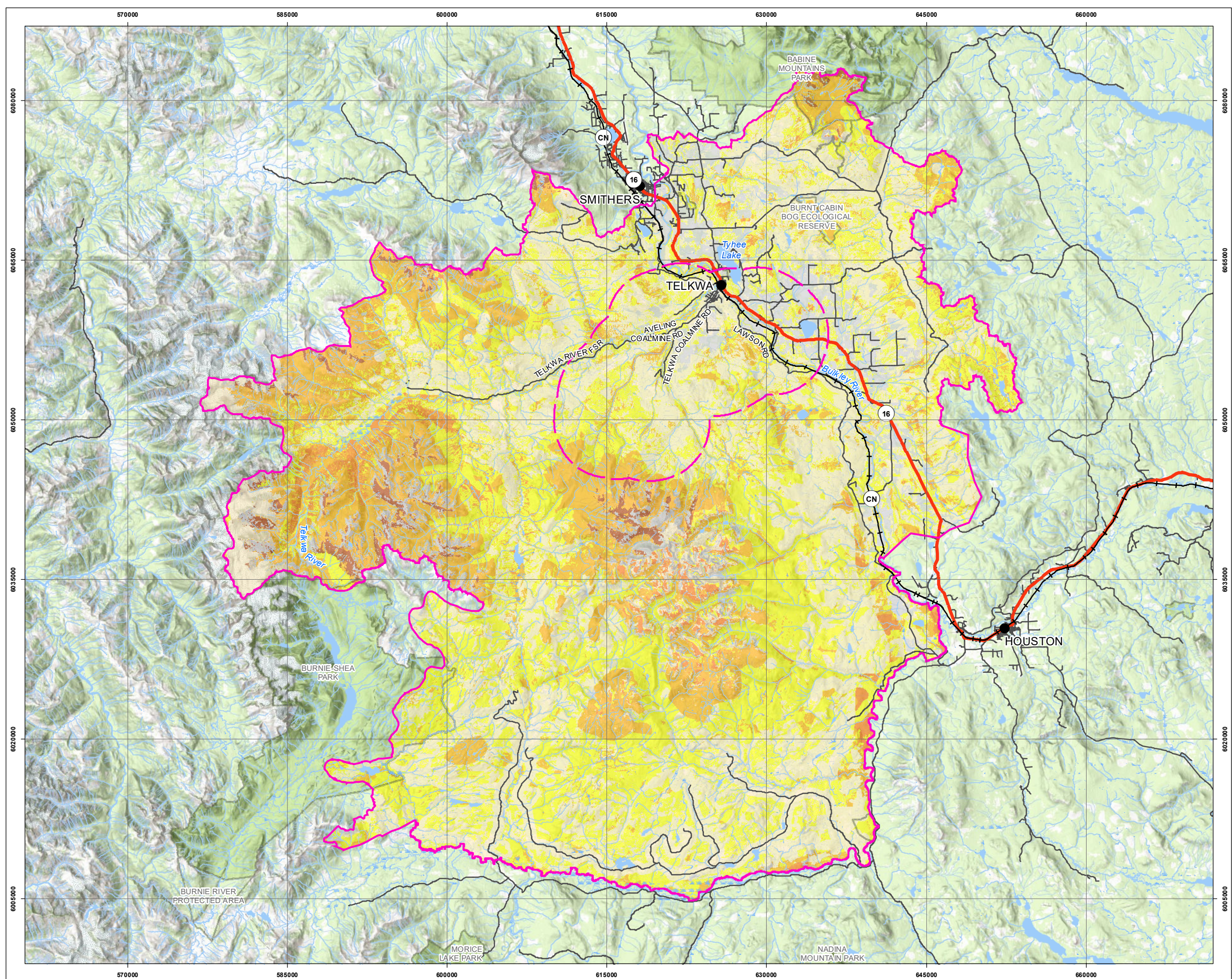
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- Basedata: Government of British Columbia
- Basemap: World Topo Base



20P0172 Production Date: Aug 05, 2021 Figure 4.2-6



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Tenas Project

Grizzly bear summer habitat suitability within the Wide-ranging Wildlife Regional Study Area

Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Wildlife Local Study Area
- Wilde-Ranging Wildlife Regional Study Area

Habitat Rating

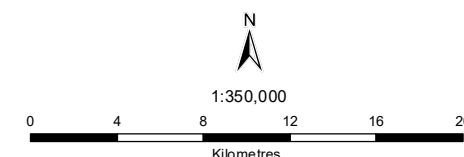
- High
- Moderately High
- Moderate
- Low
- Very Low
- Nil

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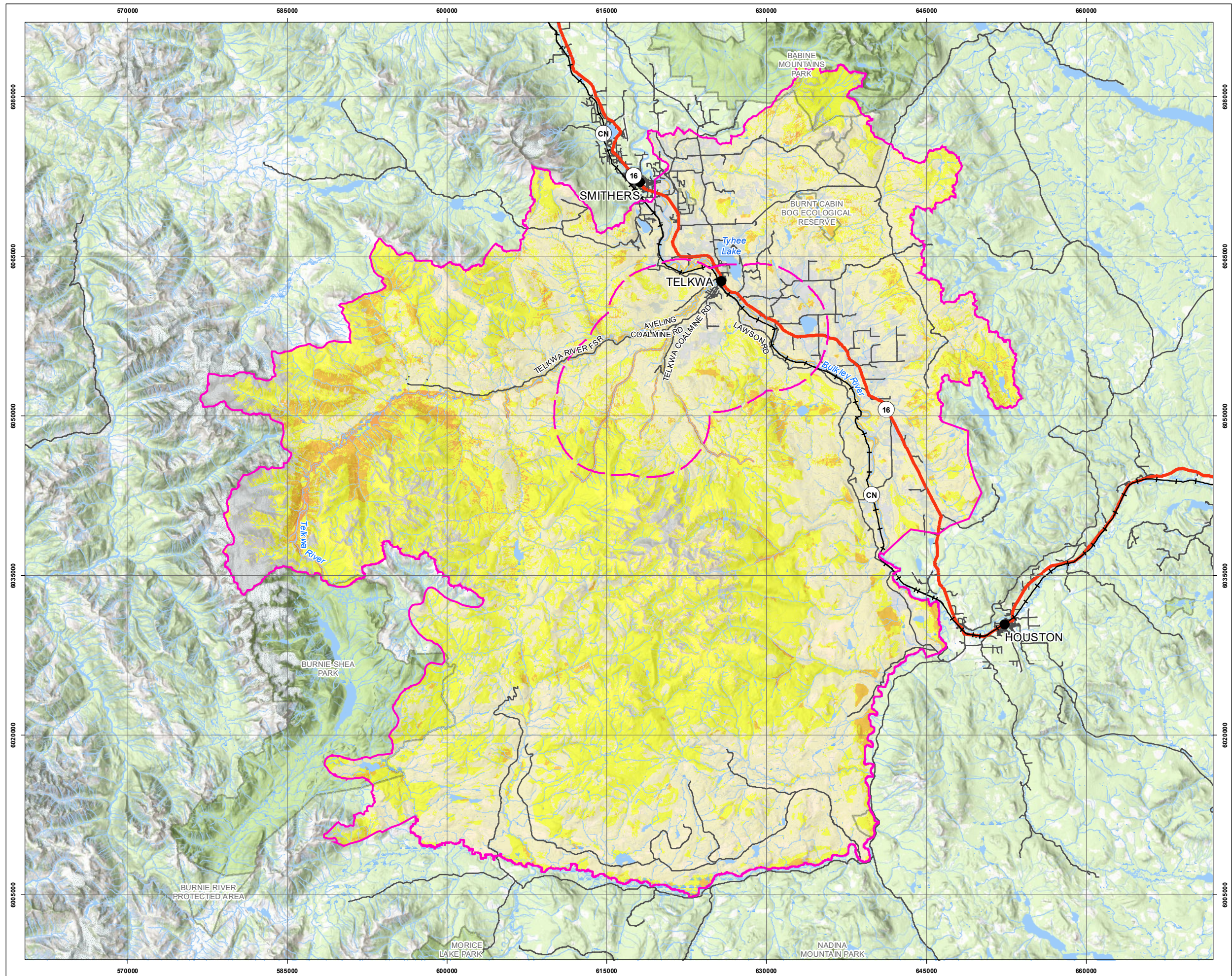
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- Basedata: Government of British Columbia
- Basemap: World Topo Base



20P0172 Production Date: Aug 05, 2021 Figure 4.2-7



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Tenas Project

Grizzly bear fall habitat suitability within the Wide-ranging Wildlife Regional Study Area

Legend

- City/Town
- Rail Line
- Highway
- Road
- Watercourse
- Wetland
- Waterbody
- Park or Protected Area
- Wildlife Local Study Area
- Wilde-Ranging Wildlife Regional Study Area

Habitat Rating

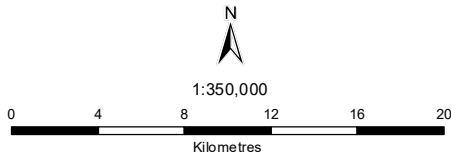
- High
- Moderately High
- Moderate
- Low
- Very Low
- Nil

Notes

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Sources

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- Basemap: World Topo Base



20P0172 Production Date: Aug 05, 2021 Figure 4.2-8



4.2.4 Moose

4.2.4.1 Moose Collar and Survey Data Review

Moose are a species of management concern and are culturally important (e.g., food, cultural goods) to the Wet'suwet'en (**Appendix 4.8-A**). Sharing of territorial foods was central to the feast system and moose meat was often shared during feasts (Crossroads 2021). Population declines in moose have been detected throughout the province despite management initiatives and modifications to hunting allocation. Within the WR-WRSA, the Moose population was stable between the last two (2) provincial aerial surveys (estimates were within the 90% confidence intervals) but were lower than the 2004 estimate (Schindler et al. 2019). Using these population estimates, the density estimate within the WR-WRSA was 0.59 ± 0.08 Moose/square kilometres (km²) for the Bulkley Valley/Lakes District area and 0.73 ± 0.14 Moose/km² for the Bulkley Valley area (Schindler et al. 2019).

Data from previously collared Moose suggested strong selection for the SBSdk subzone during growing and winter seasons compared with ecological units within the WR-WRSA. The SBSdk subzone supports Moose habitat with lower snow levels and more access to riparian and deciduous habitat types. Predation of Moose is thought to be the most common cause of natural mortality in the WR-WRSA, followed by starvation and health issues, while anthropogenic mortality (e.g., hunting, vehicle/train collisions) represent nearly 20% of Moose mortalities (Kuzyk et al. 2019).

Refer to **Appendix 4.8-A** for details on the methodologies and results for the Moose surveys and data review.

4.2.4.2 Moose Habitat Suitability Modelling

The Moose habitat suitability model used a six (6)-class rating structure and was developed for the Living life requisite during the Winter season. A literature review of suitable habitat characteristics was used to create the initial models with mapped ecosystem data from the Vegetation Resource Inventory. Moose habitat suitability ratings applied during the sampling of wildlife habitat assessment plots and Moose radio collar and survey data were used to adjust the initial model.

The results of the modelling identified that, as a percent of each study area, relatively more suitable Moose habitat occurs in the WLSA than the WR-WRSA (**Table 4.2-7 4.2-8**). Suitable Moose habitat was generally located mid- to low-slope and along bottoms of the Telkwa, Bulkley, and Morice River valleys (**Figure 4.2-9**). Wetlands and forage near security/thermal habitats in the SBS BGC zone are similar to the provincial benchmark for winter/living Moose habitat. Shrubby cutblocks and burns are an important source of suitable Moose habitat; however, the associated access roads reduced their predicted habitat suitability.

Refer to **Appendix 4.8-A** for details on the methodologies and results of the Moose habitat suitability model.

Table 4.2-8: Area and Percent of the Wildlife Local Study Area (WLSA) and Wide-ranging Wildlife Regional Study Area (WR-WRSA) for each Rating Class of the Moose Living Winter Habitat Suitable Model

Season	Habitat Suitability Rating	WLSA (ha)	WLSA (%)	WR-WRSA (ha)	WR-WRSA (%)
Winter	High	1759.7	4.9	8,495.0	2.4
	Moderately High	4483.0	12.5	27,123.1	7.6
	Moderate	8014.7	22.4	47,764.8	13.4

Season	Habitat Suitability Rating	WLSA (ha)	WLSA (%)	WR-WRSA (ha)	WR-WRSA (%)
	Low	8964.5	25.1	102,104.0	28.6
	Very Low	7882.5	22.1	110,965.6	31.0
	Nil	4621.6	12.9	61,134.5	17.1
	Total	35,725.9	100.0	357,587.0	100.0

Notes: %=percent; ha=hectare; WLSA=Wildlife Local Study Area; WR-WRSA= Wide-ranging Wildlife Regional Study Area