

24. Assessment of Potential Commercial and Non-commercial Land Use Effects

24.1 INTRODUCTION

This chapter addresses the potential effects of the Brucejack Gold Mine Project (the Project) on commercial and non-commercial land use and visual quality. This includes consideration of land management objectives; commercial land uses such as guide outfitting, trapping, forestry, utilities, minerals, oil and gas, and commercial recreation (e.g., heli-skiing, river rafting, fish camps, and angling guides); public (or non-commercial) land uses including recreation (e.g., hunting, fishing and hiking), parks, and protected areas. Sections 24.2 and 24.3 provide a high-level overview of [Appendix 24-A](#), Brucejack Gold Mine Project: Non-traditional Baseline, and [Appendix 24-B](#), Brucejack Gold Mine Project: 2013 Visual Quality Baseline Report. Potential effects of the Project on navigation are considered in Chapter 23, Assessment of Potential Navigation Effects.

24.2 REGULATORY AND POLICY FRAMEWORK

This chapter is written pursuant to the *Canadian Environmental Assessment Act, 2012* (2012) and the British Columbia (BC) *Environmental Assessment Act* (2002a), which requires an assessment of the potential adverse environmental, economic, social, heritage, and health effects of a proposed project. Land uses in the Project's study areas are informed by two regional land and resource management plans: the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP; BC ILMB 2000), and the Nass South Sustainable Resource Management Plan (SRMP; BC MFLNRO 2012a).

Table 24.2-1 details the provincial and federal legislation and policies relating to land and resource use. There is no provincial or federal legislation pertaining to visual and aesthetic resources.

Table 24.2-1. Land Use Legislation and Policies

Legislation and Policies	Description
(BC) <i>Mines Act</i> (1996e)	Applies to mineral exploration and mine development, including construction, production, closure, reclamation, and abandonment activities. Before starting any work, the owner, agent, manager, or any other person must hold a permit, and must have filed a plan outlining the details of the proposed work, and a program for the conservation of cultural heritage resources and for the protection and reclamation of land, watercourses, and cultural heritage resources affected by the mine.
(BC) <i>Mineral Tenure Act</i> (1996d)	Authorizes the registration of mineral and placer titles within the province and provides the framework for tenure administration.
(BC) <i>Forest Act</i> (1996a)	Grants rights to harvest timber on Crown land.
(BC) <i>Forest and Range Practices Act</i> (2002b)	Sets the framework for achieving 'results-based' forestry on Crown land. This framework requires forest operators to set specific targets or strategies for environmental objectives established by government for soils, timber, fish, biodiversity, cultural heritage, forage and associated plant communities, visual quality, water, wildlife, and resource and recreation features.
(BC) <i>Wildlife Act</i> (1996i)	Regulates the management of wildlife in BC, establishes wildlife management areas, and regulates the import and export of wildlife, trapping, angling guiding, guide outfitting, hunting and fishing.

(continued)

Table 24.2-1. Land Use Legislation and Policies (completed)

Legislation and Policies	Description
(BC) <i>Park Act</i> (1996f)	Establishes provincial parks, conservancies and recreation areas, including management and activities permitted and not permitted in parks.
(BC) <i>Water Act</i> (1996g)	Regulates the province's fresh water resources. Powers under the Act include granting and managing water licences, apportioning rights under licences, reserving and removing bodies of water from being used under the Act, and issuing certificates incorporating water users' communities.
(BC) <i>Land Act</i> (1996b)	Governs the disposition, management, and administration of Crown land in the province, as well as the surveying of Crown land. Powers under the Act include: determining whether a disposition of Crown land is in the public interest; temporarily reserving Crown land from disposition; designating Crown land for a particular use or prohibiting certain uses of Crown land; making a disposition of Crown land by temporary permit, licence of occupation, lease, right-of-way or easement, or by Crown grant in fee simple; disposing of Crown land in accordance with the terms and conditions the minister considers advisable; and undertaking trespass actions regarding the unauthorized use of Crown land.
<i>Protected Areas of British Columbia Act</i> (2000b)	Confirms or establishes parks, ecological reserves, and conservancies.
(BC) <i>Land Title Act</i> (1996c)	Establishes the land registry system.
<i>Canada National Parks Act</i> (2000a)	Establishes national parks and park reserves.
Wildlife Guidelines for Backcountry Tourism / Commercial Recreation (BC MOE 2006)	Guides backcountry recreation activities, including defining results, desired behaviours, indicators, and limits for backcountry activities in relation to wildlife and wildlife habitat.
Land Use Objectives Regulation: Policy and Procedures (BC ILMB 2008)	Guides the establishment of land use objectives for the purposes of the <i>Forest and Range Practices Act</i> (2002b).

Potential effects of the Project on navigation are considered in Chapter 23, Assessment of Potential Navigation Effects.

24.3 BASELINE CHARACTERIZATION

24.3.1 Historical Activities

Several historical and current human activities are within close proximity to the proposed Project area. These activities include mineral exploration, mining, hydroelectric power generation, and forestry.

Northwestern BC is a region characterized by rugged, remote mountainous terrain and relatively harsh and long winters that pose difficulties for development of road access. There has been mining and mineral exploration activity in the region throughout the past century.

- The Granduc Mine was a copper mine located approximately 25 km south of the Project, which operated from 1970 to 1978 and 1980 to 1984. The mine included underground workings and a mill site near Summit Lake, connected by a 17-km tunnel. Access to the mine was via a 51 km all-weather access road (Granduc Access Road) from Stewart, BC and Hyder, Alaska. This site is currently used as a staging area for several mineral exploration projects in the region. The Granduc Access Road is used by mineral explorationists and tourists accessing the Salmon Glacier viewpoint.

- The Sulphurets Project was an advanced underground exploration project of Newhawk Gold Mines Ltd. located at the proposed Brucejack Mine Site. Underground workings were excavated between 1986 and 1990 as part of an advanced exploration and bulk sampling program. Reclamation efforts following Newhawk Gold Mines Ltd.'s advanced exploration activities included deposition of waste rock and ore within Brucejack Lake.

More recently, the proposed KSM Project is one of the largest undeveloped gold projects in the world and is located just west of the Project. Resources-related activities contributed to the development of Highway 37 and Highway 37A, as well as Stewart, Bob Quinn, Meziadin Junction, Dease Lake (unincorporated), and Cassiar.

Exploration of the proposed Brucejack Gold Mine Project by Pretium commenced in 2011 and has included a drilling program, bulk sample program, construction of an exploration access road from Highway 37 to the west end of Bowser Lake, as well as rehabilitation of an existing access road from the west end of Bowser Lake to the Brucejack Mine Site. Past related exploration in the area has also included Silver Standards diamond drilling program at the nearby Snowfields property.

In 2010, construction began on the Long Lake Hydroelectric project which is located approximately 42 km south of the Project. The project included redevelopment of a 20-m-high rockfill dam located at the head of Long Lake, and a new 10-km-long 138-kilovolt (kV) transmission line. This project was complete and came online in December 2013 (Valard 2013).

Historical forestry activities occurred within the immediate Project area between Highway 37 and Bowser Lake, south of the Wildfire Creek and Bell-Irving River confluence. Additional details regarding historical and current forest and mining activities near the Project are included in [Appendix 19-A](#), Socio-economic Baseline Report.

24.3.2 Baseline Studies

The Non-traditional Land Use Baseline ([Appendix 24-A](#)) describes commercial and non-commercial land use within a Local Study Area (LSA) and Regional Study Area (RSA). The baseline information has been used to inform the assessment of potential effects of the Project on government designated areas (e.g., parks), commercial land use, and public recreation.

The Visual Quality Baseline Report ([Appendix 24-B](#)) describes the existing visual landscapes and provides an inventory of currently used viewpoints. This baseline information has been used to inform the assessment of potential effects of the Project on commercial and non-commercial (recreational) land users.

24.3.2.1 Baseline Study Areas and Methods

Baseline Study Areas

Commercial and non-commercial land uses were characterized for two study areas: the land use LSA and the land use RSA (see Figure 24.4-2). The LSA covers approximately 31,847 hectares (ha) and is defined by a buffer extending at least to the height of land or 1.5 km around the outer limits of the proposed Project infrastructure. The land use RSA covers 374,400 ha and includes the outer extent of the Wildlife and Terrestrial Ecosystem study areas as defined in Chapters 18, Assessment of Potential Wildlife Effects, and 16, Assessment of Potential Terrestrial Ecology Effects, respectively. This boundary was chosen because of the strong link between these environment components and land use activities.

A visual quality LSA (VQLSA) boundary was defined by the distance at which the proposed Project infrastructure could be viewed within the general Project area plus an 8-km buffer ([Appendix 24-B](#), Visual Quality Baseline Report).

Methods

Information for the baseline study was gathered between May 2012 and November 2013 using desk-based and field research. The objectives of the baseline study were to identify and characterize land use, including the type and frequency of land use within the LSA and RSA. Land uses were identified by various methods, including reviewing the provincial Integrated Land and Resource Registry (ILRR); site visits; helicopter fly-overs; and engagement of government agencies, stakeholders, and Aboriginal groups. Spatial data was overlaid in Geographic Information Systems (GIS)-based maps to consider land uses in relation to Project infrastructure and activities. Spatial information was studied and recorded using ArcGIS software.

Information on commercial tenures and Crown-designated areas (parks and protected areas) were obtained from the Provincial ILRR or Data BC. The CIS LRMP and Nass South SRMP were reviewed to identify management direction pertinent to the LSA and RSA. Public and private sector information sources and databases were reviewed. For example, trapline harvest data from 1985 to 2011 were obtained from the BC MFLNRO. Table 24.3-1 summarizes the main databases and information sources reviewed.

Table 24.3-1. Information Sources Reviewed

Source	Database or Reference
Province of BC	Data Distribution Service https://apps.gov.bc.ca/pub/dwds/home.so (accessed August 2012) Mineral Tenures Online BC https://www.mtonline.gov.bc.ca/mtov/home.do (accessed December 2013)
BC Integrated Land Management Bureau (ILMB - now BC MFLNRO)	Nass South Sustainable Resource Management Plan http://ilmbwww.gov.bc.ca/slrp/srmp/south/nass/index.html (accessed August 2012) Cassiar Iskut - Stikine Land and Resource Management Plan http://ilmbwww.gov.bc.ca/slrp/lrmp/smithers/cassiar/index.html (accessed August 2012) Integrated Land and Resource Registry https://webmaps.gov.bc.ca/imfs/imf.jsp?site=libc_ilrr (accessed August 2012)
BC MOE	British Columbia Freshwater Angling Guides 2012/2013 http://www.env.gov.bc.ca/fw/fish/guide/docs/angling_guides_list.pdf (accessed December 2012) Guide Outfitters in British Columbia 2010-2011 http://www.env.gov.bc.ca/fw/wildlife/hunting/non_resident/docs/guide_outfitters.pdf (accessed December 2012) Water licences query http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input (accessed February 2013)
BC MFLNRO	Nass Timber Supply Area (TSA) http://www.for.gov.bc.ca/hts/tsa/tsa43/index.htm (accessed October 2012) Cassiar Timber Supply Area (TSA) http://www.for.gov.bc.ca/hts/tsa/tsa04/#documents (accessed October 2012) Recreational Features Inventory (RFI) data (accessed October 2012) Big game harvest statistics for resident and non-resident hunters from hunter sample and guide declarations 2002- 2011 (December 2013)

(continued)

Table 24.3-1. Information Sources Reviewed (completed)

Source	Database or Reference
Fisheries and Oceans Canada	Region 6 - Skeena http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.htm (accessed April 2013)
BC Parks (also part of BC MOE)	Recreation - Park Finder http://www.env.gov.bc.ca/bcparks/explore/explore.html (accessed June 2012)
BC MOTI	A Guide to Driving Northern B.C.'s Beautiful Highway 37 http://www.th.gov.bc.ca/popular-topics/driver_info/route-info/hwy37/hwy37.htm (accessed December 2012)
BC EAO	Project Information Center (e-PIC) http://a100.gov.bc.ca/appsdata/epic/html/deploy/epic_home.html (accessed December 2012)
Guide Outfitters Association of BC Member List	Guide Outfitters Association of BC - Outfitter Directory http://www.goabc.org (accessed June 2012)

Provincial and local government representatives were contacted to ground-truth baseline data and to provide further context about land uses in the study areas. Guide outfitting, trapping, forestry, and commercial recreation tenure holders were contacted and asked to participate in baseline study interviews. A total of ten face-to-face or telephone interviews were conducted with guide outfitters, trappers, commercial recreation licence holders (i.e., a heli-ski operator, a river rafting operator, a mountaineer guide). Interview questions were generally open-ended and focused on determining the type of land use, harvest levels or intensity of use (quantified where possible), means of access to a tenure or licence, timing of use, and tenure related income.

Methods employed for the visual quality study are based on procedures set out by the British Columbia Ministry of Forests and Range *Visual Impact Assessment Guidebook* (BC MOFR 2001). Locations for field investigation were chosen based on the result of a viewshed analysis, which identified areas within the VQLSA that could potentially be viewed from the Project area. Notable and sensitive visual quality areas were identified based on known land uses in the general Project area. Current conditions at each viewpoint were recorded to create a visual inventory of the area.

The baseline studies were also informed by primary and secondary data collected in support of the Application for an Environmental Assessment Certificate submitted by Seabridge Gold Inc. for the KSM Project (Rescan 2013a). Baseline studies characterize land uses at the time of the writing of the Application/EIS.

Data Limitations

Harvest data for resident and non-resident hunting and trapping licences were obtained from the Fish, Wildlife and Habitat Management Branch, BC MFLNRO. These data include the type and frequency of animal harvests per year (where there are data reported for that year) for both resident and non-resident hunters by Wildlife Management Unit (WMU (BC MFLNRO 2013a). The geographic boundaries of WMUs differ from the land use study boundaries so it's not possible to determine the level or location of hunting in these areas. Additionally, hunters may hunt in more than one WMU and may not consistently report kills (MFLRNO 2013).

24.3.3 Regional Overview

The Project is situated within the Sulphurets District, Iskut River, Skeena Mining Division, approximately 20 kilometres (km) northwest of Bowser Lake or 65 km north of Stewart, BC. Land use in

northwestern BC has largely been driven by resource development, primarily mining and mineral exploration, and forestry. Access to the Project study areas is limited as the area is relatively isolated and difficult to access. Those who do access the area primarily pursue hunting, trapping, fishing, and heli-skiing activities.

Public recreation in the Project area is low due to the lack of road access. There are two small airstrips in the region and no public road access to the Project.

Commercial recreation such as guided hunting, mountaineering, guided river rafting, guide outfitting, angling, and heli-skiing occurs in the area. Areas near the Bell-Irving River—such as the Snowslide Range and Treaty Creek—see higher public use because these areas are accessible from Highway 37. Additionally, the Unuk River is used for commercial rafting adventures, and is accessible from the Eskay Creek Mine Road or from Alaska. Fishing and heli-skiing have contributed to the establishment of the Bell 2 Lodge and Spey Lodge. Activities associated with these lodge are seasonal in nature.

There is trapping in the region. The Province has records for registered traplines in the area dating back to 1985, though anecdotal evidence indicates these areas were used before 1985. There are hunting, trapping, and fishing cabins located along the Unuk and Bell-Irving River valleys, and the Treaty Creek headwaters north of Mount Anderson.

Within the LSA, there are district lots in the vicinity of the Brucejack Transmission line corridor at Granduc and Premier mine sites. A summary of land uses within the LSA and RSA is provided in Table 24.3-2. These activities are further described throughout Section 24.3.

Table 24.3-2. Summary of Land Use in the LSA and RSA

Designated Lands, Crown Tenures, and Resource Uses	Land Use in relation to the Land Use Study Areas
Provincial parks and Protected Areas	Border Lake Provincial Park is located partially within or on the edge of the RSA.
Guide outfitting	Three guide outfitting tenures partially overlap the RSA, one of which overlaps the LSA.
Hunting	Three WMUs are overlapped by the RSA, two of which also overlap the LSA.
Trapping	Six trapping licences overlap the RSA, three of which also overlap the LSA.
Commercial Recreation	Six commercial recreation licences intersect or lie within the RSA (heli-skiing, river rafting, fishing, lodging, and backcountry expeditions). Two of these licences also intersect the LSA.
Forestry	The RSA falls within the Cassiar and Nass TSAs. Four forestry licences are located within the RSA and two in the LSA.
Mineral	Mineral tenures are located within the LSA and RSA.
Water	Water licences are located in the LSA and RSA.
Agriculture Land Reserves	None.
Oil and Gas	None.
Ranges	None.
Transportation, Power, and Communications	Highways and roads relevant to land use: land users access the area via Highway 37 on the eastern edge of the RSA and other service roads that stem off highways 37 and 37A. Airports/airstrips: There are two airstrips within the RSA. NTL extends along the eastern border of the RSA and there are no telecommunications sites in the RSA.
Tourism	Tourists visit the Salmon Glacier within the southern portion of the RSA. Recreation activities take place on an informal and non-registered basis.

24.3.4 Regional Land and Resource Management Plans

Land use in the Project's study areas is informed by two regional land and resource management plans: the Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP; BC ILMB 2000), and the Nass South Sustainable Resource Management Plan (SRMP; BC MFLNRO 2012a). Figure 24.3-1 illustrates the location of the Project in relation to the CIS LRMP and Nass South SRMP. LRMPs are sub-regional integrated plans that establish a framework for land use and identify management objectives and aim to satisfy the wide range of overlapping demands on natural resources and cultural heritage (ILMB 1996; MFLNRO n.d.). SRMPs focus on similar issues and values as regional plans or LRMPs but at a more detailed level (BC Ministry of Sustainable Resource Management 2004).

24.3.4.1 Cassiar Iskut-Stikine Land and Resource Management Plan

Completed in October 2000, the CIS LRMP area encompasses 5.2 million ha in northwestern BC and aims to balance environmental, economic, and social objectives by facilitating greater economic certainty for local development while maintaining lifestyle opportunities (BC ILMB 2000; MFLNRO 2000). The LRMP was developed with the involvement of the Tahltan Central Council and multiple stakeholders. It identifies goals, objectives, and provides management direction.

The CIS LRMP includes visual quality as a resource value in the general management direction; however, it does not provide specific general management direction for the land use LSA. Visual quality objectives in the LRMP are aimed at forestry activities; however, according to the LRMP, projects consisting of non-forestry activities should address the scenic values of specified areas and be cognizant of existing visual quality objectives (MFLNRO 2000).

The CIS LRMP identifies 10 resource values linked to future goals, including access management, biodiversity/ecosystem health, fishing, mineral and energy resources, recreation and tourism, timber, and visual quality (MFLNRO 2000). One resource value titled "mineral and energy resources" states the LRMP aims to develop an economically and environmentally sound mining and energy industry based on the area's globally significant mineral and energy resources and certainty of access. Further, the LRMP states that well-designed infrastructure will support responsible mineral and energy projects that provide long-term benefits to the local community (MFLNRO 2000).

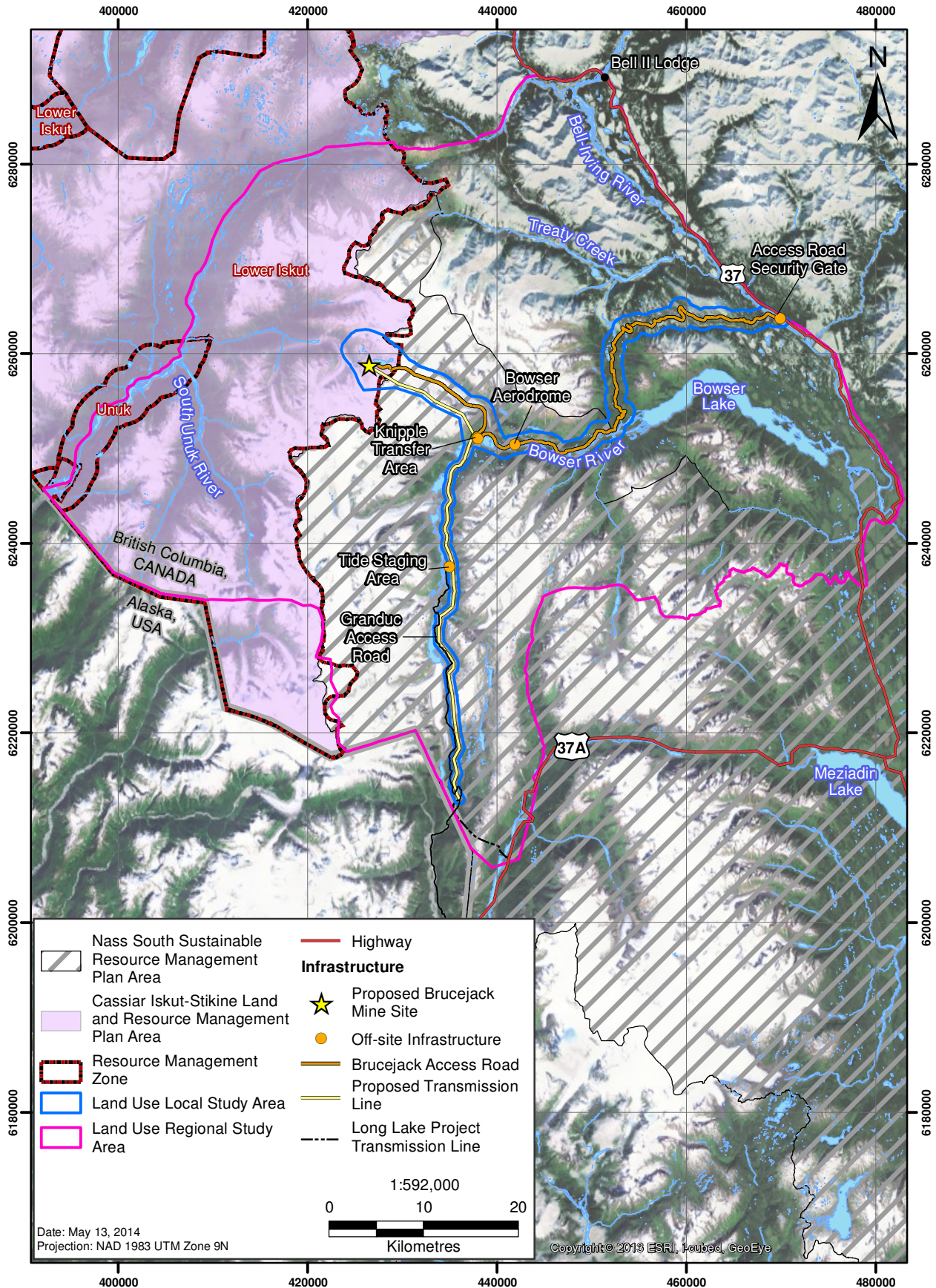
The CIS LRMP designates 15 Resource Management Zones (RMZs). The land use LSA does not overlap with any of the RMZs. The land use RSA overlaps the Unuk River RMZ, which comprises the portion of the Unuk River watershed south of Sulphurets Creek and upstream of the international boundary. In total, the land use RSA overlaps 2% of the total area of the LRMP. This zone was created to integrate the management of salmon and grizzly bears, recreation, mineral exploration and development, and timber harvesting. Management objectives are defined for eight resources within the Unuk River RMZ, including biodiversity, wildlife, aquatic ecosystems and riparian habitat, visual quality, access management, recreation and tourism, timber, and lastly, research and inventory priority. This area is recognized provincially as a significant habitat for coastal grizzly bears (MFLNRO 2000).

24.3.4.2 Nass South Sustainable Resource Management Plan

The Nass South SRMP was approved by the province in June 2012 and covers the southern portion of the Nass Timber Support Area or approximately 663,000 ha (BC MFLNRO 2012a, 2012b). It was developed with input from Nisga'a Lisims Government, Gitanyow First Nation to address sustainable management of land, water, and resources. The Nass South SRMP provides management direction for seven resources: water, biodiversity, timber, botanical forest products, fisheries, cultural heritage resources, and wildlife. It includes general visual quality objectives; however, it does not have specific visual quality objectives for the land use LSA or RSA. The SRMP provides guidelines for timber operations that include consideration for cultural, environmental, and economic values (BC MFLNRO 2012a, 2012b).

Figure 24.3-1

Land and Resource Management Plans near the Brucejack Gold Mine Project Land Use Study Areas



The SRMP identifies two zones for area-specific management: the Hanna-Tintina Area and specific water management units. Neither is located within the land use LSA or RSA (BC MFLNRO 2012a, 2012b). Parks and Protected Areas. Mineral exploration and road-related resource development are permitted in all zones, subject to legislative requirements.

There are no provincial parks, national parks, or protected areas within the land use LSA. One provincial park (Border Lake Provincial Park) is located on the western edge of the land use RSA. Other provincial parks located outside of the land use RSA include Ningunsaw Park and Ningunsaw Ecological Reserve, Lava Forks Park, Bear Glacier Lake Park, and Meziadin Lake Park.

24.3.5 Hunting

In BC, hunting activities are managed and regulated by WMU. The land use RSA overlaps four WMUs: 6-14 (<1%), 6-16 (approx. 38%), 6-17 (<1%), and 6-21 (approx. 6%; Figure 24.3-2). The LSA overlaps 4% of WMU 6-16 and 0.3% of WMU 6-21. The Brucejack Mine Site is located within WMU 6-21, while the Brucejack Access Road and transmission line are located within WMU 6-16 (Figure 24.3-2).

24.3.5.1 Resident and Non-resident Harvest Data (2002 to 2011)

Harvest data, including the number of resident and non-resident hunters, and resident and non-resident kills, are available from the BC MFLNRO by WMU and are presented in [Appendices 24-C](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-16, and [24-D](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-21 C and D.

Harvest data that characterize hunting within WMUs 6-16 and 6-21 are reviewed to provide a general contextual understanding of hunting activities in the broader region that may also occur near the land use study areas. Data for WMUs 6-14 and 6-17 are not included in the review as the majority of these areas (approximately 99%) are outside of the land use study areas and as such are not relevant. Further data summarizing the hunting activities of resident and non-resident hunters within WMU 6-16 and 6-21 are provided in [Appendices 24-C](#) and [24-D](#).

The primary species of interest to resident hunters in WMU 6-16 are moose, grizzly, and black bear. Moose has been the most harvested species in WMU 6-16 by resident hunters, with the highest number of moose kills peaking in 2003 (26 kills). The number of resident moose hunters in WMU 6-16 declined from 72 in 2002 to 17 in 2009. Resident kills of grizzly bears ranged from three in 2002 to six in 2011. Black bear harvests peaked at 16 in 2008. Other species harvested in this WMU include goat and wolf ([Appendix 24-C](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-16 (1999 to 2011)).

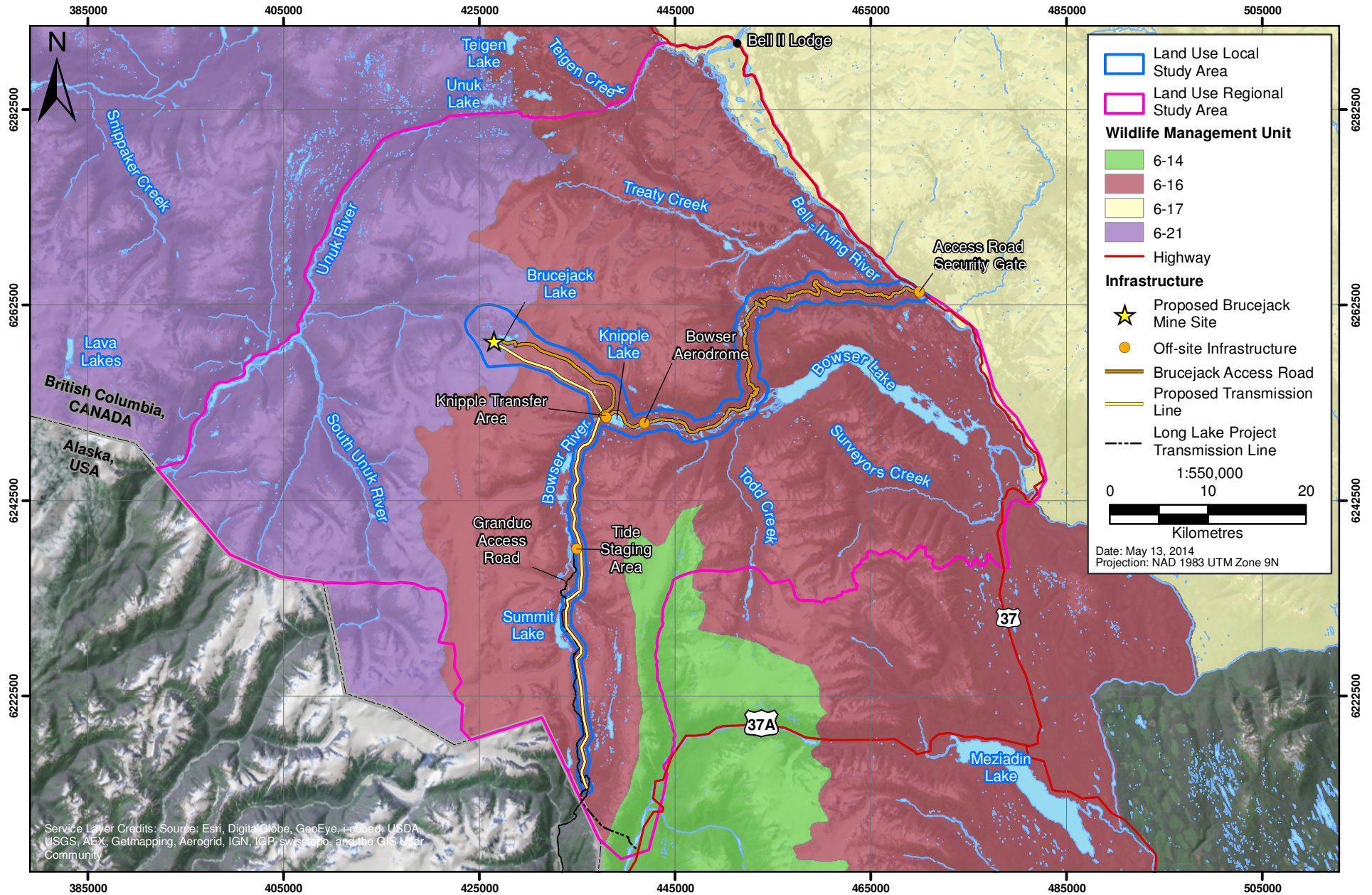
Non-resident hunting is low in this WMU, ranging between zero to six kills annually for grizzly, black bear, and goat. Non-resident moose and wolf harvests in WMU 6-16 were reported only once over a 10-year period ([Appendix 24-C](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-16 (1999 to 2011)).

Moose has been the most harvested species by resident hunters in WMU 6-21. Other species of interest include grizzly, sheep, and goat. Resident hunter kills in WMU 6-21 of moose peaked in 2005 (59 kills); grizzly bears in 2007 (nine kills); black bears in 2003 (nine kills); sheep in 2010 (13 kills), and goat in 2008 (10 kills; [Appendix 24-D](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-21 (1999 to 2011)).

Non-resident hunting is higher in WMU 6-21 than in WMU 6-16. In WMU 6-21 the number of non-resident moose kills peaked in 2006 (21 kills). Non-resident sheep and goat harvests peaked in 2005, with 11 and 14 skills respectively ([Appendix 24-D](#), Resident and Non-resident Hunting in Wildlife Management Unit 6-21 (1999 to 2011)).

Figure 24.3-2

Wildlife Management Units in the Brucejack Gold Mine Project Land Use Study Areas



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

24.3.5.2 Guide Outfitting

Three guide outfitting licence areas overlap the land use RSA (601074, 600502, and 601036; Figure 24.3-3). The Brucejack Mine Site and a portion of the Brucejack Access Road lie within licence area 601074, while the Brucejack Transmission Line and the remainder of the Brucejack Access Road lie within 601036. Table 24.3-3 describes the guide outfitting licences in relations to the land use study areas and Project components.

Table 24.3-3. Guide Outfitting Licence Areas in the Land Use Study Areas

Area	Species	% of Licence in Land Use LSA	% of Licence in Land Use RSA	Location in Relation to the Project
601074	Unknown.	2%	39%	Overlaps the Brucejack Mine Site and the eastern portion of the Brucejack Access Road
600502	Black bear, grizzly bear, moose, mountain sheep, mountain goat, wolf.	0%	7%	Does not overlap any Project components
601036	Grizzly bear, mountain goat, black bear.	0.8%	6.6%	Overlaps the Brucejack Access Road and the transmission line corridor

Source: Government of British Columbia (2013a), GOABC (2012), Grand Slam Outfitters & Advertisers (2012), Milligan Outfitting Ltd. (2012)

Licence 601074 (Formerly part of Licence 601066)

In summer 2013, guide outfitting licence 601066 was divided into two separate licence areas. The northern portion became licence 601073 and the southern portion became licence 601074. Each guide outfitting area is now held by new licence holders (see Figure 24.3-3). Guide outfitting licence 601073 is now located outside of the land use RSA and will not be assessed further.

As of November 28, 2013, guide outfitting licence area 60174 was registered with BC ILRR to J. Major (Government of British Columbia 2013b). Approximately 2% of the newly created 366,000 ha licence is overlapped by the land use LSA, while approximately 39% is overlapped by the land use RSA (Table 24.3-3). The licence holder intends to establish a new guide outfitting business within the licence area sometime in the future but had not used the area extensively to date (J. Major, pers. comm.).

Licence 600502

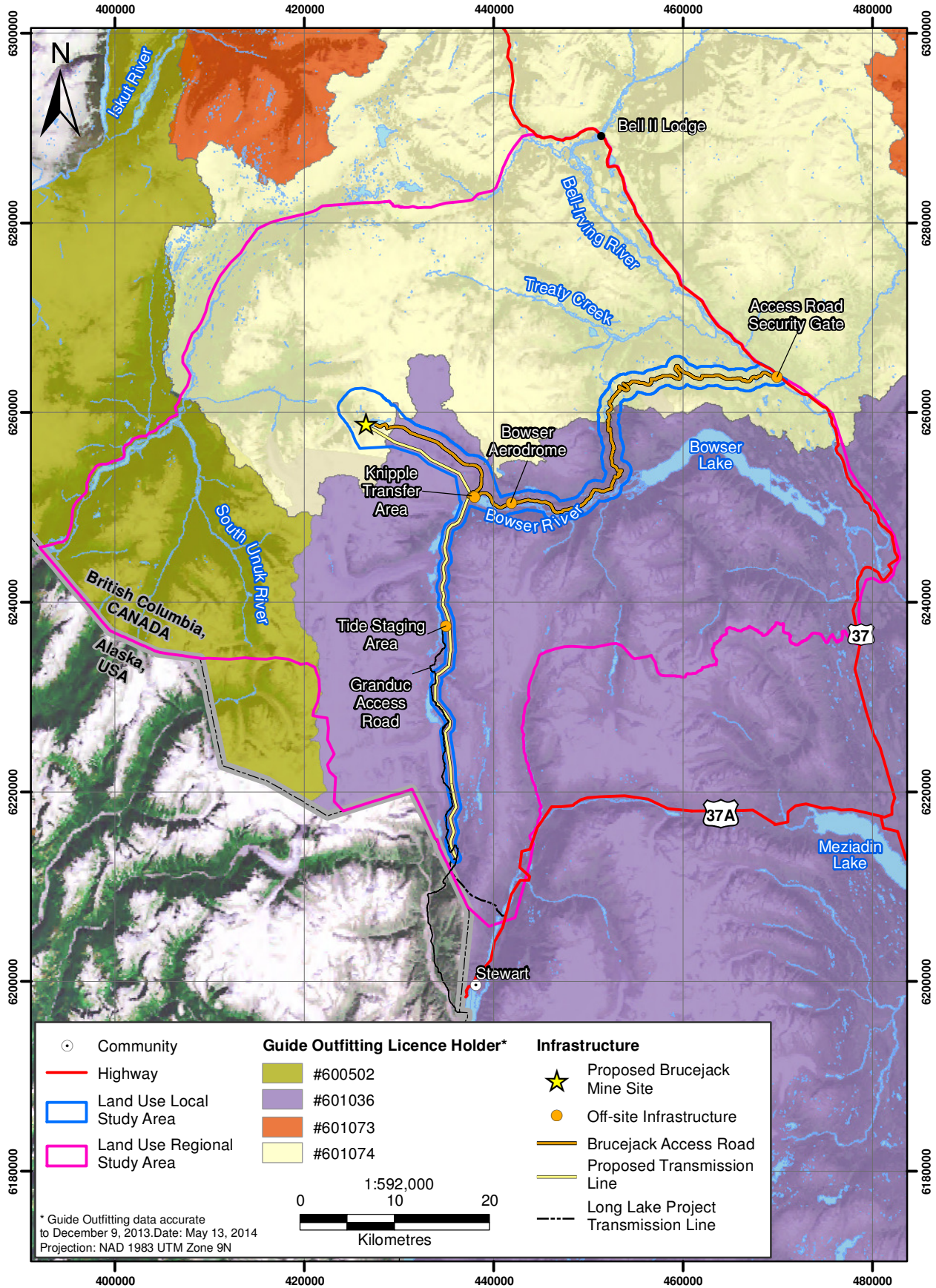
Licence 600502 is held by the operator for Northwest Ranching and Outfitting, who has been a guide outfitter for 25 years (Rescan Tahltan Environmental Consultants 2010). This licence area does not overlap the land use LSA. The land use RSA overlaps approximately 6.9% of the licence (Table 24.3-3). The licence holder has indicated that hunting trips occur farther north and that mine development south of the Iskut River would not affect their guide outfitting licence or business (Rescan 2013b).

Licence 601036

Licence 601036 is held by Milligan Outfitting. The land use LSA and RSA overlap less than 1% and approximately 6.6% of this licence, respectively (Table 24.3-3). Milligan Outfitting typically provides two guided trips per year. In 2012, Milligan Outfitting led two trips within the land use RSA, an area not used in approximately five or six years (R. Milligan, pers. comm.). The licence holder uses cabins at Bowser Lake along Bowser River at the mouth of Todd Creek. Species hunted include grizzly bear, mountain goat, and black bear, which are hunted solely as trophy kills (R. Milligan, pers. comm.).

Figure 24.3-3

Guide Outfitting Licences Areas within the Brucejack Gold Mine Project Land Use Study Areas



Licence 601036

Licence 601036 is held by Milligan Outfitting. The land use LSA and RSA overlap less than 1% and approximately 6.6% of this licence, respectively (Table 24.3-3). Milligan Outfitting typically provides two guided trips per year. In 2012, Milligan Outfitting led two trips within the land use RSA, an area not used in approximately five or six years (R. Milligan, pers. comm.). Milligan Outfitting utilizes a cabin at Bowser Lake as well as a cabin along Bowser River at the mouth of Todd Creek. Species hunted include grizzly bear, mountain goat, and black bear, which are hunted solely as trophy kills (R. Milligan, pers. comm.).

24.3.6 Trapping

The land use LSA overlaps three trapline licence areas: TR 621 T003, TR 616 T011, and TR 616 T012 and the RSA overlaps: TR 621 T001, TR 614 T101, and TR 617 T015 (Figure 24.3-4). The Brucejack Mine Site is located within licence TR 621 T003 while the transmission line and a portion of the Brucejack Access Road are located within the TR061T012. The remainder of the Brucejack Access Road is located within TR 616 T011. Table 24.3-4 provides an overview of trapline licences within the land use study areas in relation to Project components. In addition, there is a trapline cabin licence held by the BC MFLNRO which is further discussed in Section 24.3.10.

Table 24.3-4. Trapline Licence Areas within the Land Use Study Areas

Trapping Licence	Percentage of Trapline Area in Land Use LSA	Percentage of Trapline Area in Land Use RSA	Location in relation to Project
TR 621 T003	6.5%	75%	Brucejack Mine Site is located within licence area
TR 616 T011	4.5%	60%	Encompasses a portion of the Brucejack Access Road
TR 621 T001	0%	47%	No Project components are located within this licence area
TR 616 T012	14%	90%	The transmission line corridor and western portion of the Brucejack Access Road are located within this licence area
TR 614 T101	0%	16%	No Project components are located within this licence area
TR 617 T015	0%	12%	No Project components are located within this licence area

Source: (BC MOE 2012a; BC ILMB 2013).

Notes:

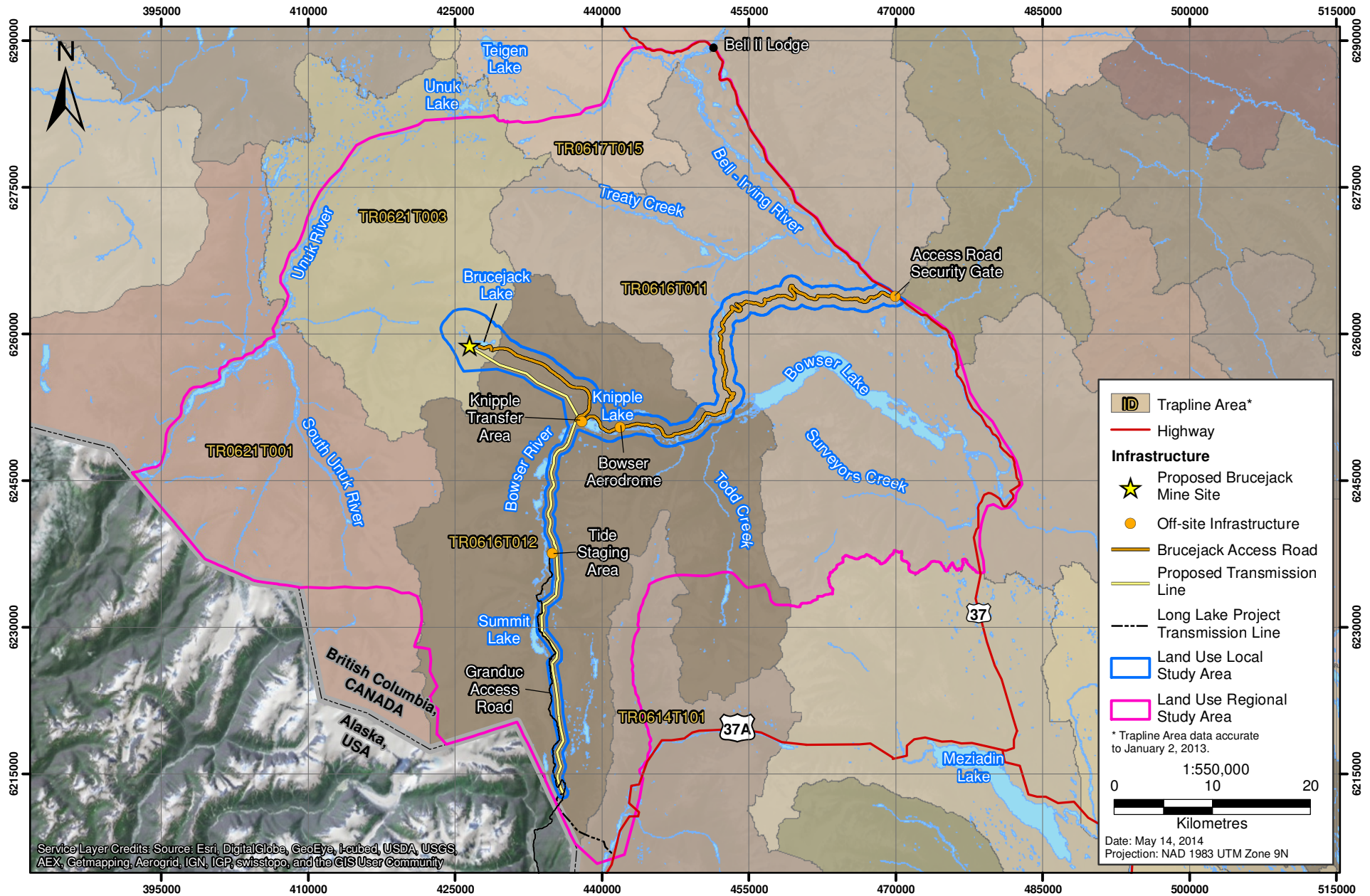
¹ Percentage of the licence area is calculated using total licence area within LSA/RSA (ha) divided by total licence area (ha) as defined by BC MFLNRO including areas extending beyond the land use study areas. Result is presented as percentage of total licence area that falls within land use LSA/RSA boundary.

24.3.6.1 Trapline Harvest Data

The traplines with the highest level of activity between 1985 and 2009 are TR 616 T011 (2,145 individuals), TR 617 T015 (1,431 individuals), TR 621 T001 (1,676 individuals), and TR 614 T101 (2,024 individuals)¹. However, updated trapline harvest data for 2010 and 2011 indicate there were no harvests on TR 616 T011 in either year (BC MFLNRO 2013b). The number of individuals trapped on TR 621 T003 is comparatively lower (296 individuals, 221 of which were marten; BC MFLNRO 2013b). Baseline studies indicate this licence is leased to a trapper that holds another trapline licence nearby ([Appendix 24-A](#), Non-traditional Land Use Baseline).

¹ Individuals reported per trapline represent the total number of individuals trapped between 1985 and 2009.

Figure 24.3-4
Trapline License Areas in the Brucejack Gold
Mine Project Land Use Study Areas



Based on the number of pelts reported per year and each year's average pelt price for each species, total cumulative revenues for traplines in the RSA ranged from \$11,800 to over \$82,000 between 1985 and 2009 (in 2012 \$CDN; BC MOE 2012a). Information related to trapping licences overlapping Project infrastructure are briefly discussed below.

24.3.6.2 *Trapline Licence Holder Level of Use*

There are six trapline licences located within the land use RSA: TR 621 T001, TR 621 T003, TR 617 T015, TR 616 T011, TR 616 T012, and TR 614 T101. The level of use of each is described below.

Licence holder TR 621 T001 traps the South Unuk River area down to Border Lake. As a lease TR 621 T003, trapping focuses on areas to the north (from the Sulphurets Creek area to Eskay Creek). This trapper usually travels by foot, cutting trails, twice per year—once in the spring and once in the fall (D. Green, pers. comm.). On average, the trapper obtains 60 pelts per year, and the average number of pelts per year from both traplines. Marten is the primary animal trapped; however, beaver, otter, wolverine, and mink are also trapped from time to time. Licence holder TR 621 T003 has been held by the same individual since 2000. Both the licence holder and the lessor indicated this area is ideal for trapping marten (D. Green pers. comm.; Rescan 2013b).

Trapline licences TR 617 T015 and TR 616 T011 are held by Skii km Lax Ha members. TR 0616 T011 was acquired in 2009 and amalgamated with another connecting trapline area so that it is now a single registered trapline (M. Williams, pers. comm.). Until recently, marten, beaver, and wolf were trapped in this licence area. As many as 160 marten were trapped in one year on TR 0616 T011, which is accessible by road, foot, or snowmobile. While traplines and harvesting are important to the Skii km Lax Ha, their recent involvement in power and mining projects within their traditional territory has not left time to pursue traditional harvesting activities, including trapping, since 2009. For further information about the Skii km Lax Ha see [Appendix 25-B, Brucejack Gold Mine Project: Skii km Lax Ha Traditional Knowledge and Traditional Use Report](#).

Trapline TR 616 T012 was inactive when baseline research was conducted in 2012. TR 616 T012 is now identified as active by the ILRR; however, further information about the licence holder is unavailable (ILRR 2013c). Licence TR 614 T101 does not overlap the land use LSA however the land use RSA overlaps a small portion of this total licence area (16%).

24.3.7 **Commercial Recreation Licences**

Two commercial recreation licences intersect the LSA (guided mountaineering/rock climbing and heli-skiing), and an additional three intersect the RSA (Table 24.3-5; BC ILMB 2013). Other commercial recreation licences within the RSA are river rafting, fishing camps, and a trapline cabin. There are six identified commercial recreation licences within and near the land use study areas. Table 24.3-5 provides a summary of the business name and operations, as well as the type of commercial licence, the commercial licence number, and its location in relation to Project components.

24.3.7.1 *Last Frontier Heli-skiing (Licence 6406136) and Rivers West Enterprises Ltd. (Licence 6407499)*

The commercial recreation licence for Last Frontier Heli-skiing overlaps the entire land use LSA and approximately 75% of the land use RSA. The land use LSA overlaps approximately 3.4% of the entire area of this licence, which includes 400 ski runs. In addition to heli-skiing, Last Frontier Heli-skiing also offers angling services and heli-fishing (associated with commercial recreation licence 6407499) from mid-September to the end of October and typically includes five trips to locations on the Nass River per year. The Last Frontier Heli-skiing Director of Operations indicated that visual aesthetics are important to the business and noted that clients value the pristine wilderness and the absence of human presence (F. Fux, pers. comm.).

Table 24.3-5. Summary of Commercial Recreation Licence Holders

Company Name	Commercial Licence Type (Licence #)	Status	Location in relation to the Project
Bear Enterprises	Guided Mountaineering/ Rock Climbing (6406985)	LSA	Intersects the Brucejack Mine Site and Brucejack Access Road at numerous points. 9.8% of this licence is overlapped by the land use LSA.
Last Frontier Heli-skiing	Hel-ski (6406136) and Multiple Use (6407499)	LSA/RSA	6406136 overlaps all Project components including the Brucejack Mine Site, Brucejack Access Road, and transmission line. 3.4% of this licence is overlapped by the LSA. 6407499 is associated with Last Frontier Heli-skiing and is registered to Rivers West Enterprises. 6407499 is not overlapped by Project components.
Spey Lodge	Eco Tourist Lodge/ Fish Camp (6407503)	RSA	In the land use RSA along the Bell-Irving River south of Bell II. This licence does not overlap the LSA.
BC MFLNRO	Trapline Cabin (6403593)	RSA	Does not interact with any Project components/activities.
Explorers League: World and Wilderness Rafting	Guided Freshwater Recreation (6406943)	RSA	Does not interact with any Project components/activities.

Source: BC ILMB (2013)

Commercial recreation licence 6407499 is held by Rivers West Enterprises Ltd. The company is based in Vernon, runs and operates the Bell 2 Lodge which provide accommodation and services to Last Frontier Heli-skiing clients (go2 Tourism 2012). Bell 2 Lodge is on the northern border outside of the RSA (Government of British Columbia 2013b). Angling guides operate from the Lodge at Bell II providing angling services in areas within and outside of the land use RSA (Beere, M., pers. comm.).

24.3.7.2 Spey Lodge/ Boundary Lodge (Licence 6407503)

Spey Lodge provides fly fishing expeditions and lodging at two locations: Spey Lodge located on the banks of the Skeena River and Boundary Lodge located on the Bell-Irving River (inside the northeastern boundary of the land use RSA; Figure 24.3-5). Spey Lodge operates from March to November, serving approximately 120 clients per year. There are three boat launches associated with Spey Lodge at Bell I, Glacier Creek, and Bell II. At Spey Lodge, clients reportedly value the experience of the outdoors and being in a relatively undeveloped area as much as the activity of fly-fishing (W. Faetz, pers. comm.).

24.3.7.3 Bear Enterprises (Licence 6406985)

Bear Enterprise's current licence has been held since 2004 and is valid until 2014 (ILRR 2013b). In total, 9.8% of the licence is overlapped by the land use LSA. The licence holder offers guided backcountry expeditions between Bell II and Hyder, Alaska, for about 10 weeks of the year along routes that include parts of the Knipple Glacier, Teigen Creek, and Hodkin Lake, depending on the chosen route.

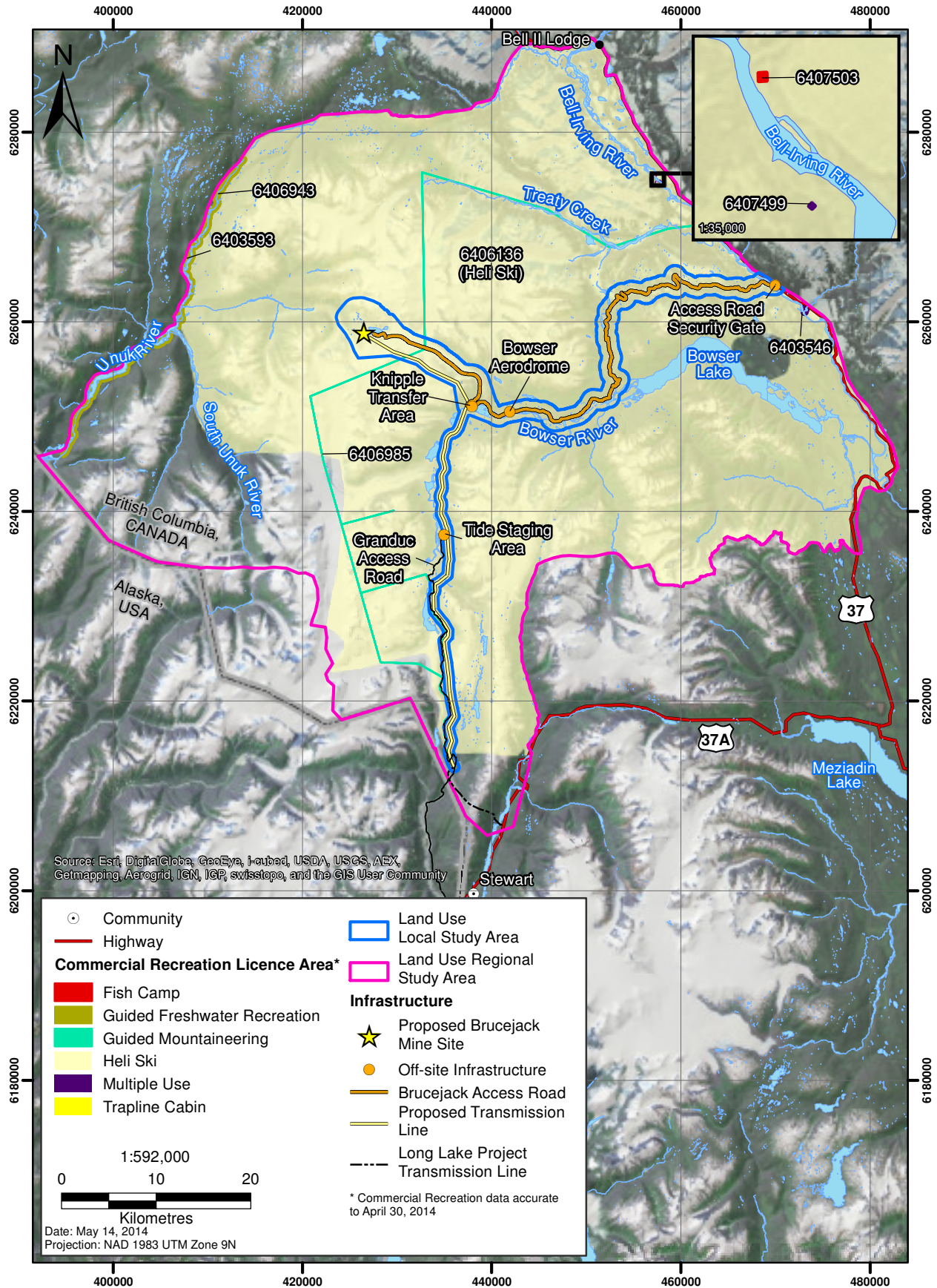
The licence area is accessed via Highway 37 or by helicopter charter from Bell II. According to the licence holder, clients are drawn to the area by its natural beauty, accessible terrain, and an interest in the region's history. The licence holder last led a guided backcountry expedition within the land use RSA in 2010 (C. Dietzfelbinger, pers. comm.).

24.3.7.4 Explorers League: World and Wilderness Rafting (Licence 6406943)

Explorers League: World and Wilderness Rafting's commercial recreation licence has two locations: one northwest of the RSA along the Iskut River and the other along the Unuk River, which forms the western boundary of the RSA. The licence holder has operated in the area for approximately 10 years, and the current licence is valid to 2014 (ILRR 2013a).

Figure 24.3-5

Commercial Recreation Licences in the Brucejack Gold Mine Project Land Use Study Areas



The company typically offers one seven-day trip per year in June, accommodating up to 20 individuals made up of Canadian, American, and some international clients. The 2013 trip on the Unuk River cost \$5,990 per participant (Explorers League 2013). The Unuk River trip includes hiking, camping, and wildlife viewing, and the area is accessed from the existing Eskay Creek Mine Road. A strong draw for clients is the remote wilderness and variety of wildlife in the area (P. Thomson, pers. comm.; Rescan 2013b).

24.3.8 Forestry

The land use LSA overlaps two forest districts (Skeena Stikine and Kalum) and two Timber Supply Areas (the Cassiar and Nass). As of January 2013, there were three forest licences within the land use LSA and seven forest licences within the land use RSA. (Table 24.3-6).

Table 24.3-6. Summary of Forest Licence Holders in the Land Use Study Areas

Licencee	Licence Number	TSA	Location in relation to the Project
Pretium Resources Inc.	L48433	Nass	North of Bowser Lake, extending from the west end of the lake north to Treaty Creek and east to Highway 37
British Columbia Hydro and Power Authority	L48305	Nass	North of Stewart, at the southernmost edge of the RSA along Highway 37A Does not interact with any Project components
Canada Resurgence Developments Ltd.	A16884	Nass	From Bell I to the southeastern edge of the RSA Does not interact with any Project components
District Manager Skeena-Stikine	L48499	Cassiar	Along the northwestern edge of the mine site area in the LSA
Ministry of Transportation and Infrastructure	L48305	Nass	On the edge of the southern boundary of the RSA Does not interact with any Project components
Regional Power Inc.	L48364	Nass	Within the southern tip of the LSA and RSA
Seabridge Gold Inc.	L48517	Nass	Within the northern boundary of the RSA Does not interact with any Project components

Source: Government of British Columbia (2013b), Ministry of Citizen's Services and Open Government (2013)

The Proponent holds forest licence L48433, located along the exploration road between Highway 37 and the west end of Bowser Lake. The forest licence held by BC Hydro and Power Authority is linked to the Northwest Transmission Line (NTL). The forest licence held by the District Manager Skeena-Stikine (L48499) is located adjacent to the land use LSA near the proposed Brucejack Mine Site. This licence is tied to a *Mines Act* (1996e) permit issued to Seabridge Gold Inc., although it is temporarily assigned to the District Manager Skeena-Stikine (W. Foster, pers. comm.).

Seabridge Gold Inc., Canada Resurgence Developments, and the British Columbia Ministry of Transportation and Infrastructure also hold forest licences within the land use RSA, including inactive cut blocks along the eastern border of the land use RSA linked to the forest licence held by Canada Resurgence Developments.

24.3.9 Mineral Exploration and Mining

Until 2008, the Eskay Creek Mine operated outside of but near to the land use RSA. Proposed mine projects in the area include the adjacent KSM Project (roughly 8 km northwest of the Brucejack Mine Site), and several other mineral properties to the north of the land use RSA (e.g., Galore Creek Project, Arctos Anthracite Project, and Schaft Creek Project). The Huckleberry mine is the closest producing mine and is located southeast of Kitimat, BC, approximately 360 km from the proposed Brucejack Mine Site (BC EAO 2013b; Invest Northwest 2013b).

As of January 2014, in addition to Pretium Resources Inc., mineral tenures are held by 51 individuals or businesses within the land use RSA, and 17 within the LSA (Figure 24.3-6). Mineral tenure holders within the LSA include, among others, Pretium Resources Inc., Seabridge Gold Inc., Teuton Resources Corp., Auramex Resources Corp., Red Eye Resources Ltd., and Eilat Exploration Ltd. (Government of British Columbia 2013a). Within the land use LSA, there were two placer claims holders in January 2013: Pretium Resources Inc. and Seabridge Gold Inc. (Government of British Columbia 2013a).

24.3.10 Water Licences

All surface water in BC is held by the Crown on behalf of residents of the Province. Authority to divert and use surface water is obtained by a licence or approval in accordance with the statutory requirements of the *Water Act* (1996g) and the *Water Protection Act* (1996h). There are two water licences within the land use LSA: one held by Pretium Resources Inc. and one held by Boliden Ltd. There are three water licences within the land use RSA: two held by Long Lake Hydro Inc. and one held by River West Enterprises Ltd. located at the Bell 2 Lodge (Table 24.3-7). Figure 24.3-7 shows water licences in the vicinity of the Project and Table 24.3-7 provides summary information on each licence.

Table 24.3-7. Water Licences in the Land Use Study Areas

Licence Number	Licencee	Stream	LSA or RSA	Use	Licence Status
C128950	Pretium Resources Inc.	Brucejack Lake	LSA	Work Camps	Current
C114597	Long Lake Hydro Inc.	Cascade River	RSA	Power-General	Current
C126114	Long Lake Hydro Inc.	Cascade River	RSA	Power-General	Current
C065537	Boliden Ltd.	Cascade River	LSA	Land Improvement	Current
C107336	Rivers West Enterprises Ltd.	Hodder Creek	RSA	Enterprise	Current

Source: BC MOE (2013)

24.3.11 Public Recreation

The land use RSA provides recreational opportunities and activities. There are no formal hiking trails, snowmobile routes, or designated recreational areas within the land use LSA or RSA and no documented public use of the area.

The Salmon Glacier viewpoint is accessible via the Granduc Access Road and includes an observation deck near the parking lot. The viewpoint is located inside the southern tip of the LSA, adjacent to the proposed Brucejack Transmission Line, and west of Highway 37A (Trailpeak 2013).

24.3.12 Transportation and Utilities

24.3.12.1 Roads

Roads within the land use study areas are limited to the Brucejack exploration access road; a service road associated with the Long Lake Hydro Project, the Granduc Access Road, and forestry services roads (Figure 24.3-7). Access to the Brucejack exploration access road is controlled from its junction with Highway 37.

An unpaved service road runs between Long Lake and the Long Lake Hydro Project Generation Station in the land use LSA (within the transmission line corridor; Regional Power 2011). The road is part of the Long Lake Project (along with other existing infrastructure). The Granduc Access Road connects to Highway 37A and is used by tourists to access the Salmon Glacier viewpoint as well as by several mineral companies accessing their tenures for exploration purposes.

Figure 24.3-6

Mineral Claims in the Brucejack Project Land Use Study Areas (as of January 2014)

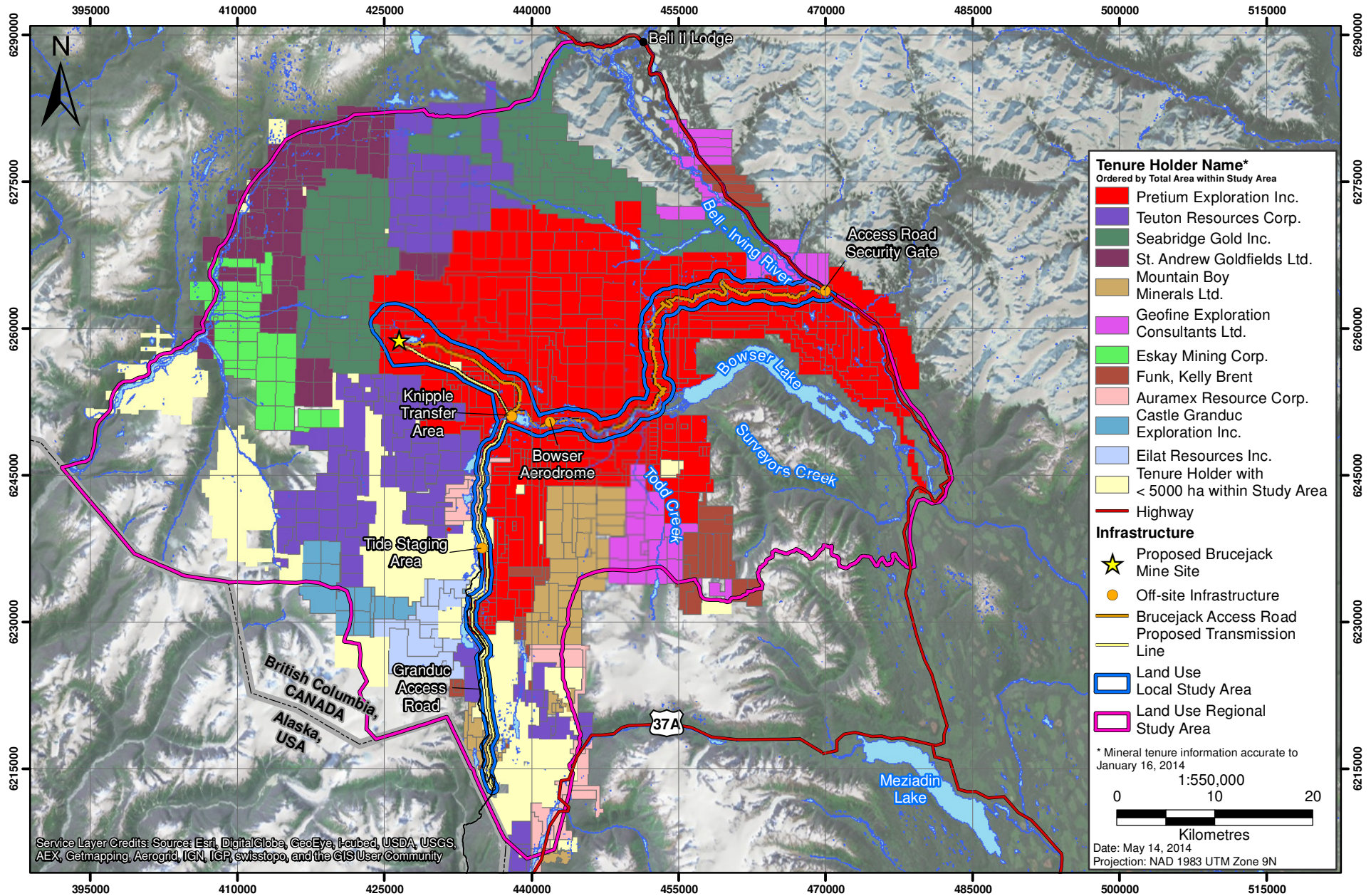
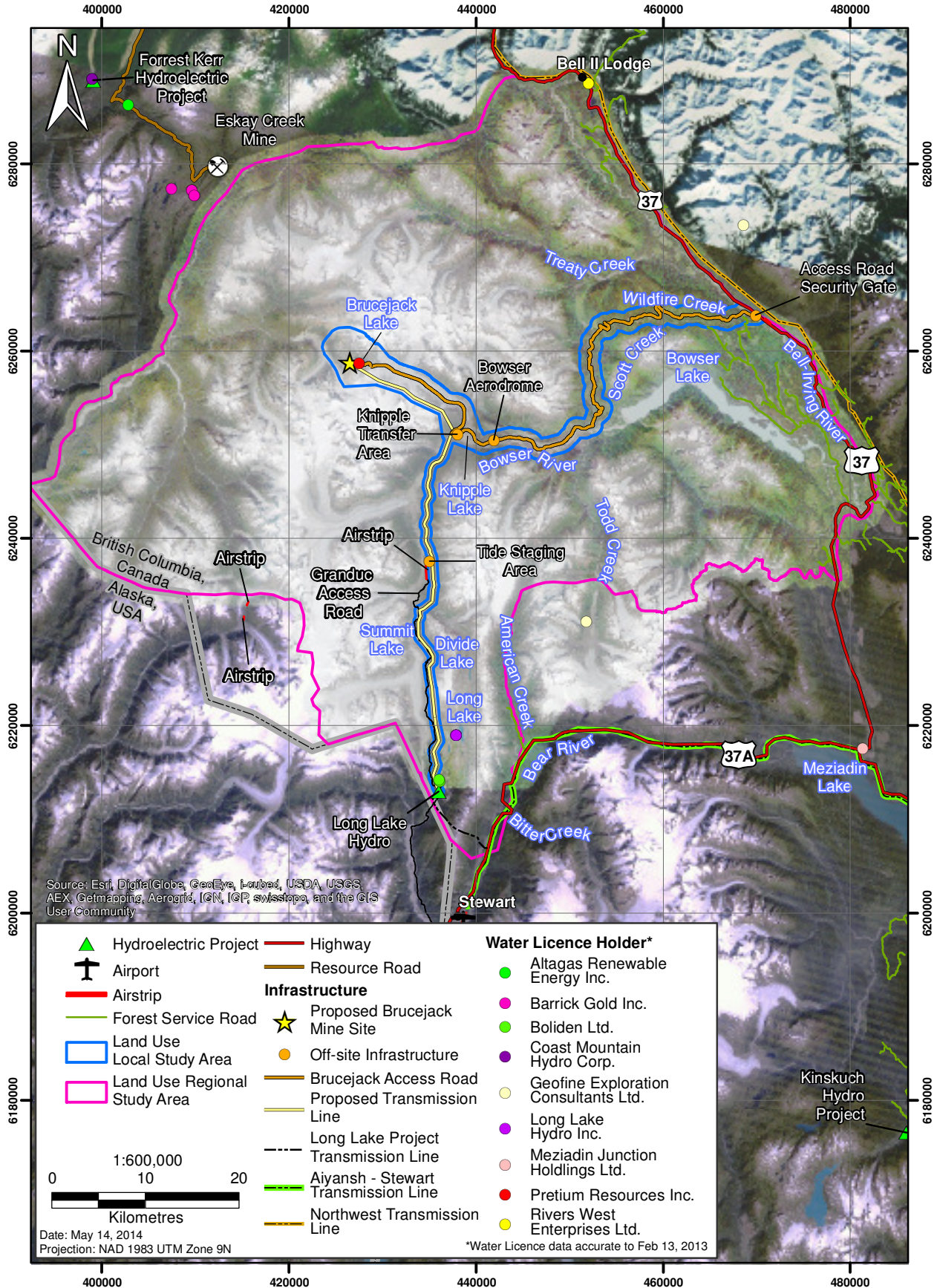


Figure 24.3-7

Transportation and Utilities in the Brucejack Gold Mine Project
Land Use Study Areas



Highway 37 (the Stewart-Cassiar Highway) and a portion of Highway 37A runs along the eastern and southern edges of the land use RSA, respectively. There are a small number of forestry roads within the land use RSA, which are likely accessed by local residents and commercial tenure holders.

24.3.12.2 Power

BC Hydro's NTL project is under construction with completion anticipated in 2014. The NTL involves the construction of a 335-km, 287-kV transmission line connecting the Skeena Substation, near Terrace, to a new substation near Bob Quinn Lake (BC Hydro 2014). The fully constructed NTL will run along the eastern border of the land use RSA and near Highway 37 (Figure 24.3-7).

The Long Lake Hydroelectric Project is located in the southern end of the LSA. Construction of the 31-megawatt Long Lake Hydroelectric Project began in the spring of 2011 and operations began in December 2013 (bclocalnews.com 2013; Invest Northwest 2013a). The Aiyansh-Stewart Transmission Line overlaps the southern tip of the land use RSA within the Bear River Valley along Highway 37A. This 138-kV line begins at the Skeena Substation in Terrace and runs through New Aiyansh, Cranberry Junction, and Meziadin Junction before proceeding to Stewart (Terrace Standard 2012).

24.3.13 Visual Quality

The VQ LSA is not heavily visited by the public. The non-traditional land use baseline identifies two user groups within the LSA that could be affected by a change in visual quality: tourists viewing Salmon Glacier and Last Frontier Heli-skiing clients. Salmon Glacier is a popular spot for tourists and is located along the Granduc Access Road that winds along the eastern slope of the Salmon River Valley, north of Stewart and Hyder (Plate 24.3-1a to Plate 24.3-1c). It is the fifth largest glacier in the world and is visited by vehicular traffic as well as heli-skiing tours. The Salmon Glacier viewpoint is located proximally to Project infrastructure; specifically the transmission line.



Plate 24.3-1a. Looking west towards the Salmon Glacier from a viewpoint to the east of the Salmon Glacier, September 23, 2012.



Plate 24.3-1b. Looking north from a viewpoint on the road to the east of the Salmon Glacier, September 21, 2012.

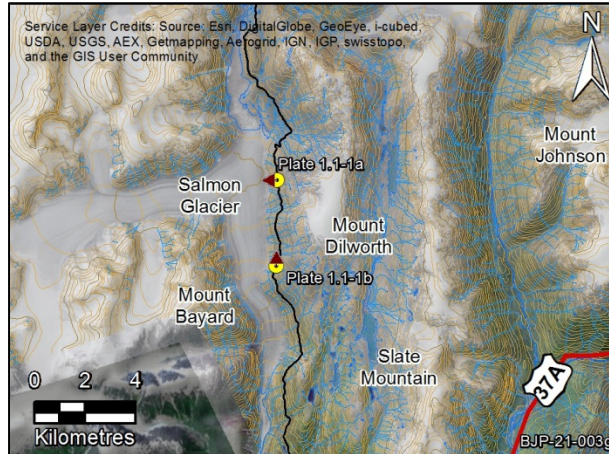


Plate 24.3-1c. Location of photographs to the east of the Salmon Glacier.

24.4 ESTABLISHING THE SCOPE OF THE ASSESSMENT FOR LAND USE

This section includes a description of the scoping process used to identify potentially affected Valued Components (VCs), select assessment boundaries, and identify the potential effects of the Project that are likely to arise from the Project's interaction with a VC. Scoping is fundamental to focusing the Application for an Environmental Assessment Certificate/Environmental Impact Statement (Application/EIS) on those issues where there is the greatest potential to cause significant adverse effects. The scoping process for the assessment of non-traditional land use consisted of the following four steps:

- *Step 1:* scoping process to select land use VCs and indicators based on a consideration of the Project's potential to interact with a VC;
- *Step 2:* consideration of feedback on the results of the scoping process;
- *Step 3:* defining assessment boundaries for land use VCs and indicators; and
- *Step 4:* identification of key potential effects on land use VCs and/or indicators.

These steps are described in detail below.

24.4.1 Selecting Receptor Valued Components

Receptor VCs are selected for assessment to focus the Application/EIS on the issues of highest concern. Receptor VCs are specific attributes of the biophysical and socio-economic environments that have environmental, social, economic, heritage, or health significance. Receptor VCs may also be indirectly affected by potential changes in the baseline condition of other environmental components, thereby acting as receptors of that change. Indirect effects may, in turn, also affect the baseline condition of the receptor VC.

To be considered for assessment, a component must be of recognized importance to society, the local community, or the environmental system, and there must be a perceived likelihood that the receptor VC will be affected by the proposed Project. Receptor VCs are scoped during consultation with key

stakeholders, Aboriginal communities and the Environmental Assessment (EA) Working Group². Consideration of certain receptor VCs may also be a legislated requirement, or known to be a concern because of previous project experience.

As described in Section 6.4.1.1, Scoping Potential Interactions between the Project and Candidate Components, a scoping exercise was conducted during the development of the Application Information Requirements (AIR; BC EAO 2014) to explore potential Project interactions with candidate receptor VCs, and to identify potential key adverse effects associated with that interaction. The results of the scoping exercise were circulated for review by the EA Working Group, and feedback from that process has been integrated into the Application/EIS.

Determination of non-traditional land use VCs involved the following steps:

- review of the AIR (BC EAO 2014);
- review of issues identified during pre-Application/EIS consultations and feedback;
- land use interviews;
- desk-based research and literature review; and
- application of professional judgement.

Each VC included in the assessment meets the following three criteria:

- There is a spatial and temporal overlap between the Project and the VC such that interactions may occur.
- There is a suitable knowledge base and measurable parameters for the VC that can be used to characterize the Project interactions and serve as the basis for assessing potential Project effects.
- There is a perceived, reasonable likelihood (i.e., as assessed by stakeholders or discipline specialists) that the VC could be affected by the Project.

As a result of this process, the VCs identified relative to potential non-traditional land use effects are: commercial and non-commercial land use.

Each VC is broken down into elements or subcomponents which characterize the VC and information is available to inform the effects assessment. The subcomponents for commercial land use are: guide outfitting, trapping, commercial recreation, mineral exploration and mining, water use, and forestry. The subcomponents for non-commercial land use are: hunting, fishing; and public recreation. The subcomponents described above are discussed further in Section 24.5.

24.4.1.1 Potential Interactions between the Project and Commercial and Non-Commercial Land Uses

Adverse effects on commercial and non-commercial VCs can occur where there is an interaction between Project components and activities. Professional judgement, knowledge of potential the Project effects and experience from previous mining projects in the area (e.g., KSM Project) helped

² The EA Working Group provides technical advice to the BC EAO and CEA Agency. It comprises representatives of provincial, federal, and local government, and Aboriginal groups.

identify the potential interactions with the Project and non-traditional land use. Table 24.4-1 identifies the Project components and activities that could interact with Current Aboriginal Use VCs. Interactions between the Project and Current Aboriginal Use were assigned a colour code as follows:

- not expected (white);
- possible (grey); and
- likely (black).

Table 24.4-1. Interaction of Project Components and Physical Activities with Commercial and Non-commercial Land Use

Project Components and Physical Activities by Phase	Commercial Land Use	Non-commercial Land Use
Construction Phase		
Activities at existing adit		
Air transport of personnel and goods		
Avalanche control		
Chemical and hazardous material storage, management and handling		
Construction of back-up diesel power plant		
Construction of Bowser Aerodrome		
Construction of detonator storage area		
Construction of electrical tie in to BC Hydro grid		
Construction of electrical substation at mine site area		
Construction of equipment laydown areas		
Construction of helicopter pad		
Construction of incinerator		
Construction of Knipple Transfer Area		
Construction of local site roads		
Construction of mill building (electrical induction furnace, backfill paste plant, warehouse, mill/ concentrator)		
Construction of mine portal and ventilation shafts		
Construction of Brucejack Camp		
Construction of ore conveyer		
Construction of tailings pipeline		
Construction and decommissioning of Tide Staging Area construction camp		
Construction of truck shop		
Construction and use of sewage treatment plant and discharge		
Construction and use of surface water diversions		
Construction of water treatment plant		
Development of the underground portal and facilities		
Equipment maintenance/machinery and vehicle refueling/fuel storage and handling		
Explosives storage and handling		
Grading of the mine site area		
Helicopter use		

(continued)

Table 24.4-1. Interaction of Project Components and Physical Activities with Commercial and Non-commercial Land Use (continued)

Project Components and Physical Activities by Phase	Commercial Land Use	Non-commercial Land Use
Construction Phase (cont'd)		
Installation and use of Project lighting		
Installation of surface and underground crushers		
Installation of transmission line and associated towers		
Machinery and vehicle emissions		
Potable water treatment and use		
Pre-production ore stockpile construction		
Quarry construction		
Solid waste management		
Transportation of workers and materials		
Underground water management		
Upgrade and use of exploration access road		
Use of Granduc Access Road		
Operation Phase		
Air transport of personnel and goods and use of Bowser Aerodrome		
Avalanche control		
Backfill paste plant		
Back-up diesel power plant		
Bowser Aerodrome		
Brucejack Access Road use and maintenance		
Brucejack Camp		
Chemical and hazardous material storage, management, and handling		
Concentrate storage and handling		
Contact water management		
Detonator storage		
Discharge from Brucejack Lake		
Electrical induction furnace		
Electrical substation		
Equipment laydown areas		
Equipment maintenance/machine and vehicle refueling/fuel storage and handling		
Explosives storage and handling		
Helicopter pad(s)		
Helicopter use		
Knipple Transfer Area		
Machine and vehicle emissions		
Mill building		
Non-contact water management		
Ore conveyer		
Potable water treatment and use		

(continued)

Table 24.4-1. Interaction of Project Components and Physical Activities with Commercial and Non-commercial Land Use (continued)

Project Components and Physical Activities by Phase	Commercial Land Use	Non-commercial Land Use
Operation Phase (cont'd)		
Pre-production ore storage		
Project lighting		
Quarry operation		
Sewage treatment and discharge		
Solid waste management/incinerator		
Subaqueous tailings disposal		
Subaqueous waste rock disposal		
Surface crushers		
Tailings pipeline		
Truck shop		
Transmission line operation and maintenance		
Underground backfill tailing storage		
Underground backfill waste rock storage		
Underground crushers		
Underground: drilling, blasting, excavation		
Underground explosives storage		
Underground mine ventilation		
Underground water management		
Use of mine site area haul roads		
Use of portals		
Ventilation shafts		
Warehouse		
Waste rock transfer pad		
Water treatment plant		
Closure Phase		
Air transport of personnel and goods		
Avalanche control		
Chemical and hazardous material storage, management, and handling		
Closure of mine portals		
Closure of quarry		
Closure of subaqueous tailing and waste rock storage (Brucejack Lake)		
Decommissioning of Bowser Aerodrome		
Decommissioning of back-up diesel power plant		
Decommissioning of Brucejack Access Road		
Decommissioning of camps		
Decommissioning of diversion channels		
Decommissioning of equipment laydown		
Decommissioning of fuel storage tanks		

(continued)

Table 24.4-1. Interaction of Project Components and Physical Activities with Commercial and Non-commercial Land Use (completed)

Project Components and Physical Activities by Phase	Commercial Land Use	Non-commercial Land Use
Closure Phase (cont'd)		
Decommissioning of helicopter pad(s)		
Decommissioning of incinerator		
Decommissioning of local site roads		
Decommissioning of mill building		
Decommissioning of mill/concentrators		
Decommissioning of ore conveyer		
Decommissioning of Project lighting		
Decommissioning of sewage treatment plant and discharge		
Decommissioning of surface crushers		
Decommissioning of surface explosives storage		
Decommissioning of tailings pipeline		
Decommissioning of transmission line and ancillary structures		
Decommissioning of underground crushers		
Decommissioning of waste rock transfer pad		
Decommissioning of water diversion channels		
Decommissioning of water treatment plant		
Helicopter use		
Machine and vehicle emissions		
Removal or treatment of contaminated soils		
Solid waste management		
Transportation of workers and materials (mine site and access roads)		
Post-closure Phase		
Discharge from Brucejack Lake		
Environmental monitoring		
Subaqueous tailing and waste rock storage		
Underground mine		

Notes:

Grey = possible interaction between Project components/Project Activities and a receptor VC

Black = likely interaction between Project components/Project Activities and a receptor VC

White = unlikely interaction between Project components/physical activities and a receptor VC

Interactions coded as not expected (white) are considered to have no potential for adverse effects on Current Aboriginal Use, and are not considered further. Table 24.4-1 provides an impact scoping matrix of intermediate components and receptor VCs that have a possible or likely interaction with Project components and activities. A full impact scoping matrix for all intermediate and receptor VCs is provided in Table 6.4-1 in Chapter 6, Assessment Methodology.

Interactions between the Project and commercial and non-commercial land use were assigned a colour code as follows: not expected (white), possible (grey), and likely (black). Interactions coded as not expected (white) are considered to have no potential for adverse effects on a receptor VC, and are not considered further.

24.4.1.2 Consultation Feedback on Receptor Valued Components

Aboriginal groups, government agencies, and the public were provided with opportunities to comment on VC selection during the review of the draft AIR and EIS guidelines. No comments specific to commercial and non-commercial land use were provided with respect to the selected receptor VCs.

24.4.1.3 Summary of Receptor Valued Components Included/Excluded in the Application/EIS

In undertaking the scoping process, a number of receptor VCs were considered. This section provides the rationale for receptor VCs that were included in the Application/EIS and those which were excluded from assessment. For the VCs included, a rationale is provided as per Table 24.4-2 and further discussion for each is provided below. No VCs related to land use and identified in the AIR were excluded from the assessment.

Table 24.4-2. Land Use Receptor Valued Components Included in the Application/EIS

Valued Sub-Components	Identified by*				Rationale for Inclusion
	AG	G	P/S	IM	
Commercial Land Use	X	X	X	X	<ul style="list-style-type: none"> AIR requires consideration of commercial land use effects. Potential to affect access for commercial land users. Potential to affect the quality of experience of the natural environment for commercial land users and their clients (including visual quality). Potential to affect distribution of wildlife important for some commercial land use.
Non-commercial Land Use	X	X	X	X	<ul style="list-style-type: none"> AIR requires consideration of non-commercial land use effects. Potential to affect public access. Potential to affect visual quality which may affect the quality of experience of the natural environment for public. Potential to affect distribution of wildlife resources for resident hunters.

*AG = Aboriginal Group; G = Government; P/S = Public/Stakeholder; IM = Impact Matrix

Commercial Land Use VC Subcomponents Included/Excluded in the Assessment of Potential Effects

Discussion of the commercial land use VC subcomponents and key potential effects is provided below.

Subcomponent 1: Guide Outfitting

Guide outfitting licences located proximally to the Project study areas include 600502, 601074, and 601036 (see Figure 24.3-5). Guide outfitting licence 600502 does not overlap the land use LSA and the licence holder reported that they do not guide in areas within the land use RSA ([Appendix 24-A](#), Non-traditional Land Use Baseline). Therefore, there is no potential for interaction between the activities associated with guide outfitting licence 600502 and project component or activities. As a result, guide outfitting licence 600502 is excluded from the effects assessment.

Guide outfitter licence 601074 is overlapped by the mine site. The licence holder indicated he does not expect the Project will affect the use of the licence (J. Major. pers. com.). Therefore, guide outfitting licence 601074 is not included in the assessment.

Guide outfitter licence 601036 is included in the effects assessment because it has the potential to interact with project activities in the area of the proposed transmission line and Brucejack Access Road. The licence holder takes guiding trips within the land use LSA and RSA; and has operated the

licence for almost 30 years. As a result, there is potential for this licence area to be affected by the Project. Guide outfitting licence 601036 is included in the effects assessment.

Subcomponent 2: Trapline Licence Areas

There are six trapline licence areas located either wholly or partially within the land use RSA; three of the six licences overlap the land use LSA. Of the six, two are included in the assessment: TR 0616 T012 and TR 0621 T003. The rationale for the inclusion/exclusion of each follows.

The land use LSA overlaps 14% of TR 0616 T012, which became active in late 2013. There is lack of information related to the use and timing of use of this trapline. Therefore it is not possible to assess the potential effects of the Project on this trapline and it is not included in the assessment.

The land use LSA overlaps 6.5% of TR 0621 T003. The current licence holder leases the trapline area to a neighbouring trapline licence holder who utilizes this licence as well as his own licence (TR 621 T001). The licence area is used in the spring and fall of each year. The lessee has indicated that he does not expect the Project to affect his use of TR 0621 T003. As a result, TR 0621 T003 is not included in the effects assessment.

TR 0616 T011 is held by the Skii km Lax Ha ([Appendix 25-B](#), Skii km Lax Ha Traditional Knowledge and Traditional Use Report). The potential effects of the Project on this trapline are assessed in Chapter 25 (Assessment of Potential Effects on Current Use of Land and Resources for Traditional Purposes).

Trapline licences TR 0617 T015 and TR 0614 T101 are both located outside of the land use LSA and do not overlap any projects components or activities and are therefore not included in the assessment.

Subcomponent 3: Commercial Recreation Licence Areas

There are five commercial recreational licences in the land use study areas. The rationale for the inclusion/exclusion of each commercial recreation licence in the land use RSA is discussed below (Figure 24.3-5).

Mountaineer Guide (6406985): The holder of this licence reported use of areas within both the land use RSA and LSA. The most recent use of the licence area occurred three years ago (C. Dietzfelbinger, pers. comm.). This licence holder traverses a large portion of the land use RSA, including areas where proposed Project infrastructure will be located. Therefore, there is a potential for the Project to interact with this licence and further assessment is warranted.

Heli-ski Operator (6406136): The heli-ski licence covers the entire land use RSA and LSA. There is potential for the Project to interact with the use of the licence. Therefore further assessment is warranted.

Multiple use licence (6407499): This licence supports the previously mentioned heli-ski business, including fishing activities out of the Bell 2 Lodge in the summer and fall months. Heli-fishing activities focus on areas outside of the land use RSA (F. Fux. pers. comm). The multiple use licence does not overlap the land use LSA or any Project activities or components. As a result, this licence is not included in the effects assessment.

Guided freshwater recreation (6406943): This licence is located along the Iskut and Unuk rivers, along and outside of the western edge of the RSA. This tenure does not overlap the land use LSA and is located some distance from the proposed development. Navigation on the Iskut and Unuk rivers will not be affected by the Project. Therefore commercial recreation licence 6406943 is not further assessed.

Eco-tourism and fly-fishing (6407503): This eco-tourism and fly-fishing lodge is located in the land use RSA along the Bell-Irving River south of Bell II and north of Treaty Creek. Fishing activities are focused on the Bell-Irving River. The location of fishing activities will not interact with project components and activities as it is located north of Treaty Creek along the Bell-Irving River. Therefore the licence is not further assessed.

Trapline cabin (6403593): This trapline cabin has been assigned to BC MFLNRO for approximately 10 years. Further information about this licence is unavailable. As a result, effects to this licence are not further assessed.

Subcomponent 4: Resource Development (Mining, Forestry, and Timber)

There are a number licences in the area related to resource development. The rationale for their inclusion/exclusion is presented below.

The Project is not expected to impact access to existing mineral tenures or forest tenures. Forest tenures are located on the edge of the RSA. Mineral and forest licence holders will continue to be able to access their tenures.

Subcomponent 5: Water Licences

There are five water licences within the LSA study areas. The assessment of potential surface water quality effects indicates the Project is not expected to affect water quality or quantity (Chapter 13, Assessment of Potential Surface Water Quality Effects). As such, water licences are excluded in the assessment of the Project effects on land use.

Conclusion

The potential impacts on guide outfitting licence 601036; mountain guide (6406985) and heli-ski operator (6406136) are considered.

Non-commercial Land Use VC Subcomponents Included/Excluded in the Assessment of Potential Effects

Several subcomponents characterize non-commercial land use. The subcomponents provide a better understanding of the potential for Project-related effects in relation to current land use activities within the land use study areas. Provided below is a discussion of each subcomponent and a rationale for the inclusion or exclusion of subcomponents in the assessment.

Subcomponent 1: Resident Hunting

The land use RSA overlaps WMUs 6-16 and 6-21 by approximately 38 and 6%, respectively. Provincially collected data that describe the level of current use by residents is relevant for each WMU; however, this does not provide an accurate representation of resident hunting within the land use RSA.³ Baseline research was unable to confirm the level of hunting in the LSA. Therefore, resident hunting is not included in the assessment.

Subcomponent 2: Angling

As commercial fishing is known to occur in the area, it is assumed that some degree of recreational or informal fishing also occurs. According to the BC MFLNRO, recreational fishing occurs within the RSA along the Bell-Irving River and Treaty Creek. There is a lack of information related to the number of recreational fishers in the LSA or RSA. No effects to water quality, water quantity, or fish and aquatic

³ Provincial data limitations are described in Section 24.3.6. Data may not accurately represent current levels of activity.

habitat are anticipated in the Bell-Irving River and Treaty Creek (Chapter 13, Assessment of Potential Surface Water Quality Effects). Due to the lack of information and prediction of no effects on water quality and quantity, effects on recreational anglers are not considered in the assessment.

Subcomponent 3: Public Recreational Use

Baseline studies indicated there are no formal or maintained hiking trails, snowmobile routes, or designated recreational area within the land use LSA or RSA. Beyond the Salmon Glacier viewpoint there is no documented public use of the area. The Salmon Glacier viewpoint is located at the southern end of the RSA and accessible via the Granduc Access Road and includes an observation deck near the parking lot. Members of the public travelling to view the Salmon Glacier may be able to see parts of the Brucejack Transmission Line (Section 24.3.7). However, the public would not see the transmission line when looking toward the glacier from the observation deck as it would be located in the valley behind them. Effects of the Project on recreationists viewing the Salmon Glacier are anticipated to be negligible and are not included in the effects assessment.

Conclusion

Non-commercial land use is not included in the effects assessment.

24.4.2 Assessment Boundaries for Land Use

The spatial and temporal boundaries employed for this land use effects assessment are provided below.

24.4.2.1 Spatial Boundaries

Figure 24.4-1 identifies the spatial boundaries for the effects assessment.

Local Study Area: The LSA covers approximately 31,847 ha and represents the area that may be disturbed by Project components and activities. The LSA includes a buffer extending to the height of land or 1.5 km around the outer limits of Project infrastructure and linear developments, whichever comes first.

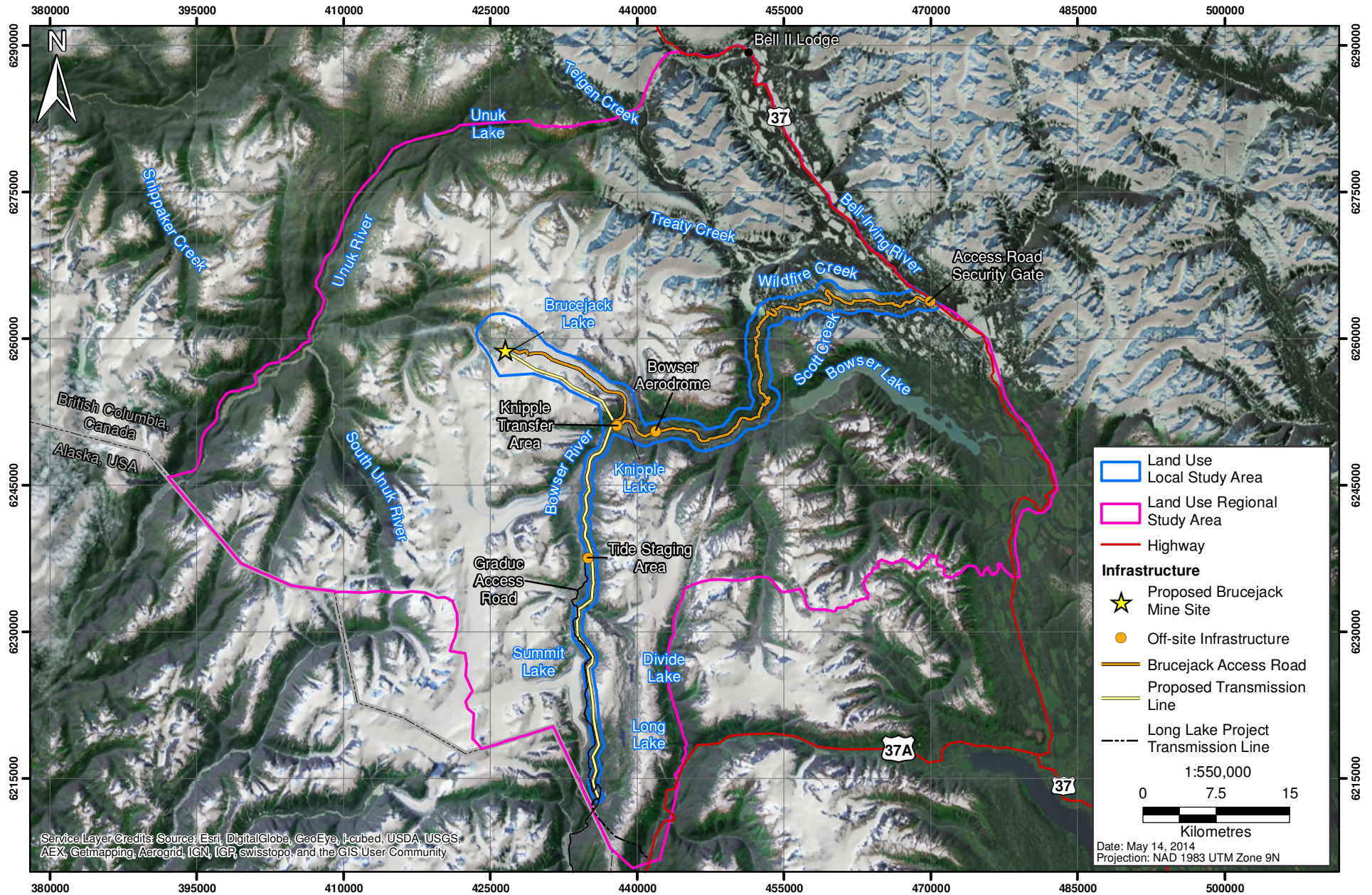
Regional Study Area: The land use RSA covers 374,400 ha and follows the same boundary of the RSA developed for use in the Wildlife and Terrestrial Ecosystem baseline reports. Both human land and resource uses and wildlife activities are influenced by terrain. The RSA took into account the area that provides habitat for wildlife species that may come into contact with proposed Project infrastructure during the course of a season or a lifetime.

24.4.2.2 Temporal Boundaries

The temporal phases of the Project are:

- **Construction:** 2 years;
- **Operation:** 22 years;
- **Closure:** 2 years (includes Project decommissioning, abandonment, and reclamation activities); and
- **Post-closure:** minimum of 3 years (includes ongoing reclamation activities and post-closure monitoring).

Figure 24.4-1
Brucejack Gold Mine Project Land Use Study Areas



24.4.3 Identifying Potential Effects on Land Use

The key effects resulting from an interaction between Project activities and commercial land use are as follows:

- **Change in access or the ability to access or use land use areas:** Construction and operation of the Project has the potential to change access or the ability to access land use areas within the land use LSA.
- **Change to the quality of experience of the natural environment:** Sensory disturbances such as noise, light and visual impacts as well as increased human presence may affect the quality of experience of the natural environment within the land use LSA.
- **Change to the abundance and distribution of wildlife:** Sensory disturbances, loss or alteration of habitat, direct mortality and indirect mortality and an increased human presence may disrupt wildlife within the vicinity of the Project. The Project may also open up the Project area, facilitating unauthorized hunting and fishing.

24.4.3.1 Construction

The Project's Construction phase will include:

- upgrades to the 75-km exploration access road to accommodate mine traffic;
- expansion of the current exploration camp facilities to accommodate the construction workforce, including an additional bunkhouse and kitchen, sewage, and administration facilities;
- construction of the mill building;
- construction of the tailings pipeline;
- development of the underground portal and facilities;
- grading of the mine site area; and
- installation of the transmission line and towers.

Blasting, heavy equipment operation, chemicals use and storage, and air and ground traffic will either begin or ramp up from current exploration activities.

Potential Project-related effects during the Construction phase include:

- change in access or the ability to access or use land use areas;
- change to the quality of experience of the natural environment; and
- change to the abundance and distribution of wildlife.

24.4.3.2 Operation

The Project's Operation phase will include:

- operation of the underground mine, including primary ore crushing underground, and then transport to surface facilities along a conveyor;
- mineral processing using a conventional sulphide flotation and gravity concentration;
- a smelting furnace to produce gold doré from the gravity concentrate;

- a flotation plant to produce gold-silver flotation concentrate that will be dewatered and trucked off site to the port of Stewart or a rail load out facility at Terrace and transported to eastern Canada; and
- a 350-person camp to house employees and mine administration offices.

Potential Project-related effects during the Construction phase include:

- change in access or the ability to access or use land use areas;
- change to the quality of experience of the natural environment; and
- change to the abundance and distribution of wildlife.

24.4.3.3 Closure

The Project's Closure phase will include:

- decommissioning mining equipment and removing material from the underground mine;
- dismantling or demolishing the mill, camp, and other buildings and infrastructure supporting the mine as appropriate;
- disposing of non-hazardous rubble and waste rock in Brucejack Lake, and moving hazardous materials off site;
- decommissioning the Brucejack Access Road; and
- removing the power line and the wooden poles associated with the power line.

Potential Project-related effects during the Construction phase include:

- change in access or the ability to access or use land use areas;
- change to the quality of experience of the natural environment; and
- change to the abundance and distribution of wildlife.

24.4.3.4 Post-closure

Activities during the Project's Post-closure phase include reclamation and environmental monitoring. Potential Project-related effects are expected to be discontinued during Post-closure.

24.5 EFFECTS ASSESSMENT AND MITIGATION FOR LAND USE

From the scoping assessment, three key effects were identified:

- change in access or the ability to access or use land use areas;
- change to the quality of experience of the natural environment; and
- change to the abundance and distribution of wildlife.

These effects have the potential to affect three subcomponent VCs: guide outfitter licence 601036 and commercial recreation licences 6406136 and 6406985. Potential effects on these commercial land uses, including proposed mitigation, are discussed in the following sections.

24.5.1 Change in Access or the Ability to Access or Use Land Use Areas

Construction and Operation

There is potential for access to land use tenures to be impacted by the Construction and Operation phases of the Project if tenure holders are unable to access or use their tenures. A loss of access could impact their income from the use of these tenures (e.g., trapping or guiding).

There has been no road access to the Project area until 2013 when the exploration access road was completed. No public access is allowed on the road for safety reasons. Commercial tenures in the area are generally accessed from Highway 37 or by helicopter.

Closure and Post-closure

The Project is not expected to impact access or the ability to access commercial tenures during Closure or Post-closure.

24.5.2 Change to the Quality of Experience of the Natural Environment

Project noise, light, and changes to visual landscapes during the Construction, Operation, and Closure phases may affect the quality of experience of the natural environment for clients of commercial land users.

Construction and Operation

Noise - During Construction, potential sources of continuous Project noise include vegetation clearing and infrastructure construction. Instantaneous/short duration noises include blasting, vehicle traffic, and helicopter/aircraft overflights. During Operation, potential sources of Project noise include industrial day-to-day operation, while instantaneous noise includes helicopter/aircraft overflights, blasting, and vehicle traffic along the roads. As stated in the Noise Predictive Study (Chapter 8.8), the Project is predicted to increase noise levels at relevant human and wildlife receptors due to construction and operation activities. Exceedances of noise levels are predicted to be sporadic and short in duration. There are no predicted exceedances during blasting for off-site human receptors. Helicopter noise is expected to be audible off of the Project site and within the land use RSA, although noise levels are predicted to be below the human annoyance threshold outside of the mine site during the Construction and Operation phases ([Appendix 8-B](#), Brucejack Gold Mine Project: Environmental Noise Modelling Study).

Visual Aesthetics - Project components and activities may be visible to commercial land users at different locations and elevations. Visual effects are generally not anticipated as the Project is located at high elevation and is shielded within a valley. The Brucejack Access Road is mostly shielded by vegetation ([Appendix 24-B](#), Visual Quality Baseline Report) although there is potential for commercial land users to be able to see the access road from some viewpoints. The access road will not be visible at lower elevations ([Appendix 24-B](#), Visual Quality Baseline Report).

Light - Mine facilities are likely to be lit continuously during night-time for worker safety considerations. Lighting in non-essential areas will be used only when necessary, without compromising safety of employees. It is unlikely that commercial land users will be able to see light from the mine site or aerodrome as the use of tenures occurs mostly during daylight hours. Lighting effects are not considered in the assessment below as they are considered to be negligible.

Closure and Post-closure

Changes to the quality of the quality of experience of the natural environment are not expected to decrease during Closure and to be largely discontinued during the Post-closure phases of the Project.

24.5.3 Change to the Abundance and Distribution of Wildlife

According to the wildlife effects assessment (Chapter 18), activities during the Construction, Operation and Closure phases may result in changes to the abundance and distribution of wildlife within the land use RSA. These changes have the potential to reduce hunting opportunities for guide outfitter licence 601036 whose guided hunting trips focus on grizzly bear, mountain goat and black bear in the Bowser Lake area. Potential effects on grizzly bears and mountain goat are described below. The wildlife chapter does not assess potential effects on black bear.

Grizzly Bear

Potential effects considered in the assessment for grizzly bears are summarized in Chapter 18, Table 18.6-5, and described in sections 18.6.3.2 to 18.6.3.8. Potential effects associated with the access road include sensory disturbance, disruption of movement, indirect and direct mortality, attractants and chemicals.

- A total of 143 ha of high-quality habitat will be lost, representing 0.11% of the available grizzly bear high-quality habitat within the RSA and 1.43% within the Wildlife LSA. With mitigation, no residual effect on grizzly bear is predicted.
- The effect of sensory disturbance is not anticipated to have a residual effect on grizzly bears.
- Bear movement may be disrupted due to traffic, despite volumes remaining below the disturbance threshold of 10 vehicles per hour. Despite mitigation, the effect of disruption of movement is predicted to result in a residual effect on grizzly bears.
- Grizzly bears may be at an elevated risk for a vehicle collision in areas that are adjacent to, provide access to, and directly overlap high-quality habitat. Despite mitigation, the possibility of grizzly bear-vehicle collisions may occur and a residual effect is predicted for grizzly bear direct mortality.
- The effect of indirect mortality as a result of increased access into high-quality habitat is predicted to result in a residual effect on grizzly bears. Improved access due to the transmission line corridor and unauthorized access road use could result in increased hunting pressure in high-quality grizzly bear habitat areas such as the Bowser River floodplain and the Todedada wetland complex areas.
- Grizzly bears are also expected to experience a residual effect from attractants such as food waste (Section 18.6.3, Potential Residual Effects on Grizzly Bears).

Mountain Goats

- Habitat loss or alteration is not predicted to result in a residual effect on mountain goats.
- Noise is predicted to result in a residual effect on mountain goats due to helicopter and fixed-wing aircraft noise.
- Disruption of movement may result from development of the infrastructure at the Brucejack Mine Site. With mitigation, the effect of disruption of movement is not predicted to result in a residual effect on mountain goats.
- Goats may be at risk of vehicle collisions in areas where proposed roads are located at high elevation, including the area along the access road from the Knipple Transfer Area to the Brucejack Mine Site. With mitigation, residual effects due to direct mortality are not anticipated for mountain goats.

- The Brucejack Access Road and transmission line may provide new access to alpine areas for hunters using ATVs and snowmobiles. Mitigation measures to reduce the effect of increased access will include controlling access to the Brucejack Access Road. The potential for indirect mortality as a consequence of increased hunting pressure may still occur due to creating access into habitat along the transmission line, thus a potential adverse residual effect is predicted for mountain goats.

24.5.4 Mitigation Measures for Commercial Land Use-Related Effects

Measures to mitigate potential effects include measures that have been identified in Chapter 18 to mitigate wildlife effects:

- restricting public access and enforcing speed limits on the access road to minimize unauthorized hunting and vehicle-wildlife interactions
- Implementing a Transportation and Access Management Plan (Section 29.16)
- implementing a Noise Management Plan (Section 29.11) to maintain acceptable noise levels for human and wildlife receptors and receptors in the vicinity of the Project
- implementing a Wildlife Management and Monitoring Plan (Section 29.21)
- coordinating and communicating helicopter flight schedules during the heli-ski season (between December 16 and April 19) during all phases of the Project.

24.6 RESIDUAL EFFECTS ON LAND USE

The Project has the potential to affect commercial land uses (guide outfitter licence 601036, commercial recreation licence 6406136, commercial recreation licence 6406985) after mitigation. The following sections assess these effects on commercial land uses and significance on commercial land use VC subcomponents.

24.6.1 Potential Residual Effect on Guide Outfitter Licence 601036

The Brucejack Access Road runs through the licence area held by this guide outfitter. This tenure holder accesses guiding areas from Highway 37. The Project is not expected to impact the tenure holder's ability to access his guide area and therefore no residual impact is anticipated.

The use of this licence is focused on the area south of Bowser Lake, and on the other side of Anderson Mountain, within the land use RSA. The licence holder takes two guided trips per year. Noise levels associated with helicopter traffic are not predicted to increase to the extent that human receptors are likely to become annoyed or complain (Section 8.6, Predictive Study Results for Noise). Changes to visual aesthetics are not anticipated to alter the quality of experience of the natural environment south of Bowser Lake. Therefore, no residual impact is anticipated.

Chapter 18.7.2 (Wildlife Chapter) predicts two potential residual effects on mountain goat: sensory disturbance and indirect mortality. Four potential residual effects are predicted on grizzly bears: disruption of movement, direct mortality, indirect mortality, and attractants. The Project has potential to affect hunting opportunities for guide outfitter 601036 during construction and operation. These effects may continue during the Closure phase as Project traffic during decommissioning may continue to affect wildlife. Impacts on the change to the abundance and distribution of wildlife are expected to be largely discontinued during the Post-closure phase of the Project. A residual impact on this licence is anticipated.

24.6.2 Potential Residual Effect on Commercial Recreation Licence 6406136

The Project is not anticipated to impact the ability of the heli-ski operator to access their licence area and therefore a residual impact is not predicted.

Noise from the Project is not expected to impact the use of this licence. Construction of the Project will be curtailed during the winter when heli-skiing is occurring. Figure 21.3-9 in the KSM Application/EIS indicates there is heli-skiing in the vicinity of the mine site and access road. It is unknown whether any of the heli-ski runs will be visible from these areas. The Proponent has committed to coordinate helicopter flight schedules with the heli-ski operator during the heli-ski season (between December 16 and April 19). It is assumed this coordination will enable the heli-ski operator to take their clients to runs located away from project activities. These measures are anticipated to mitigate impacts on the heli-ski operator and no residual impact is predicted.

24.6.3 Potential Residual Effect on Commercial Recreation Licence 6406985

The licence holder leads guided trips by foot through the RSA. Trips typically begin at Highway 37, north of Bell II, move west towards the mine site, south on the west side of the Bowser River, and cross the Bowser River. The route continues along the Knipple Glacier and back to Highway 37 (see Figure 24.3-5). The tenure holder will continue to be able to access the licence so no residual impact is anticipated.

The licence holder takes trips into his tenure area about every two to three years during winter. Project infrastructure and activities may be visible and/or heard (e.g., mine site, transmission line, and air and ground traffic) along the guiding route used by the licence holder. The road may also be visible from the Knipple Glacier where the licence holder takes his clients. There is a potential for a residual impact on this licence due to potential noise and visual impacts.

Effects due to a change to the abundance and distribution of wildlife are not relevant for this commercial use.

24.7 CHARACTERIZING RESIDUAL EFFECTS, LIKELIHOOD, SIGNIFICANCE, AND CONFIDENCE ON LAND USE

Two commercial tenures (guide outfitter licence 601036 and commercial recreation licence 6406985) may experience residual effects after the implementation of mitigation. The following sections assess the potential residual effects and significance on each of these land uses. Residual effects are characterized using the following criteria: magnitude, geographic extent, duration, frequency, reversibility, and resiliency. Table 24.7-1 defines the criteria used to assess potential residual effects. Table 24.7-2 summarizes the potential residual effects of the Project on commercial land uses, and Table 24.7-3 characterizes potential residual effects on commercial land uses.

24.7.1 Residual Effects Characterization for Commercial Land Use

Each identified residual effect is characterized and a significance conclusion of “not significant” or “significant” is assigned. The following definitions are applied:

- **Not significant:** Residual effects have no or low magnitude, local geographic extent, short- or medium-term duration, and occur sporadically if at all. There is a high level of confidence in the analyses. The effects on the receptor VC are indistinguishable from background conditions (i.e., occur within the range of natural variation).

Table 24.7-1. Definitions of Residual Effects Criteria for Land Use

Magnitude (expected magnitude or severity of the residual effect)	Duration (length of time the effects lasts)	Frequency (how often the effect occurs)	Geographic Extent (spatial scale over which the residual effect is expected to occur)	Reversibility (degree to which the effect is reversible)	Resiliency (capacity of the receptor VC to recover)
Low: Effect is limited and represents a minimal variation compared to baseline conditions	Short Term: Effect lasts approximately 1 year or less.	Low: Occurrence of effect is minimal and limited to one or two occasions	Project Footprint: Effect is limited to areas within the Project footprint	Reversible Short Term: Effect that can be reversed relatively quickly	Low: Receptor is considered to be of low resiliency following disturbances
Moderate: Effect represents a notable change from baseline conditions	Medium Term: Effect lasts from 1 to 10 years	Sporadic: Effect occurs at sporadic or intermittent intervals	Landscape: The effect extends beyond the project footprint to a broader area, but remains tied to the footprint.	Reversible Long Term: Effect that can be reversed after many years	Neutral: Receptor is considered to be moderately resilient following disturbances
High: Effect represents a major changes compared to baseline conditions	Long Term: Effect lasts between 10 and 25 years	Regular: Effect occurs on a regular basis during any Project phase	Regional: Effect extends across the land use Regional Study Area	Irreversible: Effect cannot be reversed (i.e., is permanent).	High: Receptor is considered to be highly resilient following disturbances
	Far Future: Effect lasts more than 25 years and beyond the Post-closure period	Continuous: Effect occurs constantly during any Project phase	Beyond Regional: The effect extends beyond the land use RSA		

Table 24.7-2. Summary of Residual Effects on Commercial Land Use

Effect	Project Phase	Project Component / Physical Activity	Description of Cause-Effect	Description of Mitigation Measure(s)	Potential Residual Effect	Description of Residual Effect	Who is Affected
Change to quality of experience of natural environment	Construction and Operation	Upgrading and use of access road, air and ground traffic, construction of Project infrastructure and transmission line	Project activities result in noise and visual impacts	Noise Management Plan (Section 29.11); Transportation and Access Management Plan (Section 29.16);	Yes	Despite implementation of mitigation measures, the quality of experience for clients of the tenure holder may be altered	Commercial Recreation Licence 6406985

(continued)

Table 24.7-2. Summary of Residual Effects on Commercial Land Use (completed)

Effect	Project Phase	Project Component / Physical Activity	Description of Cause-Effect	Description of Mitigation Measure(s)	Potential Residual Effect	Description of Residual Effect	Who is Affected
Change to the Abundance and distribution of wildlife	Construction, and Operation	Upgrading and use of access road, air and ground traffic, construction of Project infrastructure and transmission line	Project activities result in change to wildlife quantity and distribution affecting hunting opportunities	Noise Management Plan (Section 29.11); Transportation and Access Management Plan (Section 29.16); Wildlife Management and Monitoring Plan (Section 29.21)	Yes	Despite implementation of mitigation, wildlife may be affected, effect on hunting opportunities	Guide Outfitter 601036
	Closure	Decommissioning and reclamation begins.	Project activities and effects on wildlife are reduced but continue (indirect mortality due to traffic).	Noise Management Plan (Section 29.11); Transportation and Access Management Plan (Section 29.16).	Yes	Project activities are reduced	
	Post-closure	Project infrastructure is mostly removed and activities focus on environmental monitoring.	Project activities are limited to monitoring.	Monitoring activities continue to occur.	Yes	Wildlife return to the area over time, reinstating hunting opportunities.	

Table 24.7-3. Characterization of Residual Effects, Confidence, Likelihood, and Significance for Commercial Land Uses

	Likelihood								Significance
	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Resiliency	Probability	Confidence	
Change to the quality of natural experience	Low	Long-term	Sporadic	Project Footprint	Short-Term	High	High	High	Not significant
Change to the abundance and distribution of wildlife	Low	Long-Term	Sporadic	Landscape	Long-Term	High	Medium	Medium	Not significant

- **Significant:** Residual effects have high magnitude; have regional or beyond regional geographic extent; are chronic (i.e., persist into the far future); and occur on a regular or continuous basis. Residual effects on the receptor VC are consequential (i.e., structural and functional changes in populations and communities). The probability of the effect occurring is medium or high. Confidence in the conclusions can be high, medium, or low.

The determination of significance takes into account the resilience of land users. One residual effect on commercial land use is predicted: changes to the abundance and distribution of wildlife.

The likelihood of a residual effect does not influence the determination of significance, rather it influences the risk of an effect occurring. Likelihood has been considered here in keeping with the most recent guidance issued in September 2013 by the BC EAO (BC EAO 2013a): *Guidelines for the Selection of Valued Components and Assessment of Potential Effects*.

The following determinations of significance considered the resiliency of commercial land users, specifically, the ability of each land user to withstand the effects of the Project. The resiliency of the noted commercial land users is determined as high overall. It should be noted that in most cases commercial land users have additional resources they can access to adapt to changes brought about by the Project and are often active in number of locations.

24.7.1.1 *Residual Effects Assessment- Commercial Recreation Licence 64069856*

Residual Effect Characterization

The magnitude of a change to the quality of experience on this commercial land use is expected to have a low magnitude. The duration of the effect is anticipated to be long-term as the construction and operation the Project is beyond ten years. The frequency will be sporadic as the licence area is used every two to three years. The geographic extent of this effect will be at the Project footprint scale because the use of the licence will be in the vicinity of some project components. The reversibility is short-term as the effect reverses when the Project ceases operation. The resiliency is anticipated to be high as the licence area is not regularly used and there is potential for the licence holder to adjust parts of the trip route to avoid the Project.

Likelihood of Residual Effect

The probability of a change to the quality of natural experience is high if the licence holder does not adjust the trip route.

Significance of Residual Effect

The effect of a change to the quality of natural experience is assessed as not significant due to the low magnitude of the effect and sporadic frequency of the use of the licence.

Characterization of Confidence

The confidence in the assessment is high based on the current use of this licence.

24.7.1.2 *Residual Effects Assessment - Commercial Recreation Licence 6406985*

Residual Effect Characterization

The magnitude of a change to the abundance and distribution of wildlife is low based on the findings in the wildlife residual effects assessment related to mountain goat (Section 18.7-3) and grizzly bear (Section 18.7-4). The duration of the effect is long term as it will extend beyond 10 years. The effect

will be sporadic as guiding trips occur twice per year. The geographic extent is landscape and the reversibility is long-term based on the wildlife effects assessment for mountain goat and grizzly bear. The resiliency is anticipated to be high as the licence holder will continue to have access to a large portion of their licence area.

Likelihood

The probability of a change to the abundance and distribution of wildlife is medium based on the wildlife effects assessment related to mountain goat and grizzly bear. The guided trips organized by the licence holder focus on these species.

Significance

The effect of a change to the abundance and distribution of wildlife is assessed as not significant due to the low magnitude of the effect, and sporadic frequency of the use of the licence. Further the licence holder will continue to have access to a large portion of their licence for guiding.

Characterization of Confidence

The confidence in the assessment is medium based on the potential effects of the species hunted by the tenure holder.

24.8 SUMMARY OF RESIDUAL EFFECTS AND SIGNIFICANCE FOR COMMERCIAL LAND USE

Table 24.8-1 is a summary of anticipated residual effects of the Project on commercial land uses. This residual effect will be carried forward into the cumulative effects assessment (CEA; see Section 24.12).

Table 24.8-1. Summary of Residual Effects, Mitigation, and Significance on Commercial Land Uses

Residual Effects	Project Phase(s)	Mitigation Measures	Significance
VC: Commercial Land Use			
Change to quality of experience of natural environment	Construction and Operation	Noise Management Plan (Section 29.11) Transportation and Access Management Plan (Section 29.16) None specific to land use	Not significant
Change to abundance and distribution of Wildlife	Construction and Operation Closure and Post-closure	Wildlife Management and Monitoring Plan (Section 29.21) None specific to land use	Not significant

24.9 CUMULATIVE EFFECTS ASSESSMENT FOR LAND USE

Cumulative effects are defined in this Application/EIS as effects “which are likely to result from the designated project in combination with other projects and activities that have been or will be carried out”. This definition follows that in section 19(1) of the *Canadian Environmental Assessment Act, 2012* (2012) and is consistent with the IFC Good Practice Note on Cumulative Impact Assessment (IFC 2013), which refers to consideration of other existing, planned, and/or reasonably foreseeable future projects and developments. A CEA is a requirement of the AIR (BC EAO 2014) and the EIS Guidelines and is necessary for the Proponent to comply with the *Canadian Environmental Assessment Act, 2012* (2012) and the BC Environmental Assessment Act (2002a).

The Canadian Environmental Assessment Agency (CEA Agency) issued an Operational Policy Statement in May 2013 entitled *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2013), which provides a method for undertaking CEA. Recently the British Columbia Environmental Assessment Office (BC EAO) also released the updated *Guideline for the Selection of Valued Components and the Assessment of Potential Effects* (BC EAO 2013a), which includes advice for determining the need for a cumulative impact assessment. The CEA assessment methodology adopted in this Application/EIS therefore follows the guidance of the CEA Agency as outlined above, as well as the selection criteria in BC EAO (BC EAO 2013a).

The method involves the following key steps which are further discussed in the proceeding sub-sections: Scoping, Analysis, Identification of Mitigation Measures, Identification of Residual Cumulative Effects, and Determination of Significance.

24.9.1 Establishing the Scope of the Cumulative Effects Assessment

The scoping process involves identification of the intermediate components and receptor VCs for which residual effects are predicted, definition of the spatial and temporal boundaries of the assessment, and an examination of the relationship between the residual effects of the Project and those of other projects and activities.

24.9.1.1 Identifying Intermediate Components and Receptor Valued Components for the Cumulative Effects Assessment

Receptor VCs included in the Land Use CEA were selected using four criteria following BC EAO (BC EAO 2013a):

- there must be a residual environmental effect of the project being proposed;
- that environmental effect must be demonstrated to interact cumulatively with the environmental effects from other projects or activities;
- it must be known that the other projects or activities have been or will be carried out and are not hypothetical; and
- the cumulative environmental effect must be likely to occur.

The receptor VC included in this Land Use CEA is commercial land use, which includes the sub-components: guide outfitting.

The residual effect for commercial land use described in Section 24.6 is: Changes to the abundance and distribution of wildlife.

24.9.1.2 Potential Interaction of Projects and Activities with the Brucejack Gold Mine Project for Commercial Land Use

A review of the interaction between potential effects of the Brucejack Gold Mine Project and effects of other projects and activities on commercial land use was undertaken. The review assessed the projects and activities identified in Section 6.8.2 of the Assessment Methodology, including:

- regional projects and activities that are likely to affect the receptor VC, even if they are located outside the direct zone of influence of the project;
- effects of past and present projects and activities that are expected to continue into the future (i.e., beyond the effects reflected in the existing conditions of the receptor VC); and
- activities not limited to other reviewable projects, if those activities are likely to affect the receptor VC cumulatively (e.g., forestry, mineral exploration, commercial recreational activities).

A matrix identifying the potential cumulative effect interactions for land use is provided in Table 24.9-1.

Table 24.9-1. Potential Cumulative Effect Interactions for Land Use

Projects and Activities	Commercial Land Use
Historical	
Eskay Creek Mine	
Goldwedge Mine	
Granduc Mine (Past Producer)	
Johnny Mountain Mine	
Kitsault Mine (Past Producer)	
Silbak Premier Mine	
Snip Mine	
Sulphurets Project	
Swamp Point Aggregate Mine	
Present	
Brucejack Exploration	
Forrest Kerr Hydroelectric Power	
Long Lake Hydroelectric	
McLymont Creek Hydroelectric Project	
Northwest Transmission Line	
Red Chris Mine	
Reasonably Foreseeable Future	
Arctos Anthracite Coal Mine	
Bear River Gravel	
Bronson Slope Mine	
Coastal GasLink Pipeline Project	
Galore Creek Mine	
Granduc Copper Mine	
KSM Project	
Kinskuch Hydroelectric Project	
Kitsault Mine	
Kutcho Mine	
LNG Canada Export Terminal Project	
Northern Gateway Pipeline Project	
Prince Rupert Gas Transmission Project	
Prince Rupert LNG Project	
Schaft Creek Mine	
Spectra Energy Transmission Line Project	
Storie Moly Mine	
Treaty Creek Hydroelectric Project	
Turnagain Mine	
Volcano Hydroelectric Project	

Black = likely interaction between Brucejack Gold Mine Project and other project or activity

Grey = possible interaction between Brucejack Gold Mine Project and other project or activity

White = unlikely interaction between Brucejack Gold Mine Project and other project or activity

24.9.1.3 *Spatial-temporal Boundaries of the Cumulative Effects Assessment*

The CEA boundaries define the maximum limit within which the effects assessment is conducted. They encompass the areas within, and times during which, the Project is expected to interact with the land use VCs and with other projects and activities, as well as the constraints that may be placed on the assessment of those interactions due to political, social, and economic realities (administrative boundaries), and limitations in predicting or measuring changes (technical boundaries). The definition of these assessment boundaries is an integral part of the Land Use CEA, and encompasses possible direct, indirect, and induced effects of the Project on land use.

Spatial Boundaries

The VCs assessed in this chapter are ultimately human VCs; humans define the boundaries within which they act. The projects mapped on Figure 24.9-1 are thought to have a potential cumulative interaction with the Brucejack Gold Mine Project, for the reasons identified in Section 6.8.2. For the CEA spatial boundary used in this chapter, a mapping exercise was undertaken by overlapping the land use RSA and LSA discussed in this chapter on the map extent covered by Figure 6.7-2. Effects on wildlife resources were also taken into account in developing the map. The resulting CEA spatial boundary is shown in Figure 24.9-1.

Temporal Boundaries

The temporal boundary of the CEA used to frame cumulative effects includes the temporal boundary used for the assessment of potential effects on land use by the Brucejack Gold Mine Project:

- Construction: 2 years
- Operation: 22 years
- Closure: 2 years (includes project decommissioning, abandonment, and reclamation activities); and
- Post-closure: minimum of 3 years (includes ongoing reclamation activities and post-closure monitoring).

In addition, the boundary also includes the following temporal phases:

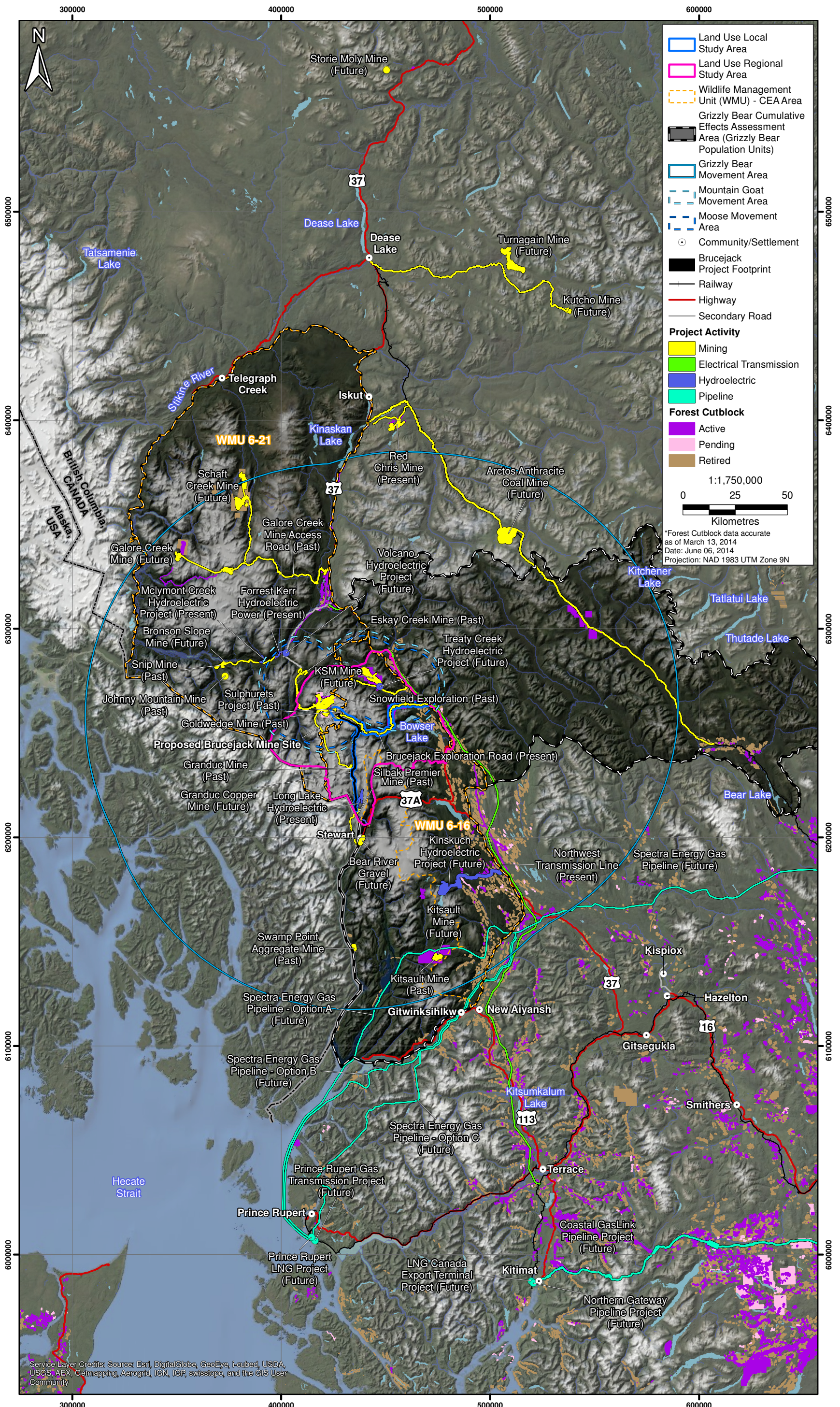
- Historical: The year 1918 is the historic temporal boundary, representing a time when organized mining activity first started to occur in the regional area. Any activity prior to 1918 is not considered further in the CEA;
- Current: Includes existing projects and activities which are operating, undergoing construction, or those that will be operating concurrently with the Project; and
- Foreseeable Future: Includes projects that have entered or completed the BC EA process.

24.9.1.4 *Potential for Cumulative Effects*

A summary of all project-related residual effects (identified in Section 6.6 and Table 6.6-2) that will be considered and analyzed for the potential to interact cumulatively with selected projects and/or activities is included below (Table 24.9-2). For land use, the scope of the CEA focuses on those projects and activities where there is an anticipated cumulative interaction with the residual effects from the Brucejack Gold Mine Project.

Figure 24.9-1

Cumulative Effects Scoping: Projects and Activities Interacting with Land Use in the Vicinity of the Brucejack Gold Mine Project



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Table 24.9-2. Potential Cumulative Effects between the Brucejack Gold Mine Project Land Use and Other Projects and Activities

	Brucejack Gold Mine Project	Past Project or Activity	Existing Project or Activity	Reasonably Foreseeable Future Project or Activity	Type of Potential Cumulative Effect
Commercial Land Use					
Changes to the experienced of the natural environment	X	N/A	Brucejack Exploration, Forest Kerr Hydro, Long Lake, McLymont Creek Hydro, NTL	Bear River Gravel, Bronson Slope, Granduc, KSM Project, Treaty Creek Hydro, Volcano Hydro	Nibbling loss, additive
Changes to the distribution of wildlife	X	Eskay Creek, Goldwedge, Granduc, Johnny Mountain, Kitsault, Silbak Premier, Snip, Sulphurets	Brucejack Exploration, Forest Kerr Hydro, Long Lake, Hydro, McLymont Creek Hydro, NTL, Red Chris	Arctos Anthracite, Bear River Gravel, Bronson Slope, Galore Creek, Granduc, KSM Project, Kinskuch Hydro, Kitsault, Kutcho, Schaft Creek, Spectra Energy Transmission Line, Treaty Creek Hydro, Volcano Hydro	Nibbling loss, additive, growth-inducing

24.9.2 Analysis of Cumulative Effects

The CEA will discuss the cumulative effect of all of the projects present in the CEA spatial boundary and how the projects, as a whole, will interact with the residual effects. This approach is taken as details around the reasonably foreseeable future projects are unknown. As the supporting evidence is not available, a detailed discussion will not be possible. In other words, the analysis will be a qualitative discussion based on a conservative approach.

Commercial land users rely on resources provided by the wilderness environment in order to carry out their activities. This effect has the potential to reduce hunting opportunities for guide outfitters within the land use RSA. Other present and foreseeable future mining, hydroelectric, and other commercial activities, such as mineral exploration, have the potential to act cumulatively contributing to a nibbling loss and additive effect in the RSA potentially resulting in further effects to mountain goat and grizzly bear.

24.9.2.1 Cumulative Effects on Guide Outfitter 60136

One potential residual effect is predicted to have a cumulative effect on guide outfitter licence 60136. The holder of this licence may be affected by further changes to wildlife within the RSA, or by changes to wildlife in areas outside of the land use RSA (as a result of other projects and development). This residual effect relates to a change in the abundance and distribution of mountain goat and grizzly bear, which are the species hunted during guided trips led by this tenure holder.

24.9.2.2 Cumulative Effects on Commercial Recreation Licence 6406985

One potential residual effect is predicted to have a cumulative effect on commercial recreation licence 6406985. The holder of this licence has been affected by sensory disturbances from past projects. Other present and foreseeable future mining, and hydroelectric projects, and other activities such as mineral exploration have the potential to act cumulatively in the RSA by increasing noise due to vehicle and/or traffic, blasting, equipment operation, and changing the landscape (i.e., visual impacts).

24.9.3 Mitigation Measures to Address Cumulative Effects on Commercial Land Use

Management plans, monitoring, and adaptive management will be implemented to mitigate changes to the abundance and disturbance to wildlife caused by the Project as outlined in Section 24.5.4. Key management plans include:

- Noise Management Plan (Section 29.11);
- Transportation and Access Management Plan (Section 29.16); and
- Wildlife Management and Monitoring Plan (Section 29.21).

No additional Project mitigation is anticipated as a result of cumulative effects. Other large resource development projects are expected to adopt mitigation and management measures similar to those of the Brucejack Gold Mine Project. Other projects are also expected to comply with relevant government legislation and policies related to noise, visual quality and wildlife.

24.9.4 Cumulative Residual Effects for Land Use

24.9.4.1 Guide Outfitter Licence 601036

The effects assessment determined the Project has the potential to result in a residual effect due to a change to the abundance and distribution of mountain goat and grizzly bear. The residual effect was determined to be **not significant**. This rating was informed by conclusions reached in Chapter 18.7.2

(Wildlife Chapter, which concludes there will be cumulative effects to mountain goat and grizzly bear due to other developments in the area. Therefore, it is expected that hunting opportunities for mountain goat and grizzly bear by the holder of guide outfitter licence 601036 may be affected.

24.9.4.2 Commercial Recreation Licence 6406985

The use of this licence is focused on the area south of Bowser Lake, and on the other side of Anderson Mountain, within the land use RSA. The effects assessment concluded this licence holder may be affected by a change to the quality of experience of the natural environment as a result of Project-related noise and changes to visual aesthetics. It is unlikely that other projects would be visible or audible from the travel route identified by the holder of this licence due to their distance from the areas used under this licence. Therefore, no residual cumulative impact is anticipated (Table 24.9-3).

Table 24.9-3. Summary of Cumulative Residual Effects on Commercial Land Use

VC	Timing of Cumulative Residual Effect ¹	Description of Cause-Effect ¹	Description of Additional Mitigation (if any)	Description of Cumulative Residual Effect
Commercial Land Use: Guide Outfitter 601036	Construction, Operation, Closure	Cumulative wildlife habitat loss and fragmentation, and wildlife-vehicle interactions in the CEA spatial boundary (nibbling loss, additive)	N/A	Decrease in hunting opportunities for commercial land users

¹ Refers to the Project phase or other timeframe during which the effect will be experienced by the intermediate receptor or VC.

² “Cause-effect” refers to the relationship between the Project component/physical activity that is causing the change or effect in the condition of the receptor VC.

24.9.5 Characterizing Cumulative Residual Effects, Likelihood, Significance, and Confidence for Commercial Land Use

The cumulative residual effects for each VC were characterized by considering the Project’s incremental contribution to the cumulative residual effect under two scenarios:

- Future case without the Project: a consideration of residual effects from all other past, existing, and future projects and activities on a subcomponent without the Brucejack Gold Mine Project.
- Future case with the Project: a consideration of all residual effects from past, existing, and future projects and activities on a subcomponent with the Brucejack Gold Mine Project.

This approach helps predict the relative influence of the Project on the residual cumulative effect for each intermediate component or VC, while also considering the role of other projects and activities in causing that effect.

The consideration of both scenarios led to the conclusion that the cumulative residual effects will be the same both with and without the Project. The Project is not considered the tipping point with respect to the cumulative residual environmental or socio-cultural effects. On the contrary, the number of Projects expected to act cumulatively with the Brucejack Gold Mine Project, and the scale and magnitude of effects expected from some of these projects, crowd out the effects of the Brucejack Gold Mine Project to the point where they are immaterial. For that reason, this CEA will only look at the modelling for the cumulative residual effects with the Project, as the same results and conclusions will be reached without the Project.

24.9.5.1 Cumulative Residual Effects Characterization for Land Use

In keeping with BC EAO (BC EAO 2013a), the likelihood of cumulative effects was considered prior to significance for effects on land use. Once a significance determination is made, the confidence in the significance prediction is evaluated to assess scientific certainty in the result (Table 24.9-4).

Guide Outfitter Licence 601036

In the event that all reasonably foreseeable future projects commence on time and as designed, the cumulative change in the distribution of wildlife resources as a result of the activities of these projects will increase the magnitude and duration of the effect on guide outfitter 601036. The magnitude and duration of the effect is predicted to be low and long term, respectively. The frequency of the effect is sporadic and the geographic extent is regional.

A cumulative residual effect is anticipated as wildlife important to guide outfitter 601036, namely grizzly bear and mountain goat, are expected to be affected by the development of the Project and by the development of other nearby future mine projects, further reducing hunting opportunities within the RSA. The wildlife resources guide outfitter 601036 relies upon in areas of the guide outfitting licence that are outside the RSA may also be affected by the development of future projects; resulting in a further reduction to the hunting opportunities available to guide outfitter 601036. However, it is assumed the licence holder could take guided hunting trips in other areas of his licence.

Likelihood

Taking a conservative approach to this assessment, should all of the reasonably foreseeable future projects be approved and proceed on time and as designed, the likelihood of cumulative effects for guide outfitter 601036 as a result of changes to the abundance and distribution of wildlife is **medium**.

Significance

In the event that all reasonably foreseeable future projects commence on time and as designed, the cumulative residual effect on guide outfitter 601036 will be **not significant**.

Confidence

The confidence in the assessment of cumulative residual effects is **medium** due to uncertainties related to the ability of the tenure holder to use other areas of his licence area.

24.10 EFFECTS ASSESSMENT CONCLUSIONS FOR LAND USE

The results of the Project effects assessment and CEA for commercial land use are summarized in Table 24.10-1. All effects were found to be not significant.

Table 24.9-4. Significance Determination of Cumulative Residual Effects on Commercial Land Uses - Future Case with the Project

Cumulative Residual Effects	Cumulative Residual Effects Characterization Criteria						Likelihood of Occurrence		Significance of Adverse Cumulative Residual Effects
	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Resiliency	Probability	Confidence	
Change to the abundance and distribution of wildlife	Moderate	Long Term	Sporadic	Regional	Reversible long-term	High	Medium	Medium	Not Significant

Table 24.10-1. Summary of Project and Cumulative Residual Effects, Mitigation, and Significance for Land Use

Residual Effects	Project Phase(s)	Mitigation Measures	Significance of Residual Effects	
			Project	Cumulative
Commercial Land Use				
Change to the abundance and distribution of wildlife Effect is within the LSA and may extend into RSA.	Construction and Operation	Wildlife Management and Monitoring Plan (Section 29.21)	Not Significant	Not Significant

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