18. COMMERCIAL AND NON-COMMERCIAL LAND USE EFFECTS ASSESSMENT

18.1 INTRODUCTION

18.1.1 Project Overview

Harper Creek Mining Corporation (HCMC) proposes to construct and operate the Harper Creek Project (the Project), an open-pit copper mine approximately 10 kilometres (km) southwest of the unincorporated community of Vavenby, British Columbia (BC) along the Southern Yellowhead Highway (Highway 5; Figure 18.1-1). The Project is located on provincial Crown land in the Thompson-Nicola Regional District (TNRD), is zoned RL-1 Rural by the TNRD, and is approximately 150 km northeast of Kamloops along Highway 5.

The Project consists of an open pit mine, on-site processing facility, tailings management facility (TMF; for tailings solids, subaqueous storage of potentially acid-generating [PAG] waste rock, and recycling of water for processing), waste rock stockpiles, low-grade and overburden stockpiles, a temporary construction camp, ancillary facilities, mine haul roads, sewage and waste management facilities, a 24-km access road between the Project Site, a rail load-out facility located on private land owned by HCMC in Vavenby which is zoned I-3 General Industrial, and a 12-km power line that will connect the Project Site to the BC Hydro transmission line in Vavenby.

The proposed Project is located within the Kamloops Land and Resource Management Plan (LRMP; Kamloops Interagency Management Committee 1995), approved by the provincial government in 1995. There are a variety of commercial and non-commercial land uses in the plan area including logging, mineral exploration, ranching, and trapping, hunting, fishing, hiking, snowmobiling and skiing.

18.1.2 Purpose of this Chapter

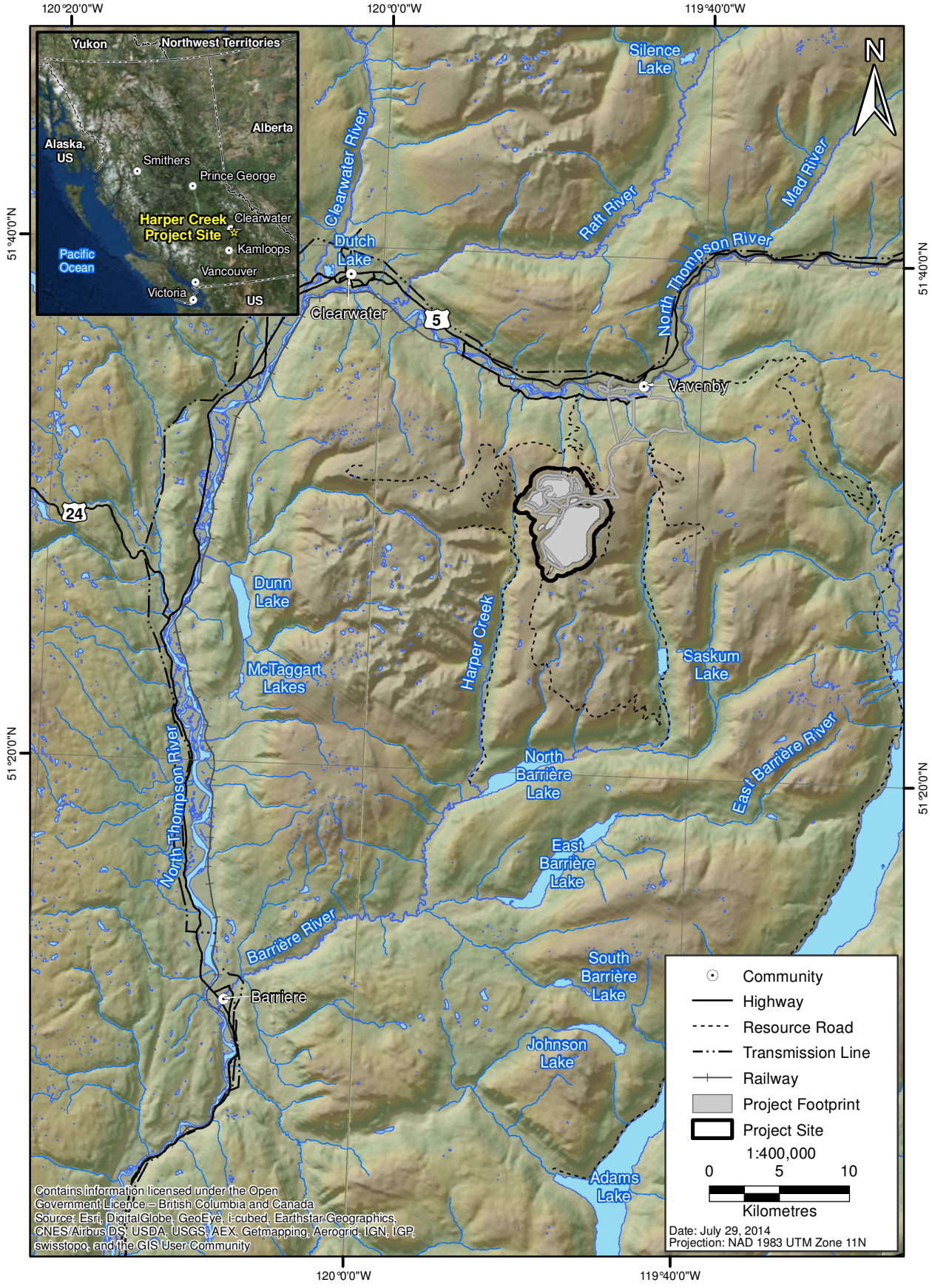
This chapter presents baseline commercial and non-commercial land use conditions, including navigation, and undertakes a scoping and effects assessment to characterize potential effects on land use as a result of the Project. It is informed by baseline data, which are provided in the chapter or by the conclusions reached in other chapters. This chapter follows the effects assessment methodology described in Chapter 8 of this Application for an Environmental Assessment Certificate/Environmental Impact Statement (Application/EIS).

18.2 REGULATORY AND POLICY FRAMEWORK

This section provides an overview of the relevant regulatory framework and regulatory requirements for potential Project effects related to commercial and non-commercial land use and navigation.

Figure 18.1-1

Project Location



The Project is subject to both provincial and federal environmental assessment (EA) requirements under the BC *Environmental Assessment Act* (2002a) and *Canadian Environmental Assessment Act* (1992). The requirements for the land use effects assessment are defined in Section 6 (Assessment of Potential Social and Economic Effects) of the Application Information Requirements (AIR) for the Project, approved by the British Columbia Environmental Assessment Office (BC EAO 2011) on October 21, 2011 and in the Background Information Document issued by the Canadian Environmental Assessment Agency (CEA Agency; 2011) in April 2011.

Table 18.2-1 identifies provincial and federal legislation and guidelines relating to commercial and non-commercial land use, including navigable waters.

Table 18.2-1. Summary of Applicable Legislation and Guidelines for Potential Land Use Effects

Name	Description
(BC) *Land Title Act* (1996d)	Provides the framework for land title administration. Establishes the land registry system.
(BC) *Mines Act* (1996g)	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) *Mineral Tenure Act* (1996f)	Provides for the registration of mineral and placer titles on Crown land and provides the framework for tenure administration.
(BC) *Forest Act* (1996b)	Provides for granting of timber rights on Crown land.
(BC) *Forest and Range Practices Act* (2002b)	Sets the framework for "results-based" forestry on Crown land, including setting targets or strategies for environmental objectives (soils, timber, fish, biodiversity, cultural heritage, forage and associated plant communities, visual quality, water, wildlife, and resource and recreation features).
(BC) *Range Act* (1996i)	Provides for granting of range tenures.
(BC) *Agricultural Land Reserve Act* (1996a)	Provides for designation of agricultural land reserves.
(BC) *Wildlife Act* (1996k)	Regulates the management of wildlife, establishes wildlife management areas, and regulates the import and export of wildlife, trapping, angling guiding, guide outfitting, hunting and fishing.
(BC) *Park Act* (1996h)	Establishes provincial parks, conservancies and recreation areas, including management and activities permitted and not permitted in parks.
(BC) *Water Act* (1996j)	Regulates the province's fresh water resources, including 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.

(continued)

Table 18.2-1. Summary of Applicable Legislation and Guidelines for Potential Land Use Effects (completed)

Name	Description
(BC) *Land Act* (1996c)	Governs the disposition, management, and administration of Crown land, 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.
(BC) *Protected Areas of British Columbia Act* (2000)	Confirms or establishes parks, ecological reserves, and conservancies.
Wildlife Guidelines for Backcountry Tourism / Commercial Recreation (BC) (BC MOE 2006)	Provides guidelines for backcountry recreation activities, including defining results, desired behaviours, indicators, and limits for backcountry activities in relation to wildlife and wildlife habitat.
(Canada) *Navigation Protection Act* (1985)	Authorizes approvals for any "works" that may affect navigation on listed "navigable waters".

In Canada there is a public right to navigation that exists under common law. This right can only be restricted by an Act of Parliament, such as the *Navigation Protection Act* (1985), which requires approval for any "works" that may affect navigation on listed "navigable waters." Environmental effects associated with navigation include safety (i.e., an indirect effect on safe navigation), and access (i.e., an indirect effect on the ability of Aboriginal and other user groups to access navigable waters for traditional [e.g., fishing, hunting, and trapping], commercial, and/or recreational [e.g., boating] purposes).

The proposed Project is located within the Kamloops LRMP (Kamloops Interagency Management Committee 1995), which is a sub-regional land use plan covering 2.2 million hectares (ha) of south-central BC. The plan directs the management of Crown land covering the plan area, subject to existing legislation, policies, and regulations. It broadly defines and provides a framework for implementing regional land and resource management objectives. The Kamloops LRMP is organized into Resource Management Zones (RMZs), including General, Settlement, and Protection, as well as Special RMZs (Community Watersheds, Habitat/Wildlife Management Areas, and Recreation and Tourism). General resource management objectives and strategies are also provided for heritage trails, cultural and heritage sites, and traditional Aboriginal land use (Kamloops Interagency Management Committee 1995).

18.3 SCOPING THE EFFECTS ASSESSMENT

18.3.1 Valued Components

The BC EAO and CEA Agency define valued components (VCs) as components "that are considered important by the proponent, public, First Nations, scientists, and government agencies involved in the assessment process" (BC EAO 2013). To be included in the Application/EIS, there must be a perceived likelihood that the VC will be affected by the proposed Project. VCs proposed for assessment were identified in the AIR (BC EAO 2011) and in the Background Information document (CEA Agency 2011).

18.3.1.1 Consultation Feedback on Proposed Valued Components

A preliminary list of proposed VCs was drafted early in Project planning based on the expected physical works and activities of the reviewable Project; the type and location of the proposed Project; consultations with federal, provincial, and local government agencies; and professional judgment. A summary of how scoping feedback was incorporated into the selection of assessment subject areas and VCs is summarized below in Table 18.3-1.

Concerns about potential effects to human health have been raised by Aboriginal groups (Appendix 3-F of Chapter 3), by the public and stakeholders (Appendix 3-J of Chapter 3), and by government (Appendix 3-L of Chapter 3).

The public raised concerns about potential impacts on recreational use including snowmobiling. Range tenure holders raised concerns related to effects on cattle and ranching, including water availability for irrigation.

18.3.1.2 Selecting Valued Components

The Project components and activities associated with each phase of the Project are screened to identify potential interactions with commercial and non-commercial land use VCs. Table 18.3-2 identifies the Project components and activities that may interact with potential land use VCs with "X" indicating a potential interaction between the land use VC and the Project component or activity.

18.3.1.3 Valued Components Selected for Assessment

Valued components proposed for the assessment are summarized in Chapter 8, Effects Assessment Methodology, and Table 8.4-3. Land use VCs in the AIR (BC EAO 2011) are identified under "social" and include the following: forestry, agriculture, recreational land use, and water use. Components identified in the AIR related to water use include navigable waters, water licences, and recreational water use. The VCs selected for inclusion in the land use effects assessment are presented in Table 18.3-3 and the rationale for choosing each VC is provided below.

Commercial interests such as forestry, agriculture, and trapping are included in the effects assessment, as these activities are occurring in the LSA. These sectors are considered as components under the commercial interests VC as the types of potential effects are similar. Effects to water quality and quantity being used for agricultural purposes, such as irrigation and stock watering, are also considered under the commercial interests VC due to potential effects on the use of range tenures.

Table 18.3-1. Consultation Feedback on Proposed Valued Component(s)

Subject Area	Feedback by*				Issues Raised	Proponent Response
	AG	G	P/S	O		
Forestry		X		X	Effects on forestry resources and provincial revenue	Potential impacts on forest tenures are assessed under the commercial interests VC. The Project is not expected to impact provincial forest revenues as forestry activities will continue in the LSA.
			X		Effects of power line on ecotourism and woodlot.	Potential impacts of the proposed power line route options on private land and third party tenures are assessed under the commercial interests VC.
Agriculture		X	X	X	Effects on cattle and ranching.	Potential impacts of the Project on agriculture are assessed under the commercial interests VC. HCMC has negotiated an agreement with the MFLNRO and the range tenure holder (RAN077435) to mitigate potential Project impacts.
Agriculture			X		Effect on availability of water for irrigation.	Potential impacts on water uses that support agriculture are assessed under the commercial interests VC.
Agriculture			X		Effects on forage for cattle.	Potential impacts on range tenures are assessed under the commercial interests VC.
Agriculture			X		Cattle access to the tailings management facility.	The grazing tenure unit (RAN 077435) may be adjusted to eliminate use within the Project area. Establishment of cattle guards to mitigate drift into the Project area would be in consultation with BC MFLNRO, forestry and range tenure holders.
Agriculture			X		Risks to cattle as a result of sumps at drill sites and weeds and exposed dust on the drill pad sites.	This will not be an issue as the grazing tenure unit (RAN 077435) may be adjusted to eliminate use within the Project area. Further, establishment of cattle guards to mitigate drift into the Project area would be in consultation with BC MFLNRO, forestry and range tenure holders..
Trapping			X		Effects on access to, and economic viability of, trapline tenure.	Potential impacts on trapping are assessed under the commercial interests VC. HCMC has negotiated agreements with the two trapline holders (TR0337T001 and TR0341T003) whose tenures overlap with the Project area to mitigate potential Project impacts.

(continued)

Table 18.3-1. Consultation Feedback on Proposed Valued Component(s) (completed)

Subject Area	Feedback by*				Issues Raised	Proponent Response
	AG	G	P/S	O		
Recreational Land Use			X	X	Effects on snowmobilers who use forest service roads (FSRs) in Project area to access snowmobiling areas.	Potential impacts on public recreation are assessed under the public use VC. HCMC will communicate with local snowmobile clubs and other recreational clubs using the Vavenby Mountain, Jones Creek and Saskum West FSRs to discuss access issues. HCMC, in consultation with the Clearwater Sno-drifters Club, has proposed two potential pullout/parking areas along the Vavenby Mountain FSR. HCMC has committed to implement a traffic and access management plan, which includes communication protocols and speed limits that must be adhered to by all users, including snowmobilers, mine employees, and contractors.
Recreational Land Use					Effects on recreational fishing, in particular Graffunder, Saskum, and North Barrière lakes.	Potential impacts on public recreation are assessed under the public use VC.
Recreational Land Use	X		X		Effects on access and use of FSRs by the public, including snowmobilers.	Potential impacts on public recreation are assessed under the public use VC.
Water Use (Navigable Waters)		X		X	Effects on navigation	Potential impacts on navigation are assessed under the navigable waters VC.
Private land			X		Project workers accessing private land to do baseline studies	Private land owners were contacted by HCMC when access to private land was needed by Project workers to undertake baseline studies.

**AG = Aboriginal Group; G = Government; P/S = Public/Stakeholder; O = Other*

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Construction								
Concrete production	Concrete batch plant installation, operation and decommissioning			X				
Dangerous goods and hazardous materials	Hazardous materials storage, transport, and off-site disposal	X	X	X				
	Spills and emergency management							
Environmental management and monitoring	Construction of fish habitat offsetting sites							
Equipment	On-site equipment and vehicle use: heavy machinery and trucks			X				
Explosives	Explosives storage and use			X				
Fuel supply, storage, and distribution	Fuel supply, storage, and distribution							
Open pit	Open pit development - drilling, blasting, hauling, and dumping			X				
Potable water supply	Process and potable water supply, distribution and storage							
Power supply	Auxiliary electricity - diesel generators		X	X				
	Power line and site distribution line construction: vegetation clearing, access, poles, conductors, tie-in	X	X	X	X	X		X
Processing	Plant construction: mill building, mill feed conveyor, truck shop, warehouse, substation, and pipelines							
	Primary crusher and overland feed conveyor installation			X				
Procurement and labour	Employment and labour							
	Procurement of goods and services							
Project Site development	Aggregate sources/ borrow sites: drilling, blasting, extraction, hauling, crushing	X		X				

(continued)

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components (continued)

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Construction *(cont'd)*								
Project Site development *(cont'd)*	Clearing vegetation, stripping and stockpiling topsoil and overburden, soil salvage handling and storage							
	Earth moving: excavation, drilling, grading, trenching, backfilling			X				
Rail load-out facility	Rail load-out facility upgrade and site preparation							
Roads	New TMF access road construction: widening, clearing, earth moving, culvert installation using non-PAG							
	Road upgrades, maintenance and use: mine haul and access roads	X	X	X				
Stockpiles	Coarse ore stockpile construction							
	Non-PAG waste rock stockpile construction							
	PAG and non-PAG low-grade ore stockpiles foundation construction							
	PAG waste rock stockpiles foundation construction							
Tailings management	Coffer dam and south TMF embankment construction							
	Tailings distribution system construction							
Temporary construction camp	Construction camp construction, operation, and decommissioning							
Traffic	Traffic delivering equipment, materials and personnel to site	X		X				
Waste disposal	Waste management: garbage, incinerator and sewage waste facilities							
Water management	Ditches, sumps, pump systems, reclaim system and snow clearing/stockpiling							
	Water management pond, sediment pond, diversion channels and collection channels construction							

(continued)

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components (continued)

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Operations 1								
Concentrate transport	Concentrate transport by road from mine to rail load-out	X	X	X				
Dangerous goods and hazardous materials	Explosives storage and use			X				
	Hazardous materials storage, transport, and off-site disposal	X		X				
	Spills and emergency management							
Environmental management and monitoring	Fish habitat offsetting site monitoring and maintenance							
Equipment fleet	Mine site mobile equipment (excluding mining fleet) and vehicle use							
Fuel supply, storage and distribution	Fuel storage and distribution							
Mining	Mine pit operations: blast, shovel, and haul		X	X				
Ore processing	Ore crushing, milling, conveyance, and processing							
Potable water supply	Process and potable water supply, distribution, and storage							
Power supply	Backup diesel generators							
	Electrical power distribution							
Processing	Plant operation: mill building, truck shop, warehouse, and pipelines							
Procurement and labour	Employment and labour							
	Procurement of goods and services							
Rail load-out facility	Rail load-out facility (loading of concentrate; movement of rail cars on siding)							
Stockpiles	Construction of non-PAG tailings beaches							
	Construction of PAG and non-PAG low-grade ore stockpile							
	Non-PAG waste rock stockpiling							

(continued)

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components (continued)

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Operations 1 *(cont'd)*								
Stockpiles *(cont'd)*	Overburden stockpiling							
Tailings management	Reclaim barge and pumping from TMF to plant site South TMF embankment construction Sub-aqueous deposition of PAG waste rock into TMF Tailings transport and storage in TMF Treatment and recycling of supernatant TMF water							
Traffic	Traffic delivering equipment, materials, and personnel to site		X					
Waste disposal	Waste management: garbage and sewage waste facilities							
Water management	Monitoring and maintenance of mine drainage and seepage Surface water management and diversions systems including snow stockpiling/clearing							
Operations 2								
Processing	Low grade ore crushing, milling, and processing							
Reclamation and decommissioning	Partial reclamation of non-PAG waste rock stockpile Partial reclamation of TMF tailings beaches and embankments							
Tailings management	Construction of north TMF embankment and beach Deposit of low grade ore tailings into open pit							
Water management	Surface water management							

(continued)

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components (continued)

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Closure								
Environmental management and monitoring	Environmental monitoring including surface water and groundwater and monitoring							
	Monitoring and maintenance of mine drainage, seepage, and discharge							
	Reclamation monitoring and maintenance							
Open pit	Filling of open pit with water and storage of water as a pit lake							
Procurement and labour	Employment and labour							
	Procurement of goods and services							
Reclamation and decommissioning	Decommissioning of rail concentrate load-out area							
	Partial decommissioning and reclamation of Project Site roads	X		X				
	Decommissioning and removal of plant site, processing plant and mill, substation, conveyor, primary crusher	X	X	X				
	Decommissioning of diversion channels and distribution pipelines							
	Decommissioning of reclaim barge							
	Reclamation of non-PAG low-grade ore stockpile, overburden stockpile and non-PAG waste rock stockpile							
	Reclamation of TMF embankments and beaches							
	Removal of contaminated soil							
	Use of topsoil for reclamation							
Stockpiles	Storage of waste rock in non-PAG waste rock stockpile			X				
Tailings management	Construction and activation of TMF closure spillway							

(continued)

Table 18.3-2. Interaction of Project Components and Activities with Proposed Land Use Valued Components (completed)

Category	Project Components and Activities	Forestry	Agriculture	Recreational Land Use	Navigable Waters	Water Licences	Recreational Water Use	Private Land
Closure *(cont'd)*								
Tailings management *(cont'd)*	Maintenance and monitoring of the TMF							
	Storage of water in the TMF and groundwater seepage							
	Sub-aqueous tailing and waste rock storage in the TMF							
	TMF discharge to T Creek		X					
Waste disposal	Solid waste management							
Post-Closure								
Environmental management and monitoring	Environmental monitoring including surface water and groundwater monitoring							
	Monitoring and maintenance of mine drainage, seepage, and discharge							
	Reclamation monitoring and maintenance							
Open pit	Construction of emergency spillway on open pit							
	Storage of water as a pit lake							
Procurement and labour	Procurement of goods and services							
Stockpiles	Storage of waste rock in non-PAG waste rock stockpile							
Tailings management	Storage of water in the TMF and groundwater seepage							
	Sub-aqueous tailing and waste rock storage in the TMF							
	TMF discharge		X					

Note: a column is marked with an X when it has been determined that the Project component or activity could potentially interact with the VC.

Table 18.3-3. Valued Components Selected for Assessment

Assessment Category	Subject Area	Valued Components	Components
Socio-economic	Land Use	Private land	
		Commercial interests	Forestry Agriculture Trapping
		Public use	
		Navigable waters	

Navigable waters is included as a VC due to the potential for effects on public and Aboriginal access to navigable waters.

Public use is included as a VC as the public use FSRs that will be used by the Project to access areas for recreation.

Private land is also included as a VC as Project components and activities have the potential to interact with private land.

18.3.1.4 Valued Components Excluded from Assessment

Several commercial interests are excluded from the assessment because there is no interaction with Project components and activities. There are no guide outfitter licences in the LSA or RSA so impacts on these tenures are not included in the assessment (see Section 18.4.3.10). No mineral tenures held by other parties interact with Project components and activities so they are not included in the assessment (18.4.3.2).

Effects on resident hunting are not assessed as the LSA overlaps a small area of three Wildlife Management Units (see Section 18.4.3.11). Effects on recreational fishing are not assessed as no recreational fishing has been identified in the LSA (see Section 18.4.3.13).

The chapter focuses on the potential effects to tenures held by third parties, private land, navigable water, and public or recreational use. Potential effects on domestic wells are assessed in Chapter 21, Human Health Effects Assessment, and potential effects of Project traffic on private land are assessed in Chapter 17, Socio-economic Effects Assessment.

18.3.2 Defining Assessment Boundaries

Assessment boundaries define the maximum limit within which the effects assessment and supporting studies (e.g., predictive models) are conducted. Boundaries encompass the areas within, and times during which, the Project is expected to interact with the VCs, as well as any constraints due to political, social, and economic realities, and limitations in predicting or measuring changes. Boundaries relevant to land use are described below.

18.3.2.1 Temporal Boundaries

Temporal boundaries are the time periods considered in the assessment for various project phases and activities, and are shown in Table 18.3-4. Temporal boundaries reflect those periods during which planned Project activities are reasonably expected to potentially affect a VC. Potential effects will be considered for each phase of the Project as described in Table 18.3-4.

Table 18.3-4. Temporal Boundaries used in the Land Use Effects Assessment

Phase	Project Year	Length of Phase	Description of Activities
Construction	-2 and -1	2 years	Pre-construction and construction activities
Operations 1	1 - 23	23 years	Active mining in the open pit from Year 1 through to Year 23
Operations 2	24 - 28	5 years	Low-grade ore processing from the end of active mining through to the end of Year 28
Closure	29 – 35	7 years	Active closure and reclamation activities while the open pit and TMF are filling
Post-Closure	36 onwards	50 years	Steady-state long-term closure condition following active reclamation, with ongoing discharge from the TMF and monitoring

18.3.2.2 Spatial Boundaries

Land use is characterized within three study areas: the Project Site, a local study area (LSA) and a regional study area (RSA). Each of these is described below.

Project Site

The Project Site consists of the mine site with a defined buffer of 500 metres (m) around the primary Project components and also includes linear facilities (e.g., the power line options and the rail-load out facility) as shown in Figure 18.3-1. Mine site components include the open pit; the open pit haul road, primary crusher, and ore conveyor; mill plant site with ore processing facilities and intake/outtake pipelines; TMF; overburden, topsoil, PAG waste rock, and non-PAG waste rock stockpiles; and non-PAG and PAG low-grade ore stockpiles.

Local Study Area

The LSA is defined as the Project footprint (mine site and infrastructure) and surrounding area within which there is a reasonable potential for immediate direct and indirect effects on land use due to an interaction with Project components or activities. The land use LSA (Figure 18.3-1) includes:

- the Project Site, which includes the mine pit, tailings management facility, waste rock piles and ancillary buildings;
- the Project access road (Vavenby Mountain FSR), with a 500-m buffer on either side of the centre line; and

- the two power line route options from Vavenby to the Project Site, with a 500-m buffer on either side of the centre line.

Regional Study Area

The land use RSA is the spatial area within which there is potential for direct and indirect interaction and/or cumulative effects to occur. The RSA, shown in Figure 18.3-1, includes areas south of the North Thompson River, west of the Upper Adams River, and east and south of Highway 5. The selection of the RSA took into account the surface water quality, human health, noise, and visual quality RSAs, by considering the surface water quality model nodes located on irrigation creeks and navigable waters, human health receptors, noise receptors and maximum distance at which a land user could see the Project, respectively.

18.3.2.3 Administrative and Technical Boundaries

No administrative boundaries apply to the land use effects assessment.

18.4 BASELINE CONDITIONS

This section provides an overview of commercial and non-commercial land use in the LSA and RSA.

18.4.1 Regional and Historical Setting

The Project is located at the headwaters of Harper Creek approximately 150 km northeast by road from Kamloops, BC. The closest population centre is the unincorporated municipality of Vavenby located about 10 km northeast of the ore body. Highway 5, the Canadian National Railway transcontinental mainline, and BC Hydro high-voltage transmission lines follow the North Thompson River Valley corridor through Vavenby.

Commercial land use in the region has largely focused on resource development, including forestry, agriculture, and mining. Other commercial land uses in the region include ranching and trapping. Public or non-commercial use includes hunting, hiking, snowmobiling, all-terrain vehicle (ATV) riding, boating, and skiing.

Table 18.4-1 provides an overview of designated land, Crown-granted tenures, and land use in the LSA and RSA.

18.4.2 Baseline Studies

18.4.2.1 Information Sources and Methods

Baseline data were collected by Laurie McNeil and Associates in 2012. Additional information was collected from secondary and primary sources in May and June 2014, including updating third-party tenure information within the LSA and RSA (see Table 18.4-2). Phone interviews were conducted with key land users to supplement information collected in 2012. Information related to navigable waters was obtained from the Hydrology Effects Assessment (Chapter 12), Fish and Aquatic Resources Effects Assessment (Chapter 14), and the Traditional Land Use and Ecological Knowledge Study prepared by the Simpcw First Nation (August 30, 2012; Appendix 22-A).

Figure 18.3-1

Land Use Local and Regional Study Areas

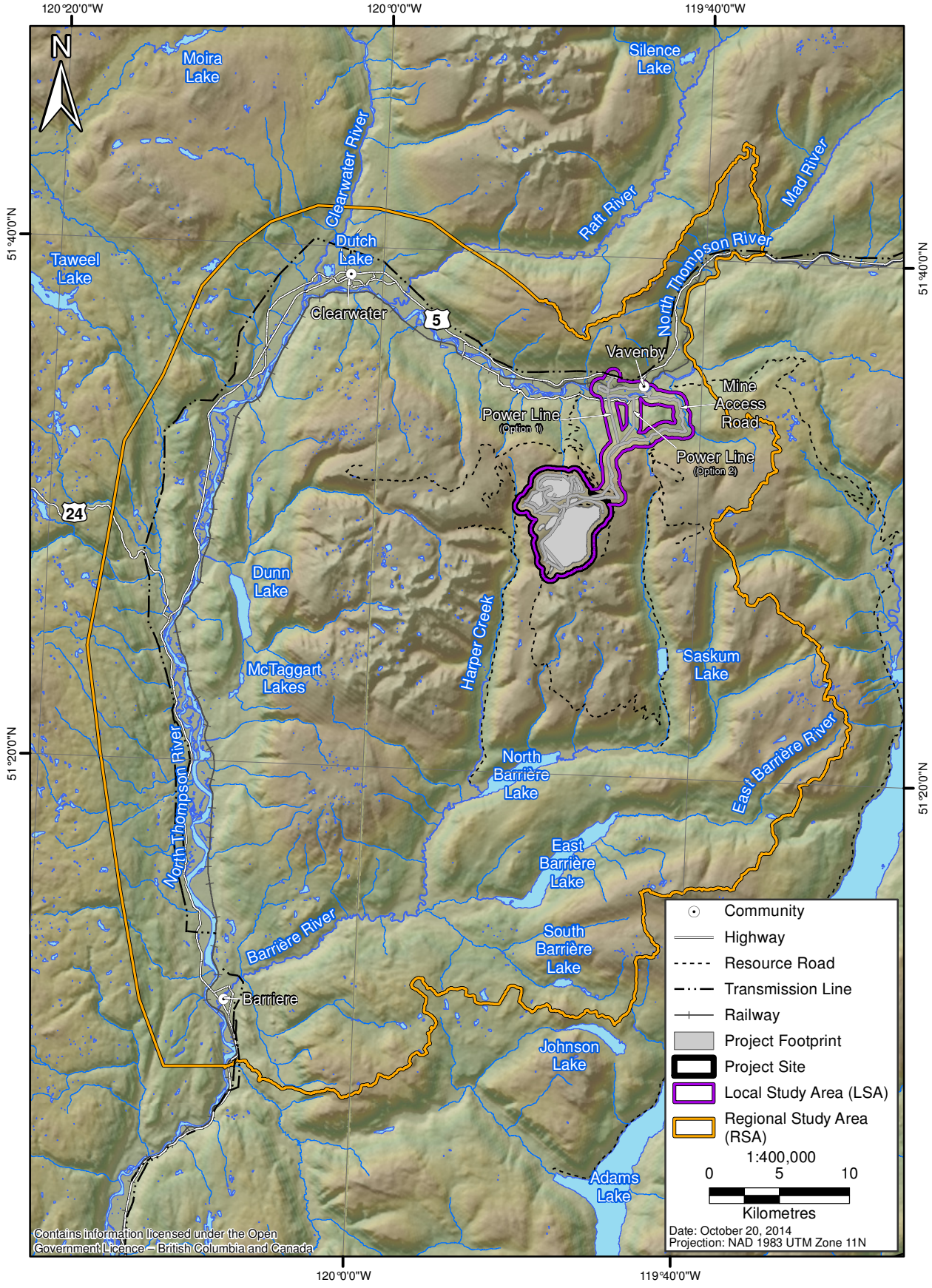


Table 18.4-1. Summary of Land Use in the Local and Regional Study Areas

Designated Land, Crown Tenures, and Land Use	Description
Mineral exploration and mining	There are no mineral tenures within the LSA held by parties other than HCMC. In the RSA, there are a total of 430 mineral claims, 11 placer claims and 8 mining leases.
Utilities	There is one hydroelectric power line statutory right-of-way (or easement) and one telecommunication line right-of-way within the LSA.
Oil and gas	There are six statutory rights-of-way (or easements) for pipelines in the RSA. Two of these are located in the LSA at Vavenby.
Forestry	The RSA falls within the Kamloops Timber Supply Area. There are active cut block tenures in the LSA, held by seven different entities. One cutblock overlaps the Project Site.
Agriculture	There are 41 Agricultural Land Reserves (ALR) within the RSA covering 13,064.1 ha, four of which (242.9 ha) overlap the LSA. Three range tenures overlap the LSA, 25 range tenures overlap the RSA.
Water licences	There are 947 water licences in the RSA and 26 in the LSA. There are five registered water intake extraction points within the LSA and 554 in the RSA
Navigable waters	Of the eight watercourses that will potentially interact with the Project; Harper Creek and North Thompson River are considered navigable based on historic and current use.
Parks and protected areas	The RSA overlaps portions of five provincial parks and one Protected Area.
Recreation (Commercial/Public)	There are four commercial recreation tenures within portions of the RSA. There is one ski hill tenure located in the RSA, south of Clearwater. There are six BC recreation sites and seven lakes within the RSA that are commonly used for public recreation. There are 262 BC recreation trails in the RSA for public use: 25% are horse riding trails, 21% ski trails, and 17% snowmobile trails. There are eight recreational-residential leases within the RSA, located on Crown land on North and East Barrière Lakes, as well as on Dutch Lake near Clearwater.
Hunting	The LSA overlaps three wildlife management units (WMUs): 3-40 (0.3%), 3-41 (4%) and 3-38 (1.7%). The RSA overlaps an additional five WMUs. Resident hunting focuses on mule and white-tailed deer, and moose. There are no guide outfitting tenures within the RSA or LSA.
Trapping	There are five trapline tenures overlapping the LSA (three of these overlap the Project Site), and an additional 11 are located within the RSA. Trapped species are primarily marten and weasel, as well as squirrel and beaver.

Table 18.4-2. Information Sources Reviewed

Source	Database or Reference
Province of BC	Data Distribution Service http://apps.gov.bc.ca/pub/dwds/home.so Mineral Tenures Online BC https://www.mtonline.gov.bc.ca/mtov/home.do
BC Integrated Land Management Bureau (BC ILMB - now BC MFLNRO)	Integrated Land and Resource Registry https://apps.gov.bc.ca/apps/ilrr/html/ILRRWelcome.html
BC MOE	Guide Outfitters in British Columbia http://www.env.gov.bc.ca/fw/wildlife/hunting/non_resident/docs/guide_outfitters.pdf Water licences query http://a100.gov.bc.ca/pub/wtrwhse/water_licences.input
BC MFLNRO	Kamloops Timber Supply Area (TSA) http://www.for.gov.bc.ca/hts/tsa/tsa11/ Crown Land Tenures – Tantalis http://www.for.gov.bc.ca/pScripts/isb/idd/isddmain.asp Recreational Sites and Trails BC http://www.sitesandtrailsbc.ca/default.aspx
BC Parks (also part of BC MOE)	Recreation – Park Finder http://www.env.gov.bc.ca/bcparks/explore/

Data Limitations

Data provided in this chapter are subject to the following limitations.

- Tenure, licence and permit information is generally current as of 2014 and is subject to change.
- In terms of resident hunting, data are reported by Wildlife Management Unit (WMU), and it is not possible to determine the level or location of hunting in the LSA or RSA. Interviews with local stakeholders confirmed that recreational hunting occurs within the RSA, but there is a lack of information to determine hunting areas.
- The number of forestry cutblocks is difficult to quantify as the time between the application and harvest date occurs within a short time frame. In addition, data and maps do not include or show forestry cutblocks from past harvesting activities within the Project Site.

18.4.3 Existing Conditions

This section describes the existing baseline commercial and non-commercial land use conditions within the LSA and RSA.

18.4.3.1 Kamloops Land and Resource Management Plan

The Kamloops LRMP is organized into RMZs, which are described in Table 18.4-3.

Table 18.4-3. Summary of Resource Management Zones and Related Management Objectives in the Local Study and Regional Study Area

Type of RMZ	Management Objectives	LSA	RSA
General	The General RMZs provide policy for the management of any Crown land and resources not covered by the other RMZ's mentioned above, and also include objectives and strategies that apply to all resource management zones. In addition to the policies set out in General RMZs, the Kamloops LRMP also includes objectives and strategies that are specific to each of the other RMZs.	Y	Y
Settlement	Settlement RMZs apply to settlement use of Crown lands, primarily managed by local governments under the Local Government Act (1996e). The principal uses of these areas are residential, commercial, industrial, agricultural, and institutional.	N	N
Protection	Protection RMZs are areas that have been identified for their natural, cultural, heritage and recreational values. The objective of Protection RMZs is to protect viable, representative examples of BC's natural diversity and recreational opportunities, and to protect special natural, cultural, heritage and recreational features. Logging, mining and energy exploration and developments are not allowed within Protection RMZ boundaries, but may occur in areas adjacent to Protection RMZs. The Dunn Peak Protection RMZ overlaps a portion of the RSA, located approximately between the community of Little Fort and Harper Creek.	N	N
Special Feature Protection	As well as larger areas, the Kamloops LRMP also protects smaller areas with unique, rare or scarce features. The primary objective for these Special Feature Protection RMZs is protection and preservation. There are no Special Feature Protection RMZs in the RSA.	N	N
Community Watersheds	Community Watershed RMZs are focused on conserving water quality and quantity and time of flow within the Kamloops LRMP. Portions of Community Watershed RMZ W11 – McDougall Creek and W17 – Russell Creek fall within the western edge of the RSA, however no Community Watershed RMZs are located within the LSA.	N	N
Habitat and Wildlife Management Areas RMZs	The primary goal of Habitat/Wildlife Management Area RMZs is to ensure the long-term viability of regionally or provincially significant wildlife habitat.	N	N
Recreation and Tourism	Recreation and Tourism RMZs include areas that have been identified for their significant recreational and tourism potential. The RMZs primary objectives are to maintain and enhance a diverse range of recreational values and uses across the Kamloops LRMP, and maintain and enhance tourism opportunities. Areas categorized as recreation and tourism RMZs within the Kamloops LRMP include: higher use, natural environment, backcountry, and remote areas. No Recreation and Tourism RMZ is located within the LSA or RSA.	N	N

N - No RMZ in the LSA or RSA; Y - Yes, the RMZ is in the LSA or RSA

18.4.3.2 Private Land

Private land in the RSA and LSA is identified in Figures 18.4-1 and 18.4-2. Appendix 18-A lists the District Lots in the LSA as well as the lot size in hectares. Private land in the RSA lies along either side of Highway 5, and the North Thompson and Barrière rivers. Private land in the LSA includes several large agricultural properties as described in Table 18.4-4.

Table 18.4-4. Agricultural Properties in the Local Study Area

Name of Property	Description
Aveley Sheep Ranch	This ranch is located to the southwest of Vavenby on Lost Creek Rd approximately 9 km northeast of the LSA. It operates as a sheep ranch, agri-tourism business, and a bed and breakfast. It also sells hay and lamb. It is open for trail rides and hikes between May and November.
The Mitchell Cattle Co.	The Mitchell ranch is 1 km north of Barriere, and has range tenures within the LSA. The ranch specializes in raising cattle, with cows spending the winters in the North Thompson Valley and in the surrounding mountain pastures up to 7,400 ft. in elevation during the summer. The ranch has developed a niche market for its alpine-raised beef.
Shook Ranch/Vavenby Trail Rides	This cattle ranch is located in the community of Vavenby and includes agri-tourism, bed and breakfast and horseback riding, catering up to 700 to 800 tourists a year. The ranch caters up to 10 visitors per day in July, August, and September.

Source: HCMC (2013)

18.4.3.3 Mineral Exploration and Mining

There are no mineral tenures held by parties other than YMI within the LSA (Figure 18.4-3). In the RSA, there are a total of 430 mineral claims, 11 placer claims, and 8 mining leases as of May 20, 2014 (Appendix 18-B).

18.4.3.4 Utilities

Within the LSA, there is one hydroelectric power line statutory right-of-way (or easement) and one telecommunication line right-of-way, located at Vavenby on Crown land (BC MFLNRO 2014a; Figure 18.4-4).

18.4.3.5 Natural Gas Pipelines

Within the RSA, there are six statutory rights-of-way (or easements) for pipelines on Crown land, located at Birch Island, west of Chu Chua, on the North Thompson River, and at Vavenby (BC MFLNRO 2014a). Two of the statutory rights of way are located within the LSA at Vavenby (Figure 18.4-4).

Figure 18.4-1

Private Land in the Regional Study Area

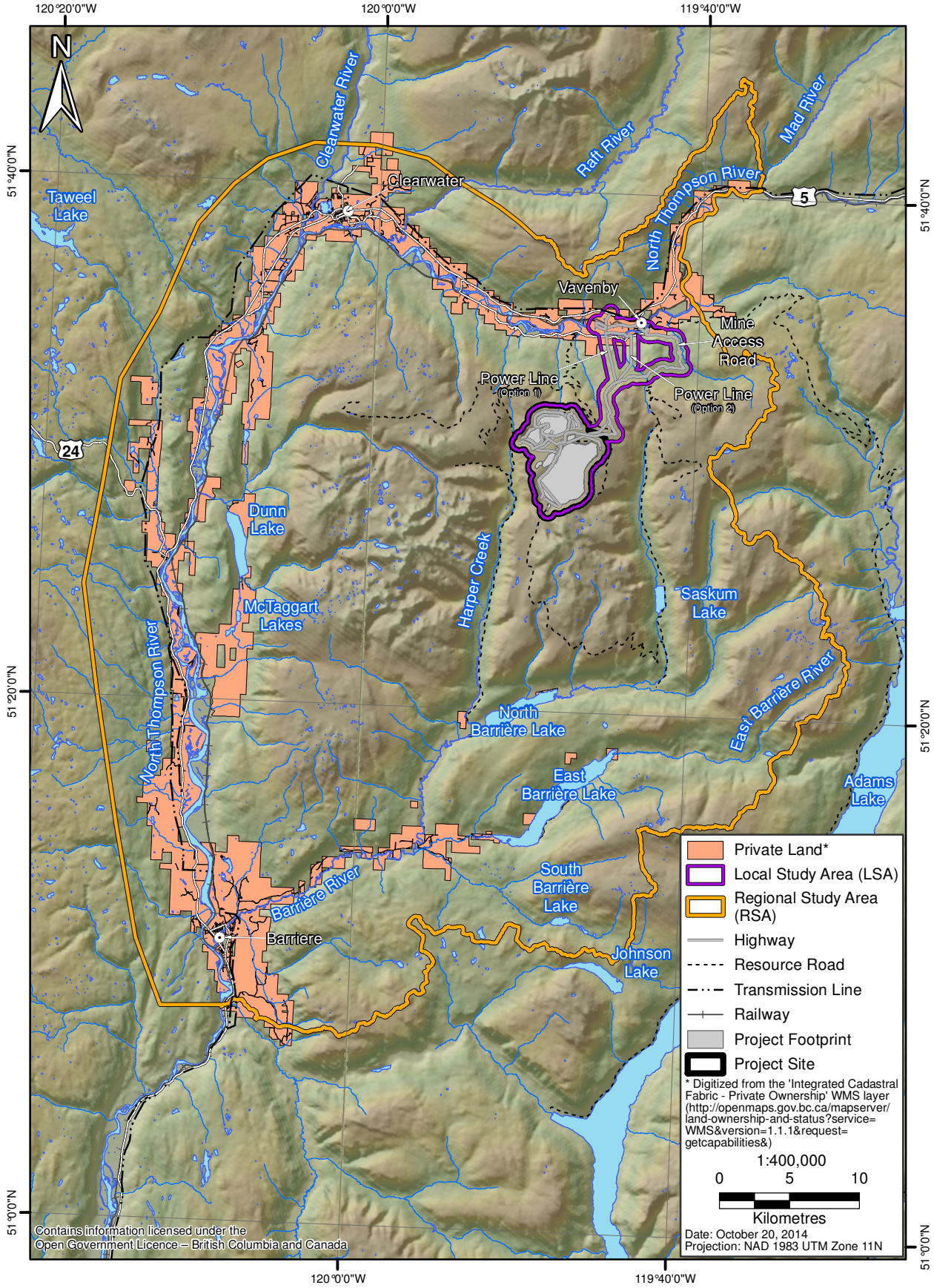


Figure 18.4-2

Location of Private Land, Agricultural Land Reserves and Woodlots in the Local Study Area

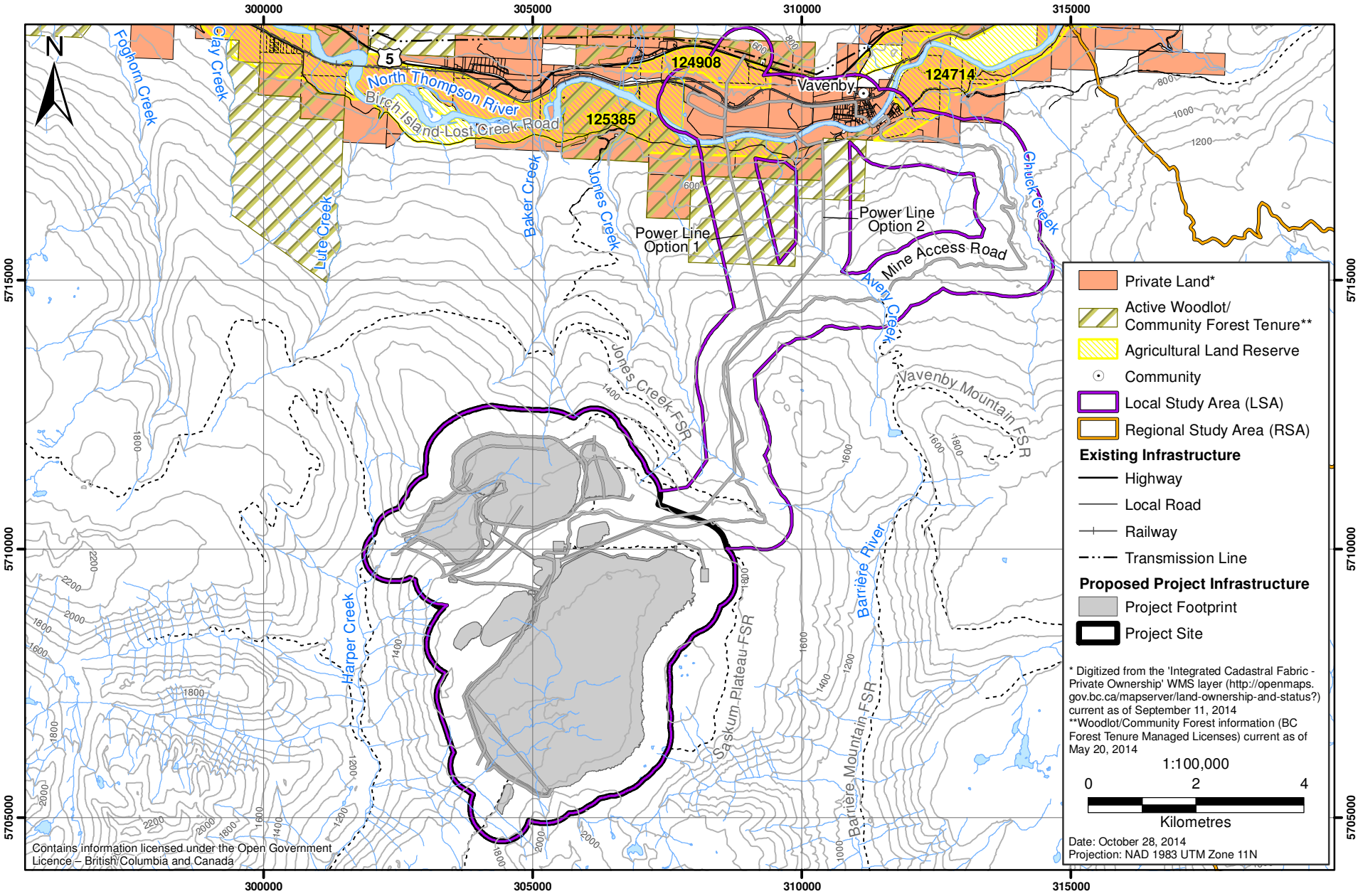


Figure 18.4-3

Mineral Tenures in the Local Study Area

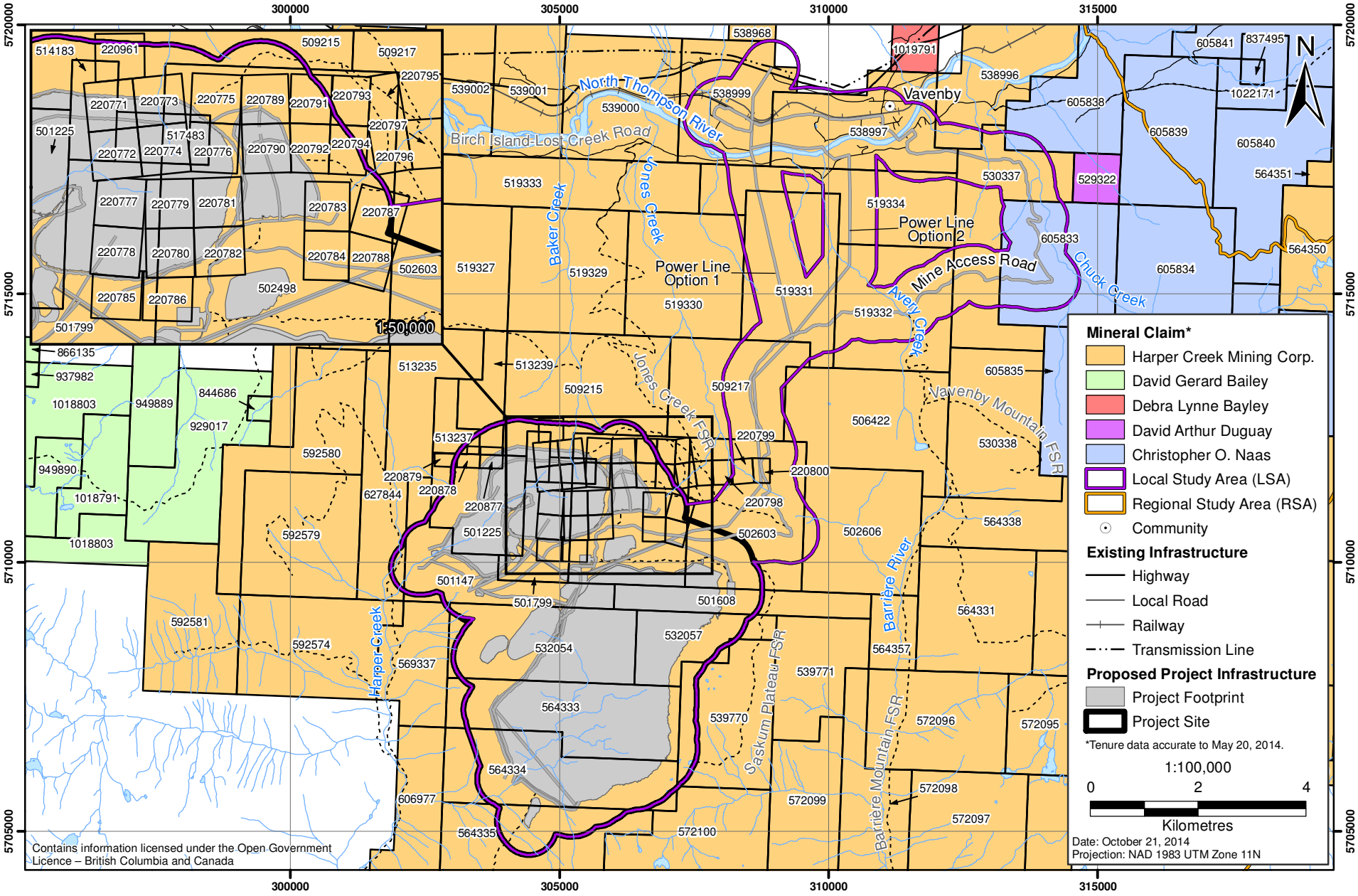
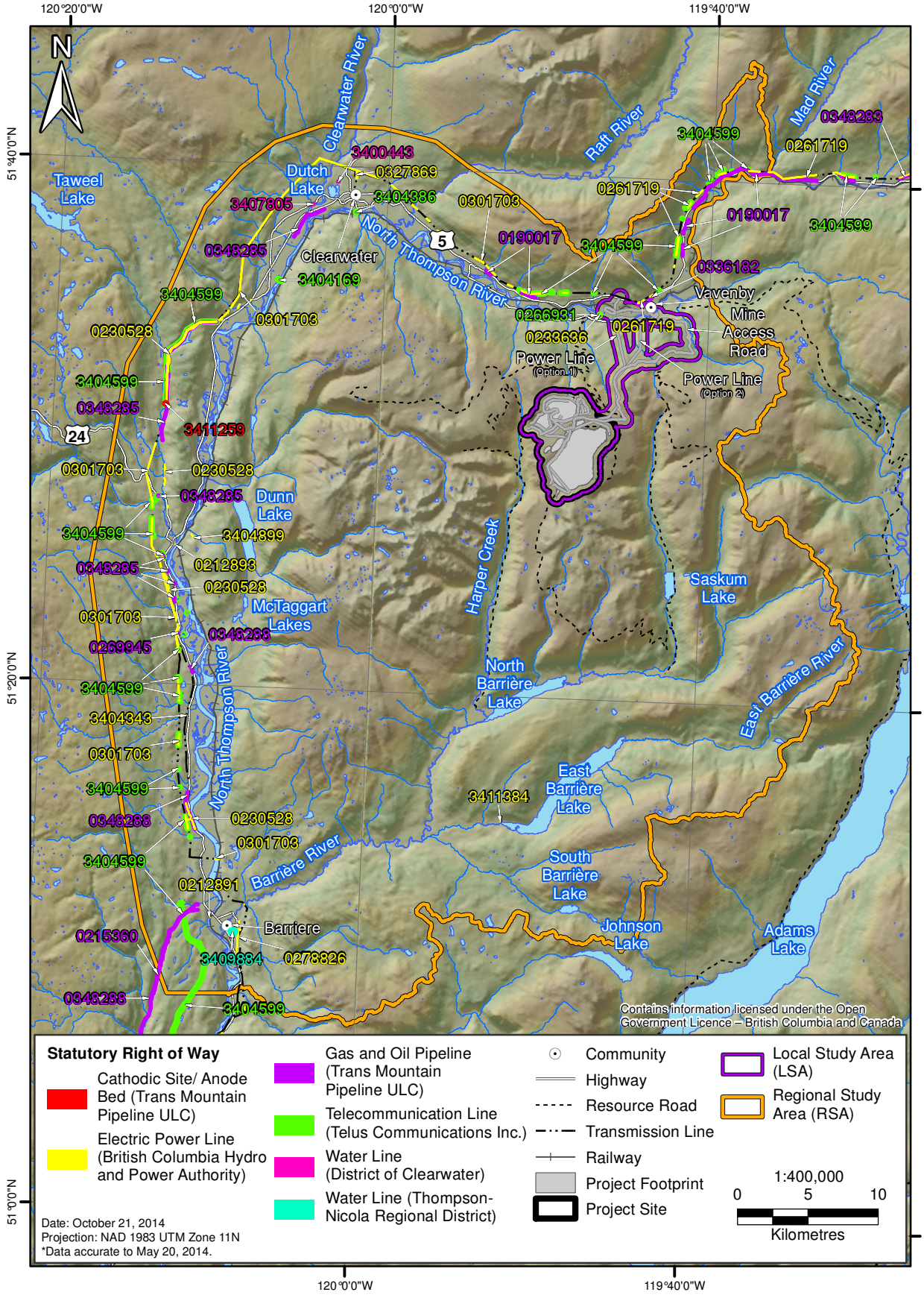


Figure 18.4-4

Statutory Right of Ways in the Regional Study Area



18.4.3.6 Forestry

The LSA and RSA are located in Blocks 1 and 3 of the Kamloops TSA within the Kamloops Forest District. The Kamloops TSA covers approximately 2.77 million ha of land in south-central BC, composed of 30% pine, 33% Douglas fir, 18% spruce, and 9% true fir forests (as of June 11, 2012; BC MOF 2012). The forestry industry is active within the LSA and RSA (see cutblocks identified in Figure 18.4-5), although forest activity in the RSA has generally declined over the past decade (HCMC 2013). Forest operations active within the RSA include Canfor South-Vavenby, Interfor, and West Fraser Mills. Figure 18.4-6 identifies cutblocks in the LSA. There are no active forest cutblock licences within the LSA, however the LSA has been heavily harvested in the past and there are numerous cutblocks located throughout the RSA. There are no cutblock licence applications pending within the RSA. There is current harvesting, and the area, including the Project Site, has been heavily harvested in the past.

The current allowable annual cut (AAC) for the Kamloops TSA is 4,000,000 m^3, effective June 1, 2008. This AAC remains in effect until a new AAC is determined, which must take place within 10 years of this determination, unless postponed in accordance with section 8(3.1) of the 1996 BC *Forest Act* (BC MFLNRO 2013b). Figure 18.4-2 identifies woodlots within the LSA. Woodlots are located on private and Crown land.

Forestry Operations

Softwood timber including spruce, fir, pine, and cedar are predominant forest resources in the North Thompson Valley. Currently three logging contractors based in Clearwater operate 12 to 14 logging trucks. The Canfor Mill is located in Vavenby. It was shut down in July 2009 to undergo a $27-million upgrade. The mill re-opened in September 2011, fitted to handle spruce-pine-fir. Additional operational capacity began in January 2012.

At the time of writing of the Application/EIS, there were 12 active cutblock tenures in the LSA, held by seven different entities. Tenure A18688-J191 transects the Project Site. The remaining cutblocks transect access roads and the two power line route options in the LSA. All cutblocks are accessed along existing FSRs, some of which will be used by the Project (see Figure 18.4-6).

Community Forests

Portions of two community forests are located within the RSA (see Figure 18.4-5), which are managed by the Wells Gray Community Forest Corporation and Lower North Thompson Community Forest Society.

The Wells Gray Community Forest (Tenure #K2A) is comprised of three blocks located to the south, north, and west of Clearwater, and is within the western boundaries of the RSA (BCCFA 2012). This community forest has an AAC of 20,000 m^3; however, the BC Government approved a temporary increase in the AAC to salvage beetle-killed pine. The Wells Gray Community Forest licence is managed by volunteers and harvesting is undertaken by a logging contractor with 11 employees. The Wells Gray Community Forest Corporation distributes its profits back to the District of Clearwater.

Figure 18.4-5

Forestry Interests in the Regional Study Area

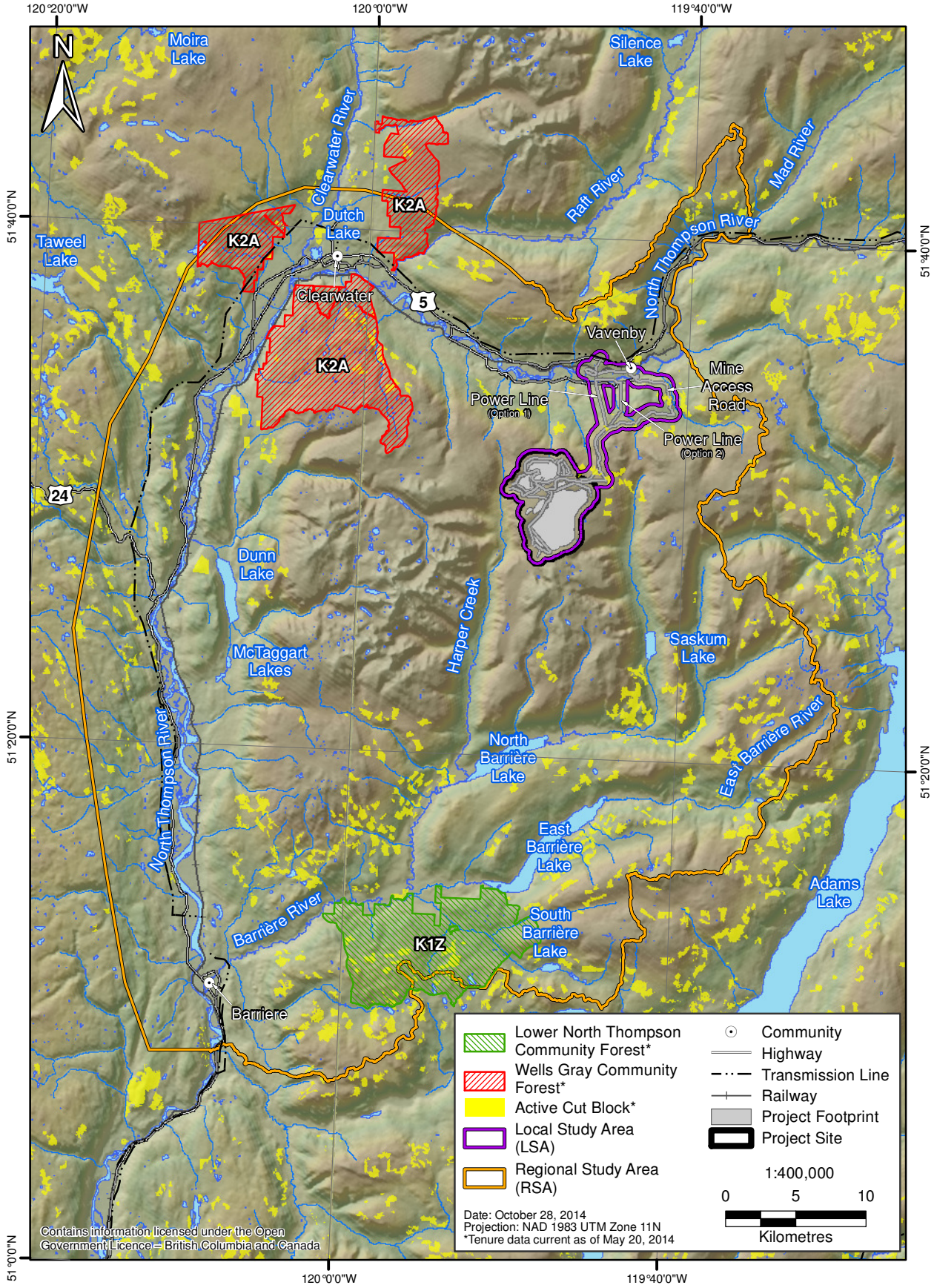
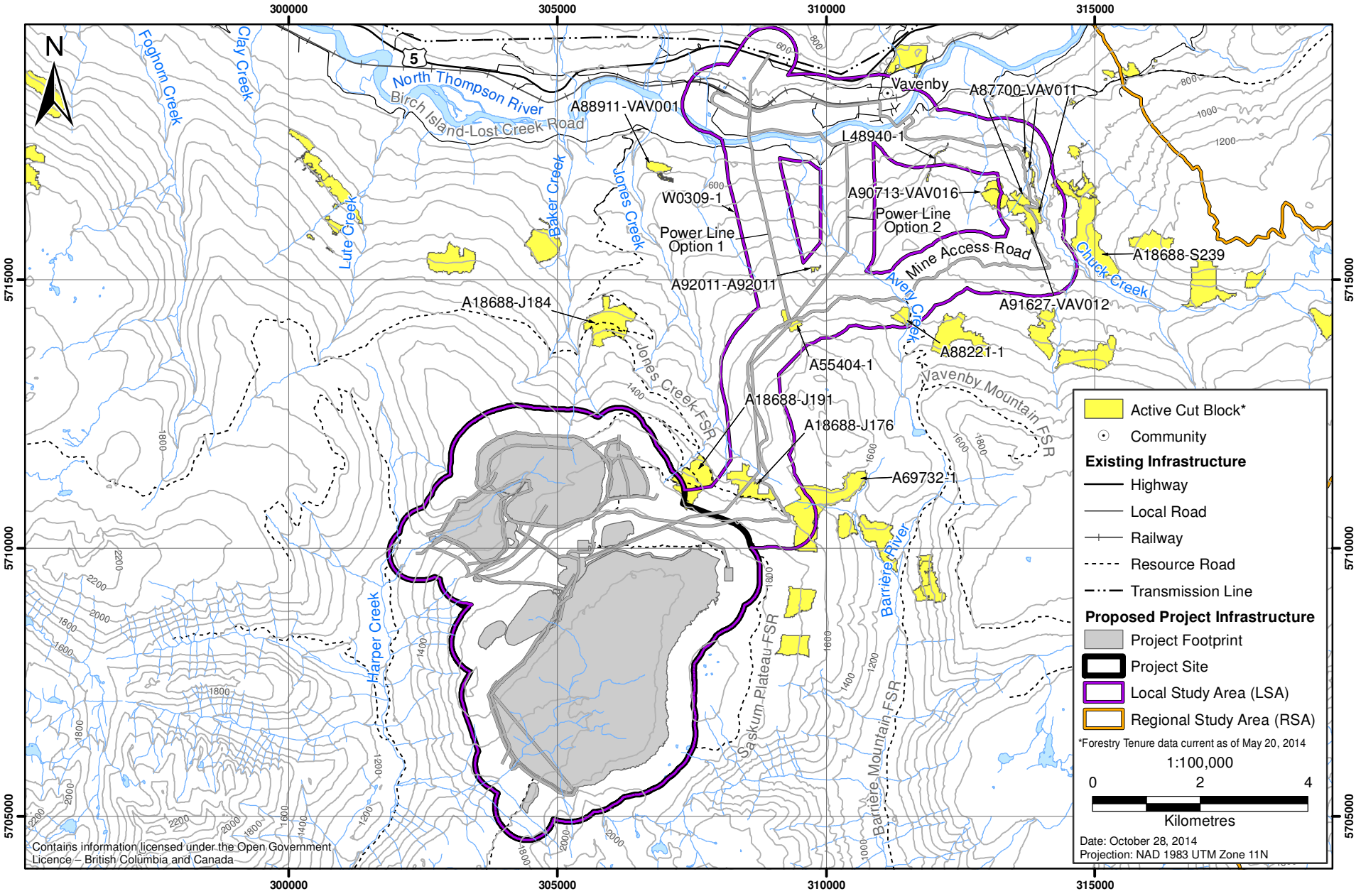


Figure 18.4-6

Forestry Interests in the Local Study Area



The Lower North Thompson Community Forest (Tenure #K1Z) is located in the southern portion of the RSA. The community forest has a short-term AAC of 24,530 m^3 and a long-term AAC of 19,000 m^3 (Bondar Forest Planning Inc. 2006).

18.4.3.7 Agricultural Land Reserves and Range Tenures

Agricultural Land Reserves

Within the RSA, there are 41 Agricultural Land Reserves (ALRs) covering 13,064.1 ha (see Figure 18.4-7). Portions of four ALRs (242.9 ha in total; see shaded lines in Table 18.4-5) are within the LSA (Figure 18.4-8).

Range Tenures

Range tenures (grazing and hay cutting licences and permits) are administered by the British Columbia Ministry of Forests, Lands and Resource Operations (BC MFLNRO). A range tenure allows the tenure holder to access a defined amount of forage for grazing (measured in animal unit months [AUMs]) or hay (tonnage; Government of BC 2014). These tenures are typically associated with ranches.

A total of 25 range tenures overlap the RSA and three of these overlap the LSA, as shown in Figures 18.4-9 and 18.4-10, and Table 18.4-6. The Project Site overlaps one range unit, the Harp Mountain Range Unit, which is administered by BC MFLNRO. In this unit, there is one tenure (RAN077435), which takes up approximately 87% of the unit. It covers the Project Site (6.7% falls in the LSA). The Harp Mountain Range Use Plan provides for the use of 988 AUMs for cattle grazing by the tenure holder of RAN077435 (Mitchell Cattle Co. Ltd. 2014). The rest of the unit, which lies to the west of Harper Creek, is currently untenured.

18.4.3.8 Water Licences

The BC MFLNRO issues water licences pursuant to the *Water Act* (1996j). Water licences cover specific surface water uses, including irrigation, domestic use, land improvement, and power generation. There are 947 water licences in the RSA (see Figure 18.4-11) and 26 in the LSA (see Figure 18.4-12; Table 18.4-7). Within the LSA, water licences are held by 15 different entities for domestic, irrigation, stock watering, work camp, fire, and water works purposes. For the purposes of this chapter, data specific to Jones, Baker, Avery, and Harper creeks were reviewed. There are 10 water licences (for domestic and irrigation purposes) on these creeks, except for Harper Creek, which has no water licences (see Figure 18.4-11). Of the 10 licences, 6 are held by two ranches.

18.4.3.9 Parks and Protected Areas

No parks or protected areas overlap the LSA. Within the RSA, there are five provincial parks, including the southern tip of Wells Gray Provincial Park, North Thompson River Park, Dunn Peak Protected Area, Eakin Creek Canyon Park, North Thompson Islands Park, and Chu Chua Cottonwood Park (Figure 18.4-13). The parks are managed by BC Parks, and are used for non-commercial, public recreation. These parks include a variety of public recreation facilities (i.e., campsites) and activities such as fishing, canoeing, hiking, and cycling.

Figure 18.4-7

Agricultural Land Reserves in the Regional Study Area

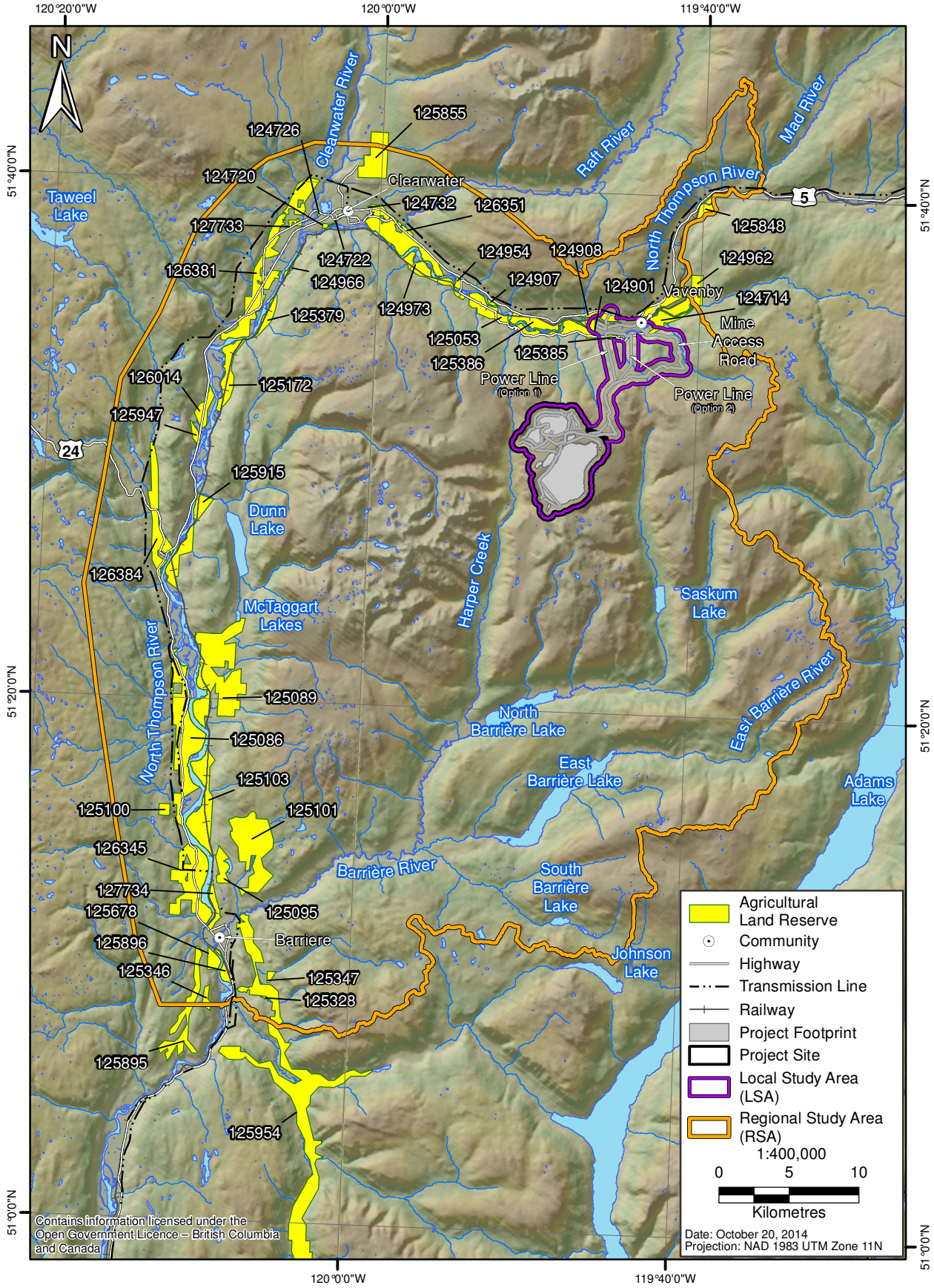


Table 18.4-5. Agricultural Land Reserves in the Local and Regional Study Areas

ALR Parcel ID No.	Within the LSA	Within the RSA	Total Area (ha)
124714	X	X	571.4
124720		X	14.5
124722		X	1.3
124726		X	6.9
124732		X	2.0
124901	X	X	53.2
124907		X	15.3
124908	X	X	109.5
124954		X	30.6
124962		X	124.1
124966		X	39.0
124973		X	265.0
125053		X	269.9
125086		X	1,287.2
125089		X	1,606.5
125095		X	173.0
125100		X	62.8
125101		X	1,081.4
125103		X	701.0
125172		X	351.3
125328		X	7.1
125346		X	66.8
125347		X	32.3
125379		X	156.9
125385	X	X	308.9
125386		X	200.6
125678		X	108.5
125848		X	120.0
125855		X	504.2
125895		X	526.5
125896		X	89.3
125915		X	445.1
125947		X	56.4
125954		X	4,285.8
126014		X	175.5
126345		X	937.7
126351		X	711.1
126381		X	1,138.0
126384		X	599.1
127733		X	38.8
127734		X	141.3

Source: Government of BC (2014)

Figure 18.4-8

Agricultural Land Reserves in the Local Study Area

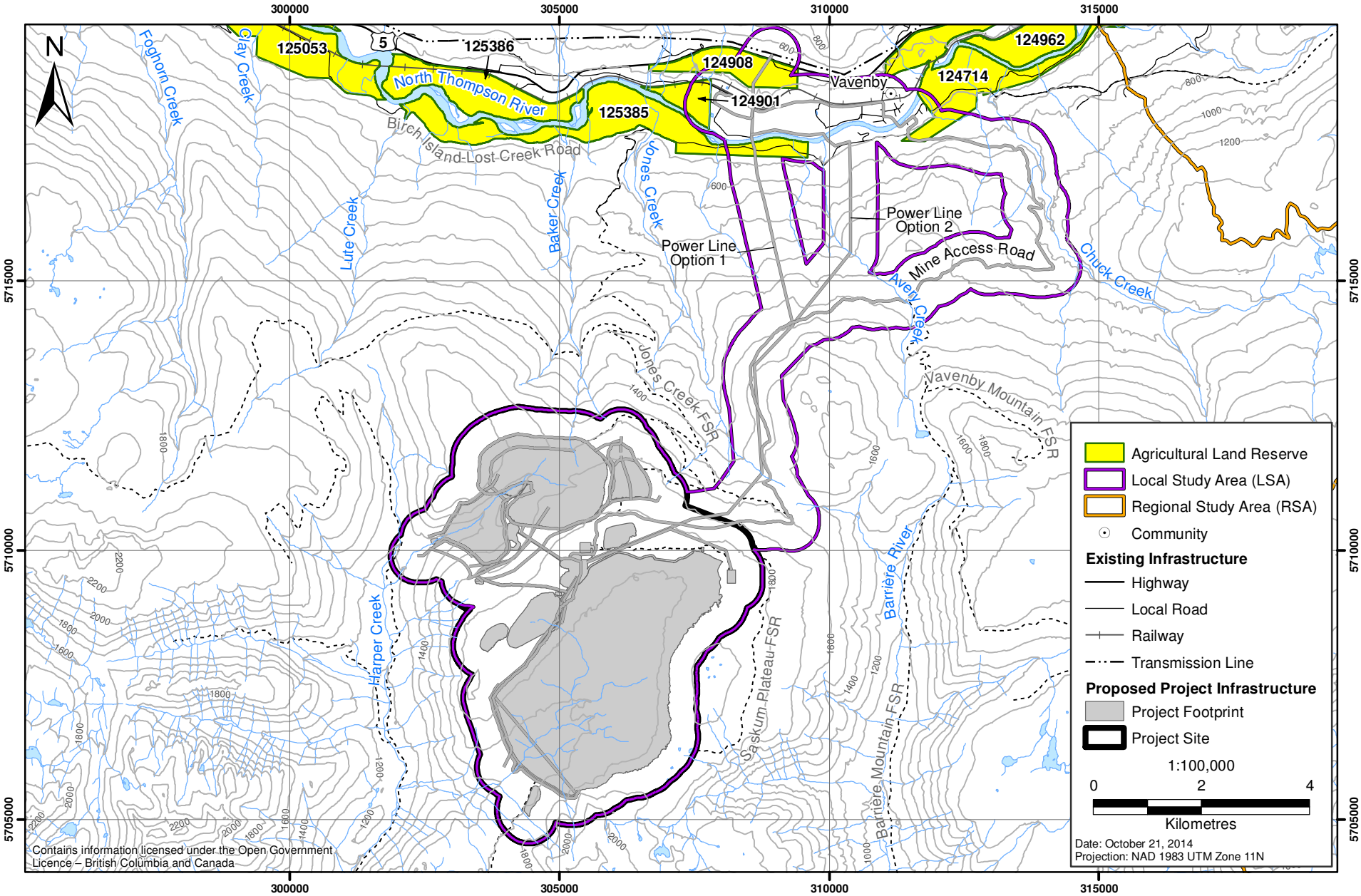


Figure 18.4-9

Range Tenures in the Regional Study Area

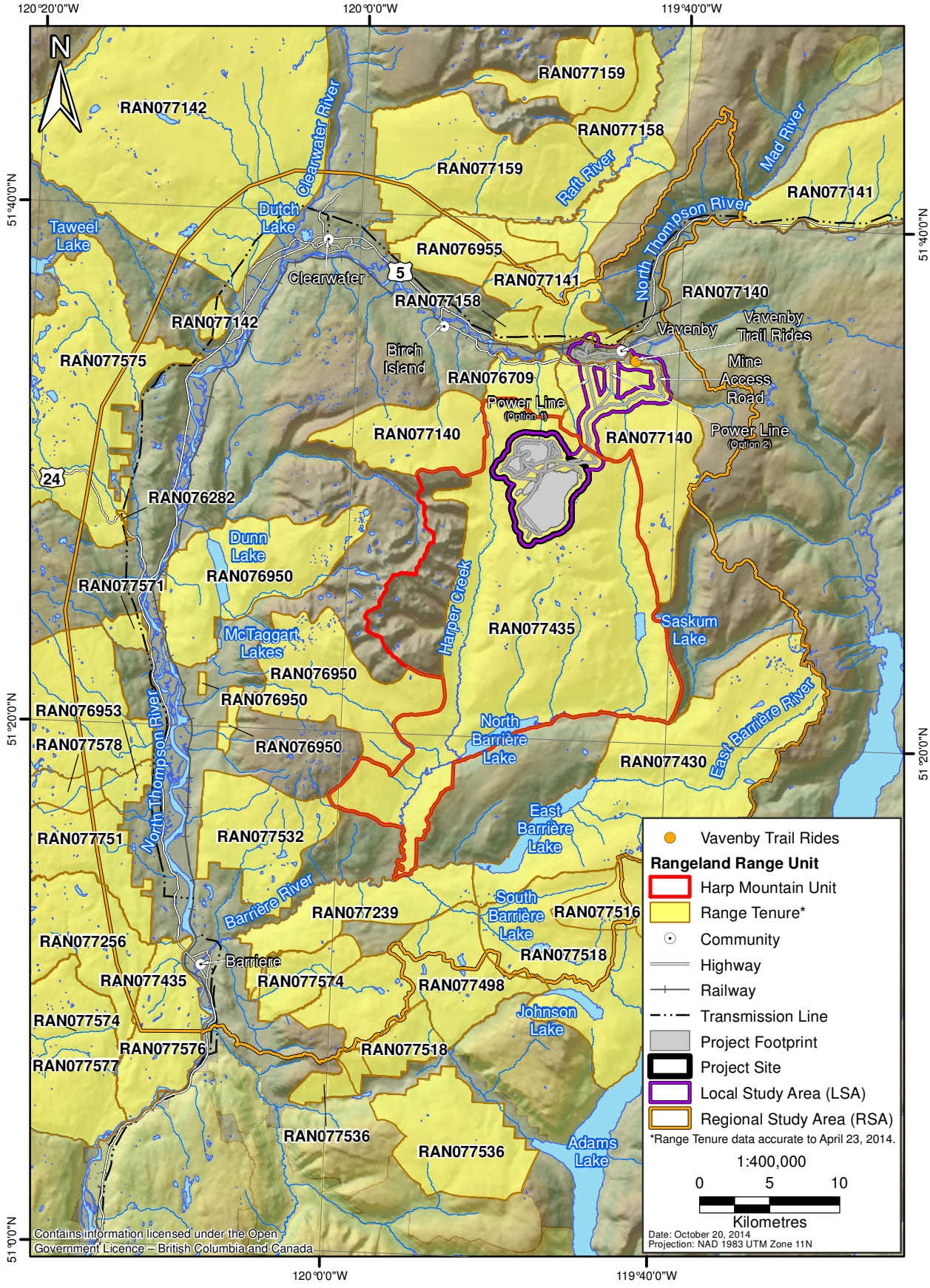


Figure 18.4-10

Range Tenures in the Local Study Area

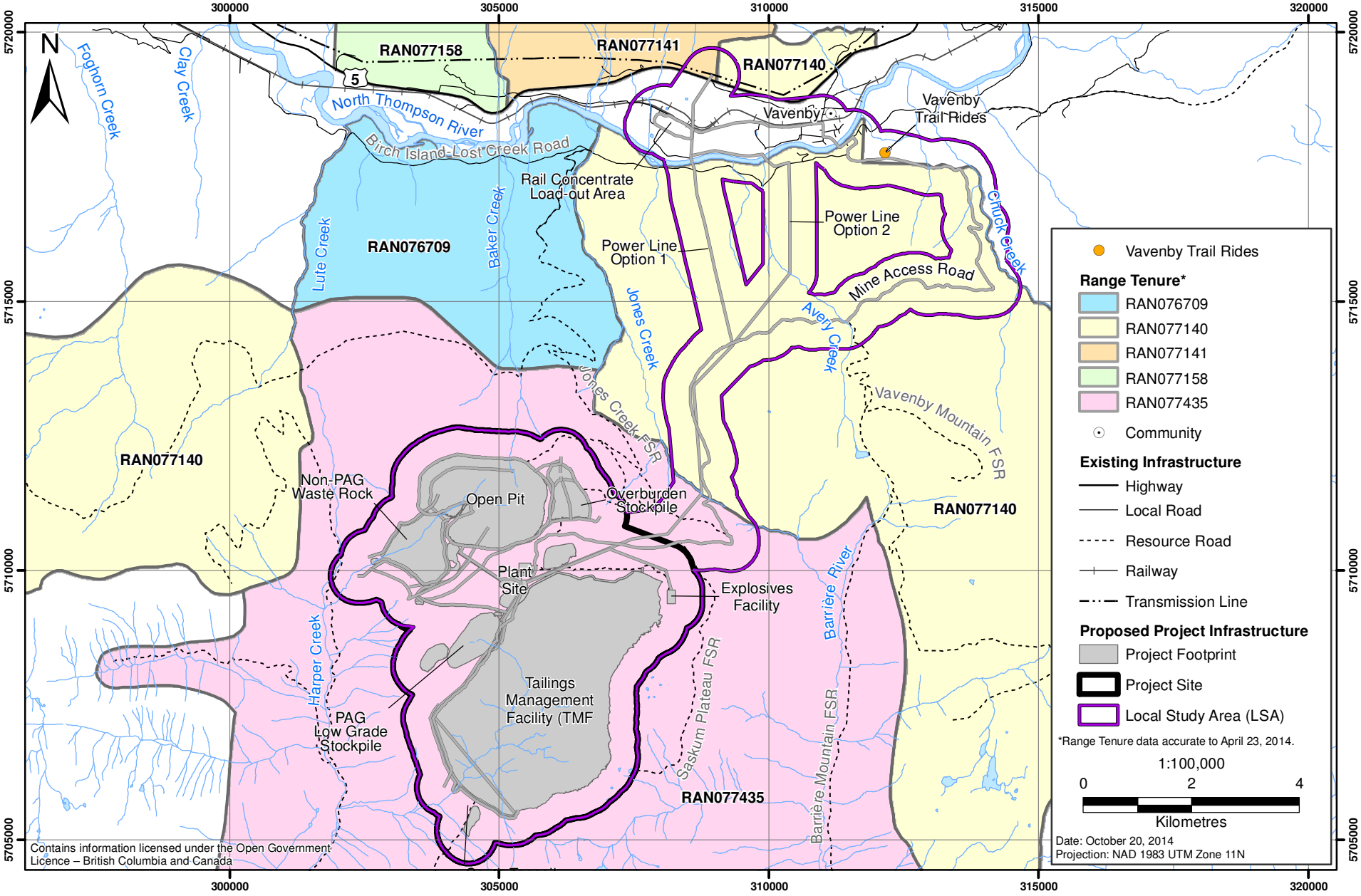


Figure 18.4-11

Water Licences in the Regional Study Area

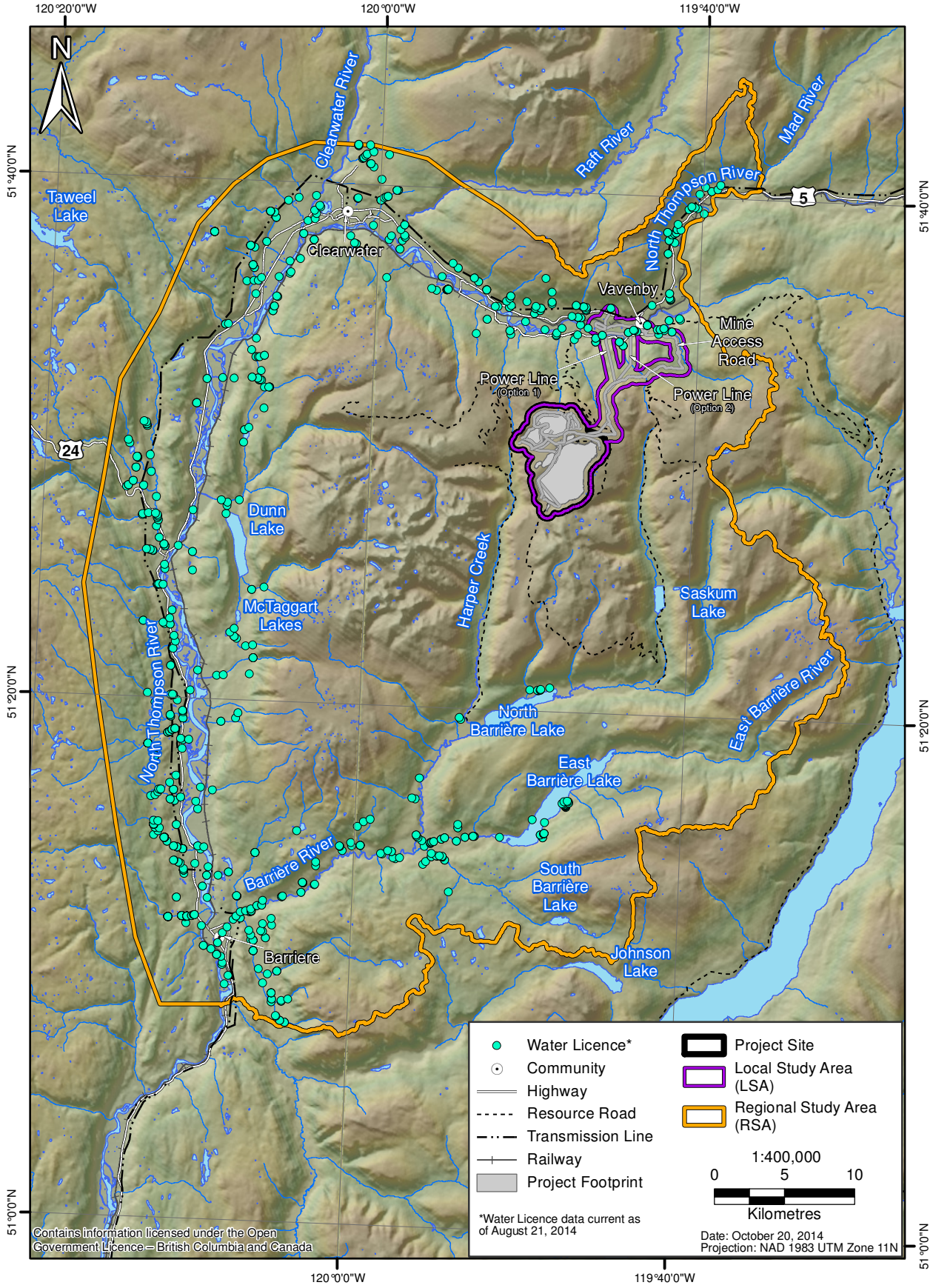


Figure 18.4-12

Water Licences in the Local Study Area

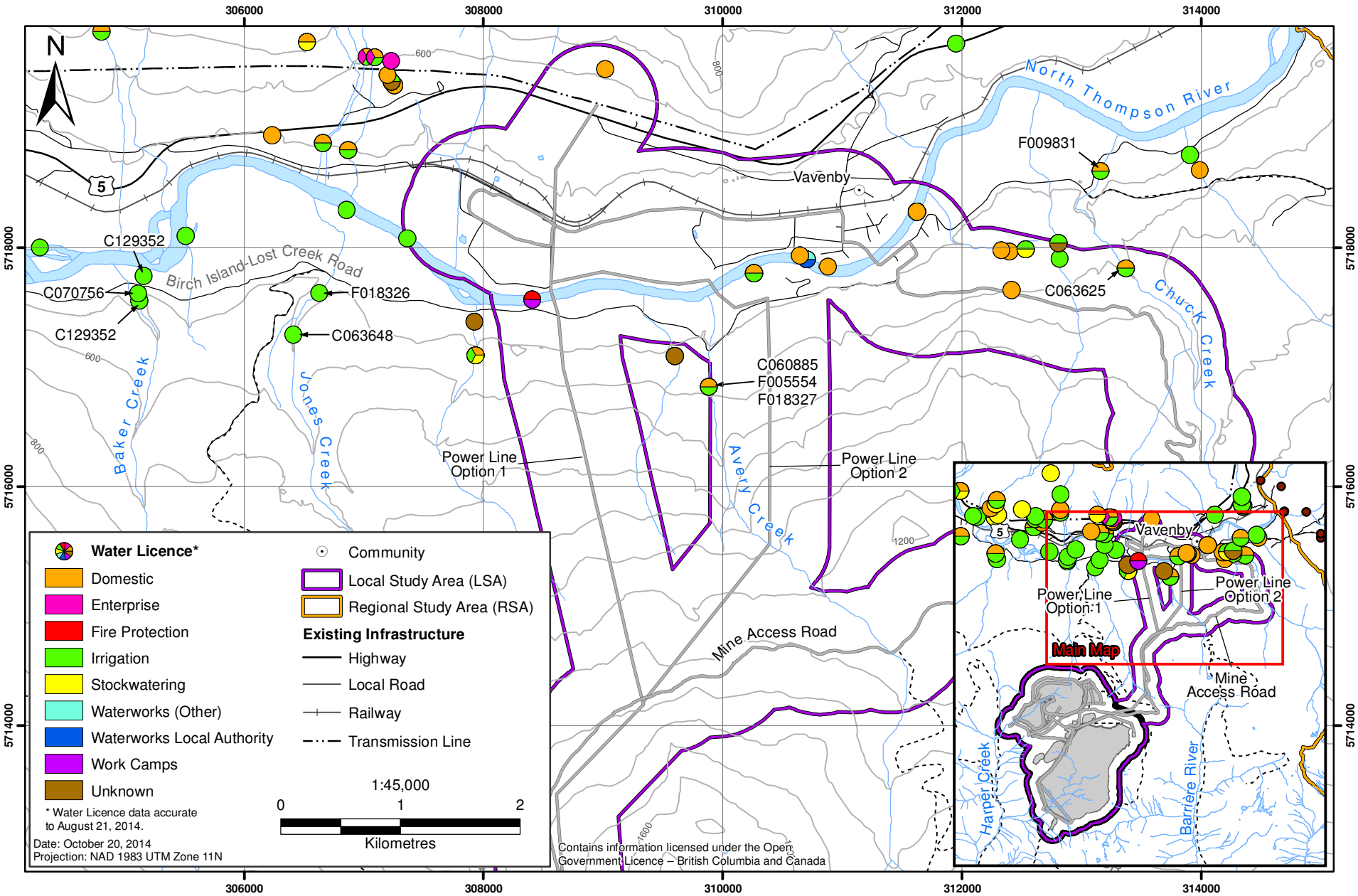


Table 18.4-6. Range Tenures in the Local Study Area[1]

Tenure #	Tenure Area (ha)	% of Tenure in RSA	% of Tenure in LSA
RAN077140	13,802	99.83%	13.15%
RAN077141	18,933	13.42%	0.15%
RAN077435	55,781	69.18%	6.70%

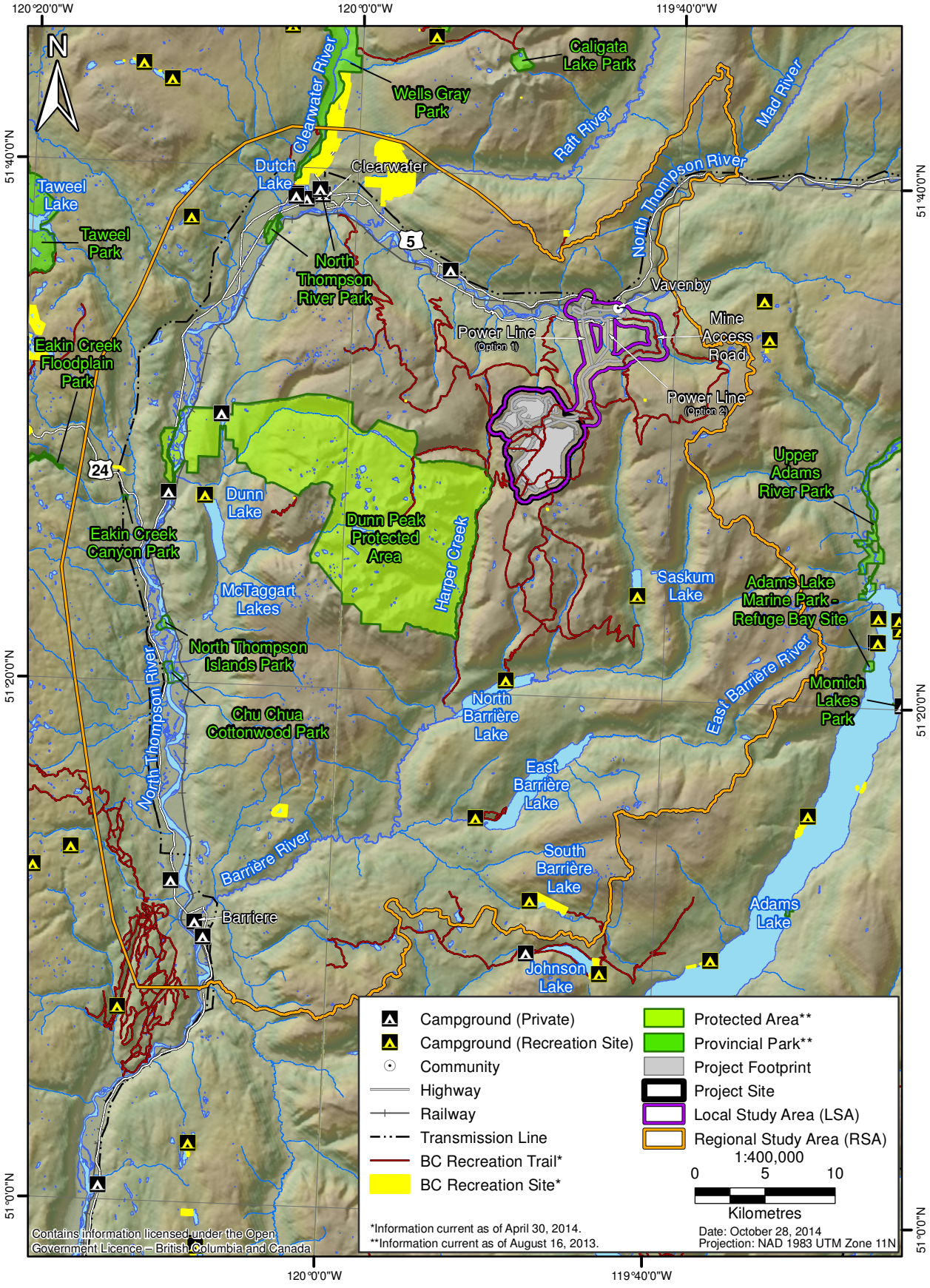
Source: Government of BC (2014)
Note: [1]=Data current as of May 2014

Table 18.4-7. Water Licences in the Local Study Area[1]

Licence Number	Purpose	Stream
C035240	Waterworks (other))	North Thompson River
C035996	Domestic	Bevan Spring
C036251	Domestic	North Thompson River
C036252	Domestic	North Thompson River
C036257	Domestic	North Thompson River
C036258	Domestic	North Thompson River
C036469	Domestic	North Thompson River
C038732	Fire Protection	North Thompson River
C038732	Work Camps	North Thompson River
C046138	Waterworks Local Authority	North Thompson River
C056116	Domestic	North Thompson River
C059932	Domestic	North Thompson River
C059933	Domestic	North Thompson River
C059937	Domestic	North Thompson River
C060885	Irrigation	Avery Creek
C063625	(none specified)	Shook Creek
C063625	Domestic	Chuck Creek
C063625	Irrigation	Chuck Creek
C063681	Irrigation	Shook Creek
C063681	Irrigation	Shook Creek
C102945	Domestic	North Thompson River
C104561	Domestic	North Thompson River
C124889	Domestic	Lime Bluff Spring
C127547	Irrigation	North Thompson River
C130901	Stockwatering	Watson Brook
C130901	Irrigation	Watson Brook
C130960	Domestic	Watson Brook
C130960	Domestic	Watson Brook
F005554	Irrigation	Avery Creek
F005554	Domestic	Avery Creek
F018327	Irrigation	Avery Creek

Source: BC MFLNRO (2014b)
Note: [1]=Data current as of May 2014

Figure 18.4-13
Parks, Protected Areas and Recreation Sites in the Regional Study Area



Wells Gray Provincial Park is a popular tourist attraction in the summer with visitors entering the park from across the region. The park offers cycling, fishing, hiking, horseback riding, hunting, swimming, and camping facilities (BC MFLNRO 2013b).

The Dunn Peak Protected Area is 19,353 ha and subject to the Management Direction Statement for Dunn Peak Park in the Kamloops LRMP (HCMC 2013). This protected area extends from the North Thompson River in the west to include the alpine areas of Dunn Peak, and to the east to the bottom of Harper Creek in the Shuswap Highlands. Dunn Peak Trail is a 7.5-km long hiking trail that leads to the base of Dunn Peak. Dunn (Matterhorn) Peak rises to 2,636 m, making it the highest point in the Shuswap Highlands. Access to Dunn Peak Protected Area is by ferry and road from Little Fort on Highway 5, or by logging road in the Harper Valley from Barriere and North Barrière Lake. Dunn Peak is a wilderness area and there are no roads in the park. Management objectives for the area include:

- maintaining the natural qualities and conditions of the protected area;
- maintaining the visual, recreational, and tourism values;
- maintaining the diversity of wildlife species and habitats;
- discouraging the introduction of non-native plant species; and
- providing for continued recreation use with opportunities for hiking, backpacking, mountaineering, ski touring, snowmobiling, horseback riding, nature viewing, hunting, and controlled use of recreation vehicles.

18.4.3.10 Recreation

Commercial Recreation Licences

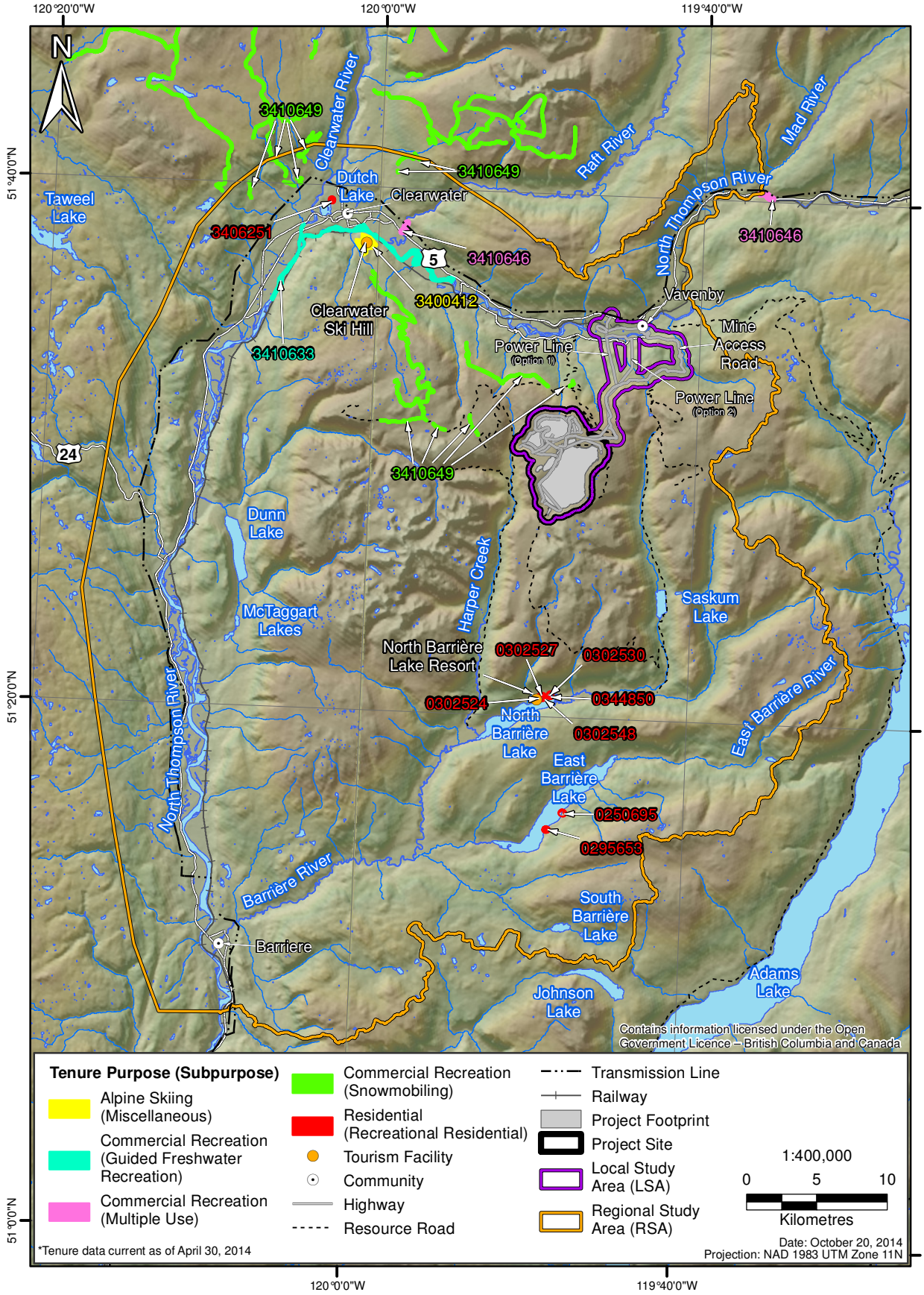
There are four commercial recreation tenures overlapping the RSA, including one freshwater recreation licence, one snowmobile licence, and two multiple-use licences, one on the North Thompson River and one on the Raft River (Figure 18.4-14). There are no commercial recreation tenures in the LSA.

Licence (Tenure #3410633) is held by Interior Whitewater Expeditions Ltd. (IWE), and is located at the intersection of Clearwater and the North Thompson River (see Figure 18.4-14). IWE is located in Clearwater and bases most of its trips out of Clearwater and Wells Gray Provincial Park. They offer a diverse set of rafting trips, of varying lengths and levels of difficulty. Some of their packages also include overnight camping and hiking (IWE n.d.).

Licence (Tenure #3410649) is held by BC Backcountry Adventures, which provides wilderness guiding in Wells Gray Provincial Park. They are based in Clearwater and have two accommodations in the park, the Wells Gray Guest Ranch and the Blue Grouse Country Inn. During the summer they offer overnight canoeing and horse packing trips, as well as day trips for canoeing, hiking, and wildlife viewing. In the winter they offer snowshoeing and snowmobiling day trips, which include lodging and meals (BC Backcountry Adventures Ltd. n.d.).

Figure 18.4-14

Commercial Recreation Tenures in the Regional Study Area



Alpine Skiing

There is one alpine skiing tenure for the Clearwater Ski Hill (Tenure #3400412, held by the Clearwater Ski Club), located south of Clearwater in the RSA (BC MFLNRO 2014a; Figure 18.4-8). The ski facilities, including a lodge, are accessible from the Dunn Lake Road. During spring and summer, there is a disc golf course on the hill.

Recreation Sites and Trails

Within the RSA, there are six recreation sites (Figure 18.4-14) offering a variety of facilities and activities for the public. Table 18.4-8 describes the recreation sites and recreational facilities within the RSA. These sites are rustic with limited amenities, including picnic tables, fire rings, and pit toilets. Fees range from $0 to $15 per night for camping. Maintaining or developing recreation sites and trails on Crown land requires authorization by Recreational Sites and Trails BC (BC MFLNRO 2013c).

Table 18.4-8. Public Recreation Sites and Facilities within the Regional Study Area

Location	Facilities and Activities	Access Route
Saskum Lake South	Activities: Camping, beach activities, kayaking, picnicking, fishing, hunting and canoeing. Facilities: Boat launch, tables, and toilets.	Access via Barriere Lakes Road
North Barrière Lake	Activities: Vehicle accessible camping, beach activities, boating, swimming, fishing, and canoeing. Facilities: Boat launch, tables and toilets.	Access via Barriere Lakes Road
East Barrière Lake	Activities: Vehicle accessible camping, boating, swimming, fishing, hiking, snowmobiling, and canoeing. Facilities: Boat launch, tables, and toilets.	Access via Barriere Lakes Road
South Barrière Lake	Activities: Camping, fishing and canoeing. Facilities: Boat launch, tables, and toilets.	Access via Barriere Lakes Road
Dunn Lake North	Activities: Vehicle accessible camping, fishing, horseback riding, snowmobiling, trail bike riding (motorized), and canoeing. Facilities: Boat launch, tables, toilets, and wharfs.	Access via Dunn Lake Road
Lolo Lake	Activities: Vehicle accessible camping, boating, and fishing. Facilities: Boat launch, tables, and toilets.	Access via TFL 18 Road 2

Source: MFLNRO (n.d.)

There are 26 recreation trails in the LSA, and 262 recreation trails within the RSA, managed by Recreational Sites and Trails BC (BC MFLNRO 2013c). Trails that overlap the LSA are known as the Foghorn-Harp Snowmobile Trails (see Figure 18.4-14). Within the RSA, there are seven additional groups of trails including:

- Adams Plateau Snowmobile Trail, south of South Barrière Lake;
- Seven Sisters Barriere Backcountry Horse Trails located west of Barriere;

- Dunn Peak Trail within the Dunn Peak Protected Area;
- McCorvie Lake Trail to North Barrière Lake beyond Highway 5;
- Baldy Mountain Lookout near Little Fort;
- Candle Creek XC Ski Trails in Clearwater; and
- East Barrière Lake Trail.

Holiday Resorts

There are no holiday resorts within the LSA, and three resorts overlap the RSA (HCMC 2013; Figure 18.4-14). These resorts are:

- Alpine Meadows Resort near Hallamore Lake, offering 29 log cabins and camping/RV sites;
- Dunn Lake Resort near Dunn Lake; and
- North Barriere Lake Resort, offering campsites and seven furnished cabins.

Recreational Residential Leases

There are eight recreational-residential leases within the RSA, located on Crown land on North and East Barrière lakes, as well as on Dutch Lake near Clearwater (BC MFLNRO 2014a).

Recreation Clubs

There are a number of recreation clubs in local communities that facilitate recreation/outdoor experiences and provide recreational facilities to area families. These are primarily non-profit organizations established by volunteers and include cross-country ski programs, motorized recreation (see below), hiking, and motorcycling clubs (District of Barriere 2011). Many of these organizations utilize FSRs to access wilderness areas.

One of the largest clubs is the North Thompson Recreation Society based out of Barriere. The club promotes the recreational use of the surrounding wilderness areas. This includes cross-country skiing lessons, hiking, and swimming lessons. The group manages Barriere Forks Park, and meets monthly. The Serenity Performing Arts Centre is located between Birch Island and Vavenby, near the entrance to the Jones Creek FSR within the LSA. The centre hosts the Performing Arts Festival. The Serenity Performing Arts Centre draws visitors from the surrounding areas, and has capacity for 400 individuals. The centre also operates a campsite nearby with between 20 and 30 spaces.

Snowmobiling

Within the RSA, there are three active motorized recreation clubs, which include the Barriere Snowmobile Club, the Clearwater Sno-Drifters, and the Snowdrifters Snowmobile Club. The Barriere Snowmobile Club is active in local communities, and sponsors an event called Snowarama near Clearwater, which is focused on exploring areas surrounding the Clearwater Ski Hill, just south of the North Thompson River within the RSA (Sled Talk 2009).

The Clearwater Sno-Drifters Club primarily operates within the RSA in areas surrounding Harp, Granite, and Vavenby mountains, where they operate seven backcountry emergency cabins. These cabins are tin-roof structures located along the Jones Creek FSR and Vavenby Mountain FSR, which are highly utilized access roads for the club. Access to trails are non-commercial and not subject to a fee. The Clearwater Sno-Drifters Club has a use agreement with the province; however, only two of the emergency cabins are covered by this agreement. Figure 18.4-15 identifies snowmobile cabins and recreation trails within the RSA and LSA.

All-Terrain Vehicle Use

The use of ATVs is a popular recreational pursuit for residents in the region. The abundance of FSRs provides opportunities for backcountry tourism and recreational opportunities. The Jones Creek FSR and Vavenby Mountain FSR is used to access Harp, Granite, and Vavenby mountains (R. Schuchardt and R. Christenson, pers. comm.).

Recreational Water Use

Use of drainages and waterbodies within the RSA primarily relate to freshwater fishing opportunities, backcountry tourism, boating, swimming, water skiing or traversing along the numerous waterbodies and drainages in the region.

18.4.3.11 Hunting

The Project is located within the Thompson Fish and Wildlife Region 3, which includes several WMUs. The LSA overlaps with WMU 3-40 (0.3%), WMU 3-41 (4%), and WUMU 3-38 (1.7%; Figure 18.4-16). The RSA overlaps with WMU 3-40 (12%), WMU 3-41 (24%), WMU 3-39 (12%), WMU 3-38 (98%), and WMU 3-28 (18%; Government of BC 2014).

Big game in Region 3 includes black bear, caribou, cougar, elk, goat, grizzly bear, moose, mule deer, big horn sheep, white-tailed deer, and wolf. Caribou, elk, bighorn sheep, and goats are not hunted in the RSA or LSA. A small population of mountain goats exists in the Dunn Peak area in the RSA to the west of the LSA, mostly in the protected area. Small game in Region 3 includes weasels, wolverine, fisher, marten, snowshoe hare, blue grouse, spruce grouse, ruffed grouse, coyote, bobcat, and lynx. According to provincial government sources, the value of harvesting in the RSA relative to the Region 3 is moderate relative to the number of active hunters in the area, but high relative to the kinds of unique hunting opportunities available in a variety of ecosystems (C. Procter, pers. comm.).

Resident Hunting

Hunting in the LSA and RSA is primarily conducted for subsistence and focuses on mule and white-tailed deer, and moose. The average number of combined mule and white-tailed deer hunters in WMUs 3-37, 3-38, 3-41, and 3-42 is about 255 per year, with a yearly average of 88 harvests. For moose, the average number of resident hunters per year is 77, with a yearly average of seven moose harvested. However, kills have been lower in recent years due to habitat changes and high predation rates, mostly by wolves (M. Schmidt., pers. comm.).

Figure 18.4-15

Snowmobile Cabins and Potential Pullout Areas in the Local Study Area

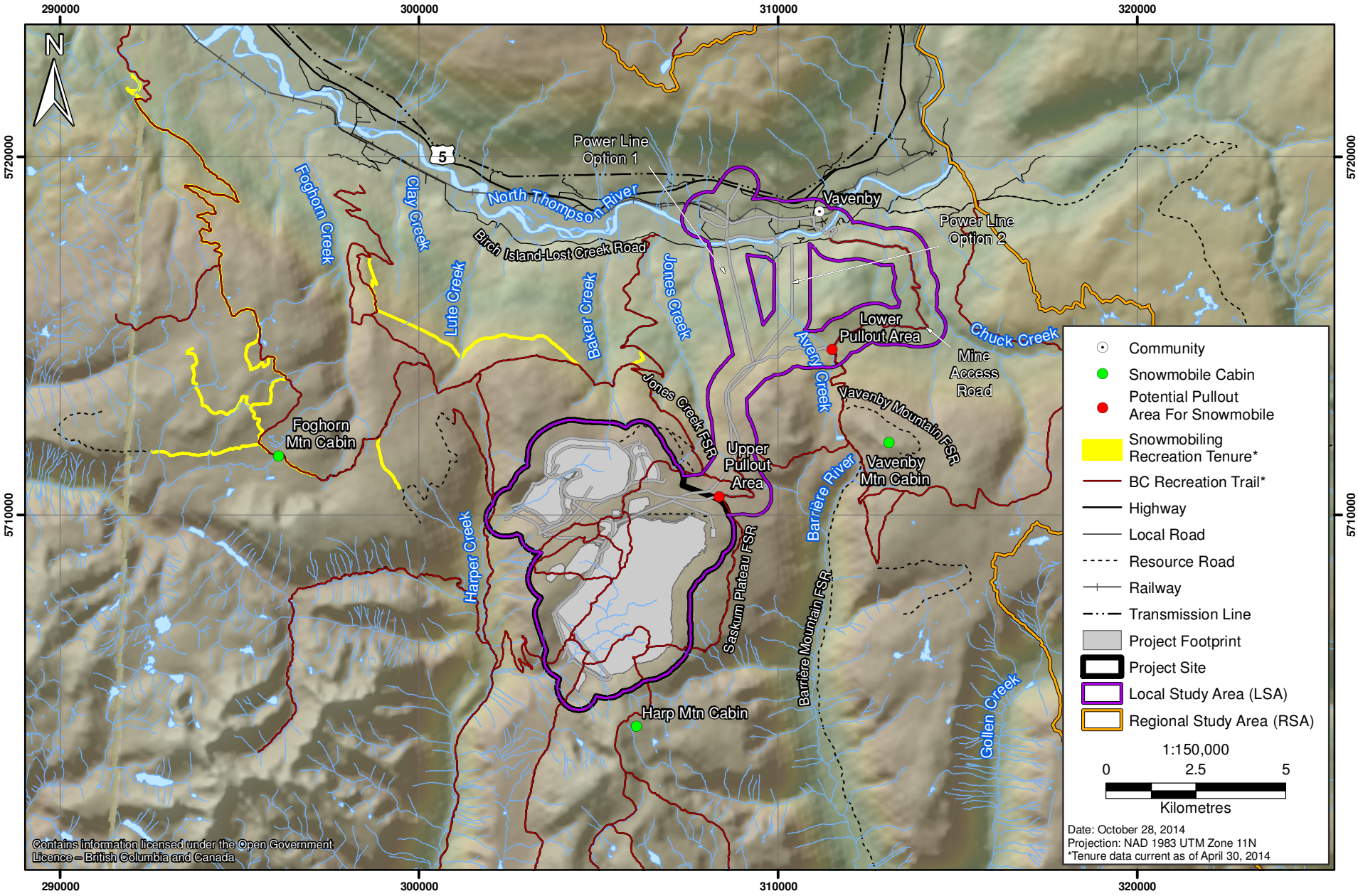
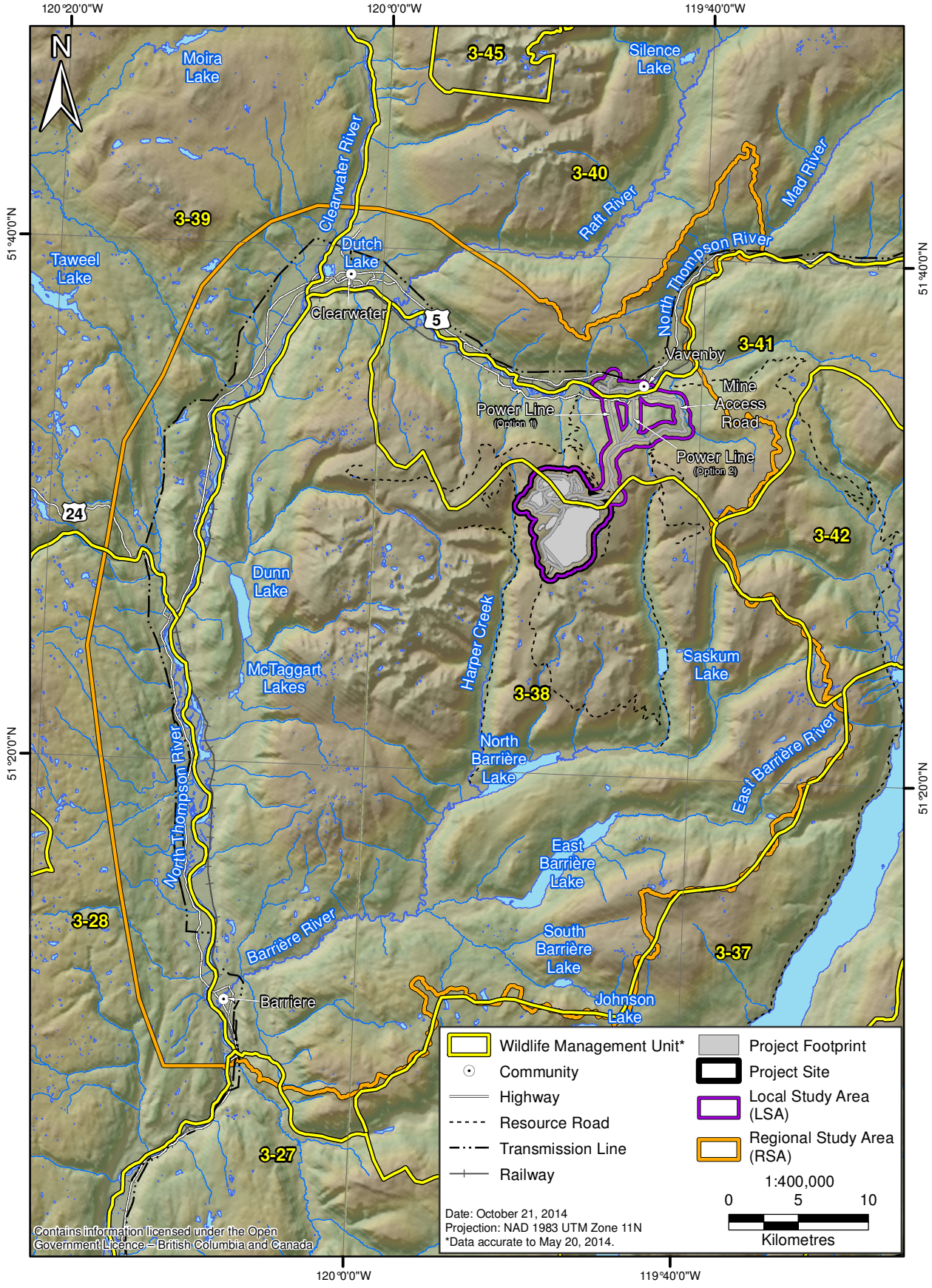


Figure 18.4-16

Wildlife Management Units in the Regional Study Area



Fowl hunted in the area includes mostly upland birds such as grouse (blue, spruce, ruffed). Some hunting of waterfowl (ducks and geese) occurs along the North Thompson River. Most fowl hunting occurs incidental to other hunting activities and stakeholders report only occasional sightings of these species.

In an interview with the North Thompson Fish and Game Club, it was estimated that several hundred hunters would access the RSA annually. Hunters have been known to camp at Saskum Lake (in the RSA) in the summer and fall (M. Schmidt, pers. comm.). ATVs are commonly used in the RSA to access backcountry hunting locations.

Non-resident Hunting

Non-resident hunting is a large commercial industry in BC, especially in mountainous regions that offer a diverse range of habitats. Governed by the BC *Wildlife Act* (1996k), non-resident hunters may hunt big game only when accompanied by a licensed guide, or a person permitted to accompany the hunter under section 70 (1) (a) of the Act.

Non-resident hunting is typically facilitated through a guide outfitter who holds tenure in a registered guiding territory. A guiding territory certificate grants to the holder exclusive control over guiding privileges in a prescribed area for the period stated in the certificate, which cannot exceed 25 years. A guide outfitter licence authorizes the holder to guide persons to hunt only for those species of game as described in the licence, possibly with quotas attached, and after a hunt is concluded, the guide outfitter must immediately submit a report.

There are no guide outfitting licensed areas in the LSA or RSA. The closest guide outfitter territory is beyond the RSA. Adams Lake Outfitters Wilderness Adventures operates an area adjacent to Upper Adams River Provincial Park. According to its website, the company offers guided hunts for black bear, moose, mule deer, grizzly bear, and predators (Adams Lake Outfitters n.d.).

18.4.3.12 Trapping

Trapping is part of BC's rural economy, pursued primarily to obtain pelts from small furbearing animals. In some cases the animal may be used for subsistence. The BC *Wildlife Act* (1996k) establishes regulations on harvesting methods and quantities to protect furbearers from overharvesting. Trappers are required to obtain licences (annual or 5-year), covering a prescribed geographic area and submit for approval a fur management plan that outlines the managing and trapping of fur bearing animals in the licenced area.

Table 18.4-9 lists the registered traplines that overlap the LSA and RSA. Of these, three traplines overlap the LSA (see shaded lines in Table 18.4-9; see Figure 18.4-17). Two (TR0337T001 and TR0341T003) tenures overlap the Project Site. One tenure (TR0338T002) touches the edge of the Project Site.

Trapped species include marten (TR337T001) and weasel (TR0341T003), as well as squirrel and beaver. Larger species sometimes trapped within the RSA include bobcat, lynx, coyote, and wolverine (HCMC 2013).

Figure 18.4-17

Trapline Tenures in the Regional Study Area

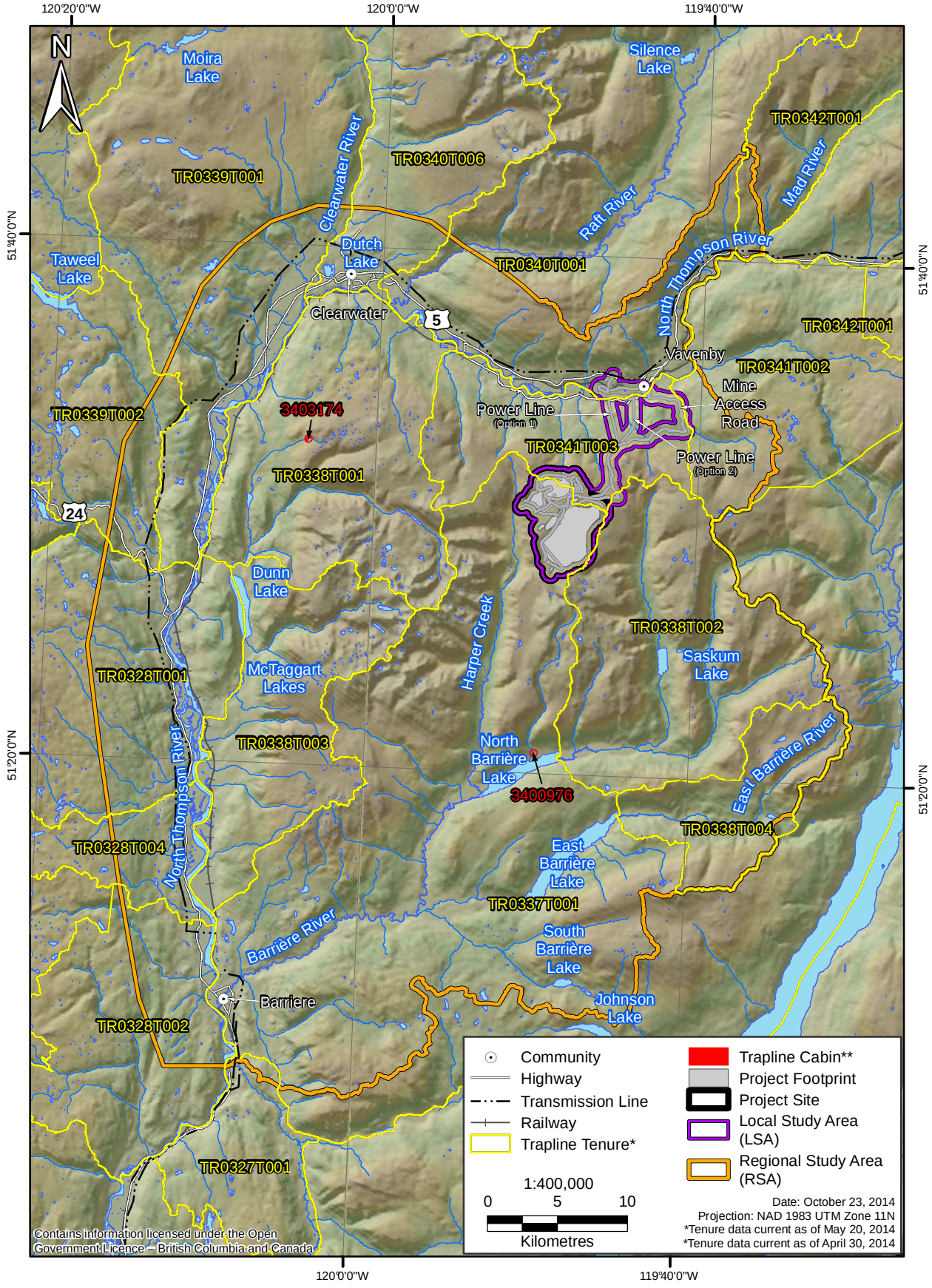


Table 18.4-9. Trapping Licences in the Local and Regional Study Areas

Licence #	Tenured Area (ha)	% in RSA	% in LSA	% in Project Site
TR0339T001	64,578	22.04	0	
TR0340T006	20,608	18.64	0	
TR0341T002	23,236	18.88	0.36	
TR0338T001	27,564	100	0	
TR0339T002	20,040	19.05	0	
TR0341T003	13,767	100.00	19.30	4.5
TR0338T002	27,857	100.00	0.51	0.1
TR0328T001	35,240	44.90	0	
TR0338T003	20,072	100.00	0	
TR0338T004	10,546	98.11	0	
TR0328T004	10,456	46.88	0	
TR0328T002	21,095	29.35	0	
TR0327T001	10,583	3.21	0	
TR0340T001	84,078	18.59	0.65	
TR0342T001	139,495	0.80	0	
TR0337T001	264,330	30.09	1.07	1.1

Source: Government of BC (2014)

18.4.3.13 Fishing

The Project RSA is within the Thompson-Nicola Fish and Wildlife Region 3. Fishing occurs in lakes, rivers, and streams in parks and recreation sites in the RSA including Hallamore Lake, Dunn Lake, Saskum Lake, North Barrière Lake, East Barrière Lake, and South Barrière Lake. As many as five boats can be seen at Saskum Lake on weekends during the summer (M. Schmidt, pers. comm.). Species caught include Rainbow Trout, Dolly Varden, and Bull Trout. Individuals camp at the adjacent recreation area. Summer residences are located at North Barrière Lake, and Rainbow Trout are primarily harvested here. East Barrière Lakes are home to full-time residents and summer cottages used by individuals. Species caught is predominantly Rainbow Trout (M. Schmidt, pers. comm.). Lakes within the RSA generally start to freeze over in late October and therefore have limited use beyond this time.

All streams that are valued for fishing are closed to fishing until July 1 (July 16 for Clearwater and North Thompson Rivers; BC MFLNRO 2013a). Clearwater River to the northwest of the RSA is known for Chinook Salmon (Destination BC Corp. 2014). Chinook Salmon can also be caught on the North Thompson River downstream of Station Road Bridge in Clearwater to the ferry crossing at Little Fort (DFO 2014). High water conditions limit access at the start, but rapid improvement occurs as water levels drop. Adams and Raft River trout follow Sockeye Salmon in late August and early

September. None of these are classified rivers[1] (Little Fort Fly and Tackle n.d.). Stakeholders interviewed in 2014 were not aware of fishing on rivers, creeks, or streams located within the LSA (M. Schmidt, pers. comm.).

18.4.3.14 Navigable Waters

Generally, if a floating vessel used for transportation, recreation, or commerce is able to pass over a body of water, the water could be considered as navigable under the jurisprudence interpretation (Transport Canada 2010). The "Coleman principles", summarized by the 2011 Ontario Superior Court of Justice citing Simpson v. Ontario (2011), provide a further framework for the determination of navigability.

1. A stream, to be navigable in law, must be navigable in fact. That is, it must be capable in its natural state of being traversed by large or small craft of some sort—as large as steam vessels and as small as canoes, skiffs, and rafts drawing less than one foot of water.
2. "Navigable" also means "floatable" in the sense that the river or stream is used or is capable of use to float logs, log-rafts, and booms.
3. A river or stream may be navigable over part of its course and not navigable over other parts.
4. To be navigable in law, a river or stream need not in fact be used for navigation so long as realistically it is capable of being so used.
5. The underlying concept of navigability in law is that the river or stream is a public aqueous highway used or capable of use by the public.
6. Navigation need not be continuous but may fluctuate seasonally.
7. Interruptions to navigation, such as rapids, on an otherwise navigable stream which may, by improvements such as canals, be readily circumvented, do not render the river or stream non-navigable in law at those points.
8. A stream not navigable in its natural state may become so as a result of artificial improvements.

The Coleman principles have been upheld and further defined in other case law, including by Justice Doherty in Canoe Ontario v. Reed (1989), who accepted the conclusions reached in the Coleman case and further clarified that:

> *In essence, the test of navigability developed in Canada is one of public utility. If a waterway has real or potential practical value to the public as a means of travel or transport from one point of public access to another point of public access, the waterway is considered*

[1] Classified waters of BC are 52 highly productive trout streams. These streams are classified as either Class I or Class II and are listed in the Water Specific Tables within for each Region or a listing is provided in the *Wildlife Act* (1996k) under the Angling and Scientific Collection Regulation. The Classified Waters Licensing System was created to preserve the unique fishing opportunities provided by these.

> *navigable...navigability should depend on public utility. If the waterway serves, or is capable of serving, a legitimate public interest in that it is, or can be, regularly and profitably used by the public for some socially beneficial activity, then, assuming the waterway runs from one point of public access to another point of public access, it must be regarded as navigable land as within the public domain* (Canoe Ontario v. Reed 1989, emphasis added).

There are eight waterbodies located within the LSA that have the potential to interact with the Project: Jones Creek, Baker Creek, Chuck Creek, Avery Creek, T Creek, P Creek, Harper Creek, and North Thompson River. Avery, Baker, Chuck, and Jones creeks and the North Thompson River are located along roads that will be used to access the Project Site. None of these waterbodies, aside from the South Thompson and Thompson rivers are listed under the *Navigation Protection Act* (1985). Provided below is an assessment of physical navigability of waters that have the potential to interact with the Project as well as natural barriers, and documented current and historical use by the public and Aboriginal people.

T Creek

The average channel gradient of T Creek is 7.4%, in excess of the maximum slope for navigation (4%). Moreover, directly upstream of the confluence with Harper Creek, Reach 1 of T Creek consists of a short 7.5% slope stretch bounded by a 1.8-m high cascade, followed by Reach 2, which is 1,970 m in length and has a mean slope of 23.8%. This effectively forms a barrier to navigation that does not permit upstream travel from Harper Creek. While T Creek may be physically navigable upstream of Reach 1 and Reach 2, the downstream barrier to navigation isolates the upstream reaches and prevents public access and utility. As a result, T Creek is non-navigable. There is no publically documented historical use of T Creek by the public or Aboriginal people.

P Creek

P Creek consists of two reaches. Both reaches have gradients in excess of 4%, with a mean gradient of 9.6%. Given the high gradient, P Creek is not physically navigable. There is no publically documented use of P Creek by the public or Aboriginal people.

Baker Creek

Baker Creek is high gradient, with a gradient of 15.5% in Reach 1 directly upstream of the confluence with the North Thompson River. All reaches of Baker Creek have slopes in excess of the 4% threshold, and therefore Baker Creek is not physically navigable. There is no publically documented use of Baker Creek by the public or Aboriginal people.

Jones Creek

The average channel gradient of Jones Creek is 12.9%, exceeding the 4% slope threshold for physical navigability. As a result, Jones Creek is not physically navigable. There is no publically documented historical use of Jones Creek by the public or Aboriginal people.

Chuck Creek

The average channel gradient of Chuck Creek is 5.5%. This gradient exceeds the 4% slope threshold for physical navigability; therefore, Chuck Creek is not physically navigable. There is no publically documented use of Chuck Creek by the public or Aboriginal people.

Avery Creek

Avery Creek has an average slope of 16% and an average depth of 0.35 m, and is not considered physically navigable. Avery Lake is a small shallow lake (2.7 ha) located at its headwaters, which is physically navigable but is isolated from any other navigable waters and therefore has no public utility for navigation. Both Avery Creek and Avery Lake are not considered navigable. There is no publically documented historical use of Avery Creek by the public or Aboriginal people.

Harper Creek

Elevations in the Harper Creek watershed range from approximately 640 masl near the confluence with North Barrière Lake to over 2,600 masl at the peak of Granite Mountain, with a median elevation of 1,660 masl.

Harper Creek is primarily low gradient (with slopes less than 3%) with several high-gradient reaches distributed throughout. The highest gradient reach, Reach 9, which is located approximately 6 km from the Project Site, is non-navigable and may be a barrier to navigation to the upstream reaches due to the difficulty of portaging through or around the canyon through which Reach 9 flows. To follow a conservative approach to this effects assessment, all reaches except for Reach 9 are considered navigable, despite the possibility that the rugged terrain surrounding Reach 9 prevents navigation upstream of that point. There is documented use of Harper Creek by Aboriginal people (see below).

North Thompson River

North Thompson River is a large, low-gradient river. It is an established boating and navigation corridor, and is navigable. There is documented use of the North Thompson River by the public and Aboriginal people.

Public Use of Waterways in the Local and Regional Study Areas

There is documented historic and current use of the North Thompson River. The North Thompson River valley is tied to the fur trade history of the Northwest Company and the Hudson's Bay Company. A trail along the North Thompson River spanned from the Yellow Head Pass, past the fur traders' post and traverse at Little Fort. From here fur traders remounted their horses and led their packhorses south, down the east bank of the North Thompson River toward the old Thompson's River post at Kamloops. Fur traders tended not to navigate the North Thompson River, partly because birch trees (for building the birch bark canoes) were scarce (Anderson 2010). This trail was later used during the Gold Rush by prospectors travelling between Kamloops and Prince George.

At "The Traverse" at Little Fort, the New Caledonia Fur Brigades crossed the North Thompson River in a 40 foot canoe that was provided by the Thompson's River post some miles downriver. The

brigade used to cross the river and travel down the east bank of the North Thompson to the old Thompson's River post, at modern day Kamloops (Anderson 2010).

Later, the North Thompson River could be travelled by steamship from Kamloops. From 1866 until 1916, 19 stern and side-wheeled steamships were built to provide transportation between Savona, the North Thompson, the Shuswap Lakes and as far south as Enderby (Cooperman 2014).

Today, there is a one-person ferry that takes one or two cars at a time for people who want to cross the North Thompson River at the fur traders' traverse, however it is currently closed in both directions at North Thompson River because the ferry is out of service until further notice.

The North Thompson River is also used for recreational canoeing and paddling, from North Thompson River Provincial Park to Kamloops (BritishColumbia.com). River rafters also ride through the canyons of the Clearwater River. See Section 18.4.3.9 for further details on recreational water use in the land use study areas.

Aboriginal Use of Waterways in the Local and Regional Study Areas

There is documented use of the North Thompson River and Harper Creek. According to the Simpcw First Nation Traditional Land Use and Ecological Knowledge Study (Appendix 22-A), Simpcwetkwe (the Secwemptsin word for the North Thompson River):

> *…occupies a significant spatial, transportation, and resource presence within the study area, and flows through the middle of Vavenby and Birch Island, the mouth of Raft River (Raft River Mouth camp), Little Fort, Chu Chua, and Chinook Cove. Similarly, Harper Creek and Harper Creek Valley from Birch Island to North Barrière Lake occupy an equally significant spatial transportation, habitation, resource harvest, and water source corridor. These two routes were well established and remained well used as integral to Simpcwemc life, as they are today.*

18.5 EFFECTS ASSESSMENT AND MITIGATION

The following sections describe the key potential effects of the Project on commercial and non-commercial land use as a result of changes to access and the use of land and resources and on commercial and non-commercial land users during the four phases of the Project. The potential effects to be assessed for private land, commercial interests, public use and navigation are those that result from Project-related changes to access to land and use of land and the quality of the natural experience. Mitigation measures to avoid, control, and mitigate land use effects are described in Section 18.5-2, Mitigation Measures (see Table 18.5-2).

18.5.1 Screening and Analysis of Potential Project Effects

A scoping exercise was undertaken to understand which Project interactions and activities have the potential to cause potential adverse effects on land use VCs, including private land, commercial interests, public use, and navigable waters. Commercial interests include holders of Crown tenures such as forest licences, ranchers and trappers. Non-commercial interests refer to the public who

recreate in the area of the Project. Potential project effects on land use VCs are described in the sections below.

18.5.1.1 Change in Access and Use of Lands and Resources

Private Land Valued Component

The two proposed power line route options cross private land, with ALR zoning, and a woodlot with a private land component. Construction of the power line may result in a change to the use of private land. The power line will require a cleared right-of-way of approximately 12 km in length and 30 m in width, for a total of 36.3 ha of cleared area. During Operations, Closure, and Post-Closure, entry on to private land may be required to monitor the power line. This access is expected to be infrequent.

HCMC has initiated discussions with private landowners with respect to the route and construction of a power line, and potential mitigation options. With the implementation of the mitigation measures (see Table 18.5.2), the Project is not expected to affect access and use of private land. No further consideration of effects is warranted.

Commercial Interests Valued Component

Forest Licensees

Access to the Project Site will be via existing public roads, including the Vavenby Mountain, Vavenby Plateau, and Vavenby-Saskum FSRs, and no new roads will be constructed for the Project (see Figure 18.5-1). During the 18 to 24 month Construction phase, there is potential for forest licensees' use of the Vavenby Mountain, Saskum Plateau and Vavenby-Saskum FSRs to be temporarily disrupted due to upgrading of the FSRs, and construction of a 2.5-km section of road from the intersection of the Saskum Plateau and the Vavenby-Saskum FSRs. This disruption will be temporary and short term given the length of the Construction phase.

At the peak of Operations, a total of 85 two-way trips per day are projected. Less than 10% of these trips will be light vehicles (e.g., buses) transporting personnel to and from the parking lot at the rail load-out facility. The remaining traffic will support mine operations. During the Operations phase, there will be approximately 21 two-way, daily truckloads of side-dump B-train vehicles, carrying 40 tonnes of concentrate payloads along Vavenby Mountain FSR, between the Project Site and the rail load-out near Vavenby (Appendix 5-E, Traffic Impact Assessment). Interactions between mine haul and logging trucks have the potential to occur on the Mine Access Road, subject to frequency of use by logging trucks. During the Closure phase, there will be reduced Project traffic on the FSRs. Traffic during Post-Closure will be for monitoring and maintenance purposes.

Forest licensees will continue to be able to use the FSRs to access their tenures during all Project phases. With the implementation of the identified mitigation measured (see Table 18.5-2), the Project is not expected to affect forest licensees' access and use of their tenures. No further consideration of effects is warranted.

Range Tenures

Mine construction will impact one range tenure, RAN077435, in the Harper Mountain Range Unit which overlaps the Project Site (Figure 18.4-10). Mitigations for impacts on RAN077435 have been developed with the BC MFLNRO. No range tenure will be issued within the footprint of the mine development once the Project has been approved. Cattle drift from tenured range surrounding the mine footprint will be mitigated on an "as needed" basis. The current range tenure holder moved to a vacant grazing tenure outside of the LSA in 2014.

Construction of the power line has the potential to temporarily disrupt the use of RAN077140, which overlaps the two proposed power line route options. Use of this tenure may be disrupted during the upgrading of the FSRs, and during Operations when sheep are moved to grazing areas. HCMC will communicate and work with the tenure holder regarding movement of sheep to grazing areas. This disruption will be temporary and short term given the length of the Construction phase. No impacts related the use of this tenure are expected during the Closure and Post-Closure phases.

A short section of the proposed power line route enters RAN077141 to connect to the existing BC Hydro 230-kV transmission line near Vavenby. No impacts on RAN077141 are anticipated during any phase of the Project due to the limited interaction with the power line.

The Project has the potential to impact water quality and quantity in creeks where water is withdrawn for irrigation and stock watering purposes. Within the LSA and RSA, there are water licences for irrigation and stockwater purposes on Avery, Chuck, Jones, Shook and Baker creeks, the North Thompson River, and Watson Brook (Figure 18.4-12). Based on the surface water quality effects assessment, no water quality effects to livestock in the expected case model are predicted (Appendix 13-D).

With the implementation of identified mitigation measures (see Table 18.5-2), the Project is not expected to affect range tenure holders' access and use of their tenures. No further consideration of effects is warranted.

Trapline Tenures

Mine construction will impact the use of the northern extent of TR0337T001 (Figure 18.4-17). However, most of this tenure will still be available for trapping. Construction of the power line has the potential to temporarily disrupt the use of TR0341T003, which overlaps the two proposed power line route options. No impacts on the access and use of these tenures is expected during the other phases of the Project. HCMC has mitigation agreements with both trapline holders regarding potential impacts of the Project on their trapline tenures.

Trapping tenure TR0338T002, which borders the eastern edge of the Project Site, and TR0341T002, which overlaps a short section of the proposed power line route, are not expected to be impacted by any phase of the Project due to their limited interaction with the Project.

With the implementation of identified mitigation measures (see Table 18.5-2), the Project is not expected to affect trapline tenure holders' access and use of their tenures. No further consideration of effects is warranted.

Public Use VC

Access to the Project Site will be via existing public roads, including the Vavenby Mountain, Vavenby Plateau, and Vavenby-Saskum FSRs, and no new roads will be constructed for the Project (see Figure 18.5-1). During the 18 to 24 month Construction phase, there is potential for public recreational access along the Vavenby Mountain, Saskum Plateau and Vavenby-Saskum FSRs to be temporarily disrupted due to upgrading of the FSRs, and construction of a 2.5 km of section of road from the intersection of the Saskum Plateau and the Vavenby-Saskum FSRs. This disruption will be temporary and short term given the length of the Construction phase.

At the peak of Operations, a total of 85 two-way trips per day are projected. Less than 10% of these trips will be light vehicles transporting personnel to and from the parking lot at the rail load-out facility. The remaining traffic will support mine operations. During Operations, there will be approximately 21 daily truckloads of side-dump B-train vehicles, carrying 40 tonnes of concentrate payloads along Vavenby Mountain FSR, between the Project Site and the rail load-out near Vavenby (Appendix 5-E, Traffic Impact Assessment). Interactions between public vehicles and logging trucks have the potential to occur on the Mine Access Road. During the Closure phase, there will be reduced Project traffic on the FSRs. Traffic during Post-Closure will be for monitoring and maintenance purposes.

With the implementation of the identified mitigation measures (see Table 18.5-2), the Project is not expected to affect public access and use of the Project area for recreation purposes. No further consideration of effects is warranted.

Navigable Waters Valued Component

The Project has the potential to affect public and Aboriginal access to navigable waters during the construction of the power line. Flows of navigable waterbodies may be impacted by the Operations, Closure, and Post-Closure phases. Based on the assessment provided in Section 18.4.3.8, Harper Creek and North Thompson Creek are considered navigable as there is documented public and Aboriginal use of these waterbodies. The highest gradient reach of Harper Creek is Reach 9, located 18.5 km from the confluence of Harper Creek and the Barrière River. Rugged terrain around Reach 9 prevents navigation upstream of this point. Reach 9 is located approximately 6 km from the Project Site (Figure HCP-06-013).

Harper Creek does not directly interact with Project infrastructure but it is predicted to experience decreases in water level. The effects assessment for the hydrology VC found the residual effect to changes to Harper Creek flow is of high magnitude within the LSA, negligible in the RSA, the geographic extent is local, the duration is future, the frequency is continuous, partially reversible, and the resilience is neutral. The confidence in the significance prediction is high. The residual effect for all Project phases is of moderate scale and considered not significant (Section 12.5.6, Chapter 12).

Based on the hydrology effects assessment, the decrease in mean annual flow of the North Thompson during the four project phases is predicted to be negligible (Section 12.5.3, Chapter 12).

With the implementation of the identified mitigation measures (see Table 18.5-2), the Project is not expected to affect navigation on the North Thompson River or Harper Creek. No further consideration of effects is warranted.

HCMC will construct a 12-km power line from the BC Hydro substation in Vavenby to the Project Site. The HCMC power line will cross the North Thompson River, with the North Thompson River being approximately 80 metres wide at the proposed point of crossing. The NWPA was repealed and replaced by the *Navigation Protection Act* (1985). The North Thompson River is not listed as a navigable water under the Schedule to the Navigation Protection Act. The HCMC power line will not substantially interfere with navigation as it will be constructed in accordance with all Transport Canada standards and regulations relating to aerial cables, suspended cable span markings, and aviation safety standard obstruction markings.

18.5.1.2 Change in the Quality of Experience of the Natural Environment

Public Use Valued Component

During Construction and Operations, noise and visual quality effects have the potential to affect the quality of the experience for the public recreating in the LSA or RSA. Potential noise sources include noise from Project construction or operations, noise from increase in traffic volume, and noise from blasting. Despite the implementation of mitigation measures, there is a potential for a residual effect.

Three snowmobile cabins are located in the RSA; one on Foghorn Mountain, west of the Project, one on Harp Mountain, south of the Project, and one on Vavenby Mountain, east of the Project. As per the noise effects assessment (Section 10.5.2.2 of Chapter 10), no exceedances to baseline noise levels were recorded for any of the snowmobile cabins). Therefore, Project-related noise is not anticipated to affect the quality of experience for users when these cabins are used.

18.5.1.3 Risk Rating of Project Effects on Land Use Valued Components

A scoping exercise was conducted in order to explore potential Project interactions with Project components and activities in order to identify the key potential adverse land use effects. Table 18.5-1 provides risk ratings of Project effects on land use VCs with green indicating low risk interaction, yellow indicating moderate risk interaction, and red indicating high risk interaction. Low risk interactions are not considered further in the assessment.

18.5.2 Mitigation Measures

This section details mitigation and management measures designed to reduce or eliminate adverse Project land use effects. Mitigation measures that are recommended to reduce an adverse effect are technically, environmentally, and economically feasible, and aim to avoid, reduce, control, eliminate, or offset potential Project effects. The Project has been designed to reduce adverse effects by optimizing alternatives, incorporating specific design changes, following best practices, and enhancing project benefits.

The mitigation methods which will be implemented are listed in Table 18.5-2. The anticipated effectiveness of each mitigation measure is defined in Chapter 8 as follows.

- Low effectiveness: After implementation of the mitigation measure, there is still a major change in the indicator, VC, or discipline from the baseline condition.
- Moderate effectiveness: After implementation of the mitigation measure, there is a measurable change in the indicator, VC, or discipline from the baseline condition.
- High effectiveness: After implementation of the mitigation measure, there is no change in the indicator, VC, or discipline from the baseline (e.g., it returns to its original condition before the construction of the Project) or an environmental enhancement is evident.
- Unknown effectiveness: The suggested mitigation measure has not been tried elsewhere in similar circumstances and the response of the indicator, VC, or discipline compared to the baseline is unknown.

Measures to mitigate potential effects on the land use VCs are identified below along with an assessment of the effectiveness of the mitigation measure.

Table 18.5-1. Risk Ratings of Project Effects on Land Use Valued Components

Project Components and Activity	Private Land	Commercial Interests	Public Use	Navigable Waters
Construction				
Hazardous materials storage, transport and off-site disposal		🟢	🟢	
Construction of fish habitat offsetting sites				
Process and potable water supply, distribution and storage				
Explosives storage and use			🟡	
Open pit development – drilling, blasting, hauling and dumping			🟡	
Auxiliary electricity - diesel generators				
Power line and site distribution line construction; vegetation clearing, access, poles, conductors, tie-in	🟡			🟡
Primary crusher and overland feed conveyor installation				
Earth moving, excavation, drilling, grading, trenching, backfilling				
Aggregate sources/borrow sites: drilling, blasting, extraction, hauling, crushing			🟢	
Road upgrades, maintenance and use: mine haul road and access road		🟢	🟢	
Traffic delivering equipment, materials, and personnel to site		🟢	🟢	
Coffer dam and South TMF embankment construction				
Water management pond, sediment pond, diversion channels and collection channels construction				🟡
Operations 1 and Operations 2				
Process and potable water supply, distribution, and storage		🟡		
Concentrate transport by road from mine to rail load-out		🟡	🟡	
Hazardous materials storage, transport, and off-site disposal		🟢	🟢	

(continued)

Table 18.5-1. Risk Ratings of Project Effects on Land Use Valued Components (completed)

Project Components and Activity	Private Land	Commercial Interests	Public Use	Navigable Waters
Operations 1 and Operations 2 (*cont'd*)				
Mine pit operations: blast, shovel, and haul		●	●	
Backup diesel generators				
Traffic delivering equipment, materials, and personnel to site		●	●	
Closure				
Partial decommissioning and reclamation of Project Site roads		●	●	
Decommissioning and removal of plant site, processing plant and mill, substation, conveyor, primary crusher		●	●	
Post-Closure				
TMF discharge				●

Notes:
● = *Low risk interaction: a negligible to minor adverse effect could occur; no further consideration warranted.*
● = *Moderate risk interaction: a potential moderate adverse effect could occur; warrants further consideration.*
● = *High risk interaction: a key interaction resulting in potential significant major adverse effect or significant concern; warrants further consideration.*

Table 18.5-2. Proposed Mitigation Measures and their Effectiveness

Potential Effect	Proposed Mitigation Measure	Mitigation Effectiveness (Low/Moderate/ High/ Unknown)	Residual Effect (Y/N)
Private land VC – access and use of private land	HCMC will work with private landowners on the power line route to identify potential mitigation measures to enable power line construction; and secure necessary approval from the Agricultural Land Commission for the power line right of way (if it crosses ALR-zoned land).	High	N – Discussions have been initiated with private landowners regarding the power line right of way
Commercial interests VC - change in access and use of forest resources	Traffic and Access Management Plan (Section 24.16); consultation with forest licensees who use the Vavenby Mountain, Saskum Plateau and Vavenby-Saskum FSRs before deciding whether to establish additional gates (aside from the gate at the Project Site), and cattle guards, if necessary to prevent livestock drift, along the Mine Access Road; upgrading the FSRs to improve overall road condition and safety for users. Commercially merchantable timber will be harvested prior to, or during, construction.	High	N

(continued)

Table 18.5-2. Proposed Mitigation Measures and their Effectiveness (continued)

Potential Effect	Proposed Mitigation Measure	Mitigation Effectiveness (Low/Moderate/ High/ Unknown)	Residual Effect (Y/N)
Commercial interests VC - change in access and use of range tenures	HCMC has an agreement with range tenure holder (RAN077435) for potential impacts of the Project on use of this tenure; HCMC has agreed to the installation of a cattle guard to control livestock drift if needed; in consultation with MFLNRO along the Mine Access Road, if warranted; installation of wing fencing, at appropriate locations along the Mine Access Road to prevent cattle drift, if required; upgrading the FSRs to improve overall road condition and safety for users; monitoring of livestock movement along Mine Access Road; Site Water Management Plan (Section 24.13); Sediment and Erosion Control Plan (Section 24.11).	High	N - A short section of the proposed power line route enters RAN077141 to connect to the existing BC Hydro 230 kV transmission line near Vavenby. No impacts on RAN077141 are anticipated due to limited interaction with the power line
Commercial interests VC - change in access and use of trapline tenures	HCMC has mitigation agreements with trapline holders TR0337T001 and TR0341T003.	High	N - TR0338T002, which borders the eastern edge of the Project Site, and TR0341T003, which overlaps a short section of the proposed power line route, are not expected to be impacted due to limited interaction with the Project
Public use VC - change in public access and use of areas for recreation	Installation of gate at the Project Site to control access to the mine site; Traffic and Access Management Plan (Section 24.16); possible construction of two pullouts (lower and upper pullouts; Figure 18.4-15) on Vavenby Mountain and Saskum Plateau FSRs; communications with local recreation clubs; upgrading and maintenance of the FSRs for safety.	High	N
Public use VC - change in experience of the natural environment	Noise Management Plan (Section 24.10); visual quality mitigation measures described in Section 19.5.4 of Chapter 19 (Visual Quality Effects Assessment)	Moderate to High	Y

(continued)

Table 18.5-2. Proposed Mitigation Measures and their Effectiveness (completed)

Potential Effect	Proposed Mitigation Measure	Mitigation Effectiveness (Low/Moderate/ High/ Unknown)	Residual Effect (Y/N)
Navigable waters VC - change in access to navigable waters	HCMC will construct a 12 km power line from the BC Hydro substation in Vavenby to the Project Site. The HCMC power line will cross the North Thompson River, with the North Thompson River being approximately 80 metres wide at the proposed point of crossing, and will not substantially interfere with navigation, as it will be constructed in compliance with all Transport Canada standards and regulations. Power line construction will meet the Transport Canada standards and criteria for aerial cables (power and communication "Warning – Construction Ahead" signs that are legible from at least 50 m will be installed 50 m upstream and downstream from the work site.	High	N

18.5.3 Predicted Residual Effects and Characterization

18.5.3.1 Assessment and Characterization of Residual Effects on Public Use due to a Change in the Quality of the Experience of the Natural Environment

Noise and visual quality effects have the potential to affect the quality of the experience of the natural environment for the public recreating in the Project area.

The noise level from snowmobiles, regulated to be less than 73 dBA at 15 metres away while travelling at 24 km per hour (International Snowmobile Manufacturers Association n.d.), is likely to be higher than the noise from the trucks passing by. Considering the expected short-term use of these locations, the magnitude of the potential for effects to human health is considered **negligible** as people are expected to be present at these locations for a matter of minutes on a (noisy) running snowmobile.

There are two cabins used by snowmobilers, one directly east of the Project Site and one directly west of the Project Site (Figure 10.5-1). People may stay overnight at the snowmobile cabins occasionally. The Human Health Effects Assessment chapter (Section 21.5.3) concludes the probability that an increase in noise levels will affect human health during the Construction and Operations phases is **low**. This is because human receptors are not continuously in the areas closest to the Project where noise levels are predicted to be highest, and therefore is unlikely that residual effects to human health will occur. During Construction, the residual effects of the Project on increased noise levels are negligible in magnitude, local geographic extent, of regular frequency, and of short-term duration (Section 21.5.4.4). During the Operations phase, the magnitude is negligible, geographic extent is local, frequency is regular, and duration is medium term (Section 21.5.4.4).

The Clearwater Sno-Drifters Club operates seven backcountry emergency cabins in areas surrounding Harp, Granite and Vavenby mountains within the RSA (see Figure 18.4-9). The Visual Impact Assessment (Appendix 19-A) concludes moderate changes in the visual landscape at Viewpoint 7 (Granite Mountain), Viewpoint 9 (Harp Mountain) and Viewpoint 10 (Harp Mountain Trail #1) are anticipated. With the implementation of mitigation measures, visual effects will not be avoided. The visual quality effects assessment concludes that after mitigation is applied, the magnitude will be moderate, the geographic extent will be foreground to middle ground (i.e., 0.5 km to 3 km) and limited to individuals (as up to approximately 100 recreational users annually use the area and nearby snowmobile cabins), the duration will be long-term, the frequency will be continuous, the change will be reversible in the long-term, and the resiliency of the environment to absorb the change is low. The scale of the significance of the adverse residual effect will be moderate and the rating is not significant.

18.5.3.2 Likelihood of Public Use Residual Effects

Likelihood refers to the probability of the predicted residual effect occurring and is determined according to the attributes identified in Table 8.5-4 in Chapter 8, Effects Assessment Methodology. It is expected that the likelihood of the residual effect is **high, but is not significant**. This is consistent with the likelihood determination in the noise and visual quality effects assessments which conclude the effects are of minor scale and not significant for noise, and are of moderate scale and not significant for visual quality.

18.5.4 Significance of Residual Effects

The significance determination follows a two-step process. First, the severity of residual effects is ranked according to a minor, moderate and major scale. Then, consideration of whether the minor, moderate, or major effects are considered significant or not significant is made, as per the following definitions:

- **Not significant (minor, moderate)**: Residual effects have low or moderate magnitude; local to regional geographic extent; short- or medium-term duration; could occur at any frequency, and are reversible or partially reversible in either the short- or long-term. The effects on the VC (e.g., at a species or local population level) are either indistinguishable from background conditions (i.e., occur within the range of natural variation as influenced by physical, chemical, and biological processes), or distinguishable at the individual level. Land and resource management plan objectives will likely be met, but some management objectives may be impaired.
- **Significant (major)**: Residual effects have high magnitude; regional or beyond regional geographic extent; duration is long-term or far future; and occur at all frequencies. Residual effects on VCs are consequential (i.e., structural and functional changes in populations, communities, and ecosystems are predicted) and are irreversible. The ability to meet land and resource management plan objectives is impaired. The significance determination is also illustrated in Figure 8.6-1 in the Chapter 8, Effects Assessment Methodology.

18.5.4.1 Public Use due to a Change in the Quality and Experience of the Natural Experience

Overall, the residual effect associated with a change in quality and experience of the natural environment on public recreation is considered **not significant (minor)**. Only three locations were anticipated to experience a moderate alteration of visual quality. There are numerous alternate recreation areas available for use by recreationalists in the RSA.

18.5.5 Confidence and Uncertainty in Determination of Significance

Confidence, which can also be understood as the level of uncertainty associated with this assessment, is a measure of how well residual effects are understood and the confidence associated with the baseline data, and effectiveness of mitigation. The confidence in the significance prediction related to effects on public use due to a change in quality of the experience of the natural environment is informed by the noise and visual quality effects assessment. Thus the confidence in the determination of significance is **moderate**.

18.5.6 Summary of the Assessment of Residual Effects for Land Use

Residual effects to public use due to a change in the quality of the natural environment are summarized in Table 18.5-3 including the associated characterization criteria, significance, likelihood, and confidence in the determination.

18.6 CUMULATIVE EFFECTS ASSESSMENT

18.6.1 Scoping Cumulative Effects

18.6.1.1 Valued Components and Project-related Residual Effects

Project-related residual effects are predicted for the public use VC due to the potential for changes in the quality and experience of the natural environment. This effect was rated as **not significant (minor)**, with a **high** likelihood of occurrence and a moderate confidence in the rating.

18.6.1.2 Defining Assessment Boundaries

Similar to the Project related effects, assessment boundaries define the maximum limit within which the cumulative effects assessment is conducted. Boundaries relevant to land use are described below.

Table 18.5-3. Summary of Key Effects, Mitigation, Residual Effects, Likelihood, Significance, and Confidence

Key Effect	Mitigation Measures	Summary of Residual Effects Characterization Criteria *(Magnitude, Geographic Extent, Duration, Frequency, Reversibility, Resiliency)*	Likelihood *(High, Moderate, Low)*	Significance of Adverse Residual Effects		Confidence *(High, Moderate, Low)*
				Significance Scale (*Minor, Moderate, Major*)	Significance Rating *(Not Significant; Significant)*	
Change in quality and experience of the natural environment for public users	Noise Management Plan, including mitigation measures such as low noise emitting equipment will be preferentially selected, adequate maintenance, reduce vehicle speed, avoid idling, and optimize construction design and site layout; visual quality mitigation measures described in Section 19.5.4 of Chapter 19 (Visual Quality Effects Assessment)	Low, local, medium term (Construction and Operations phases), regular, reversible, neutral	Low	Minor	Not Significant	Moderate

The temporal boundaries for the identification of physical projects and activities have been categorized into past, present and reasonably foreseeable projects and are defined as follows:

- **Past**: no longer operational projects and activities that were implemented in the past 50 years. This temporal boundary enables to take into account any far-future effects from past projects and activities2;
- **Present**: active and inactive projects and activities; and
- **Future**: certain projects and activities that will proceed, and reasonably foreseeable projects and activities that are likely to occur. These projects are restricted to those that 1) have been publicly announced with a defined project execution period and with sufficient project details for assessment; and/or 2) are currently undergoing an environmental assessment, and/or 3) are in a permitting process.

Information on other physical projects and activities has been identified for the Kamloops LRMP boundary as per the commitments in the AIR (see Figure 8.7-1, Chapter 8). The cumulative effects assessment area for land use is based on a reasonable expectation of where Project residual effects may spatially or temporally overlap with the residual effects of other projects and activities. Given that the land use residual effect is present in the RSA, the CEA boundary for land use has been defined as the land use RSA, as shown in Figure 18.6-1.

18.6.1.3 Projects and Activities Considered

Past, present, and reasonably foreseeable future projects and activities within the boundaries described above were considered in the CEA. The project list was developed from a variety of information sources, including local government, provincial and federal government agencies, and companies' and businesses' websites. The projects and activities considered in the CEA are presented in Chapter 8 in Tables 8.7-1 and 8.7-2, respectively. The methodology used in the CEA is provided in Chapter 8, Section 8.7.

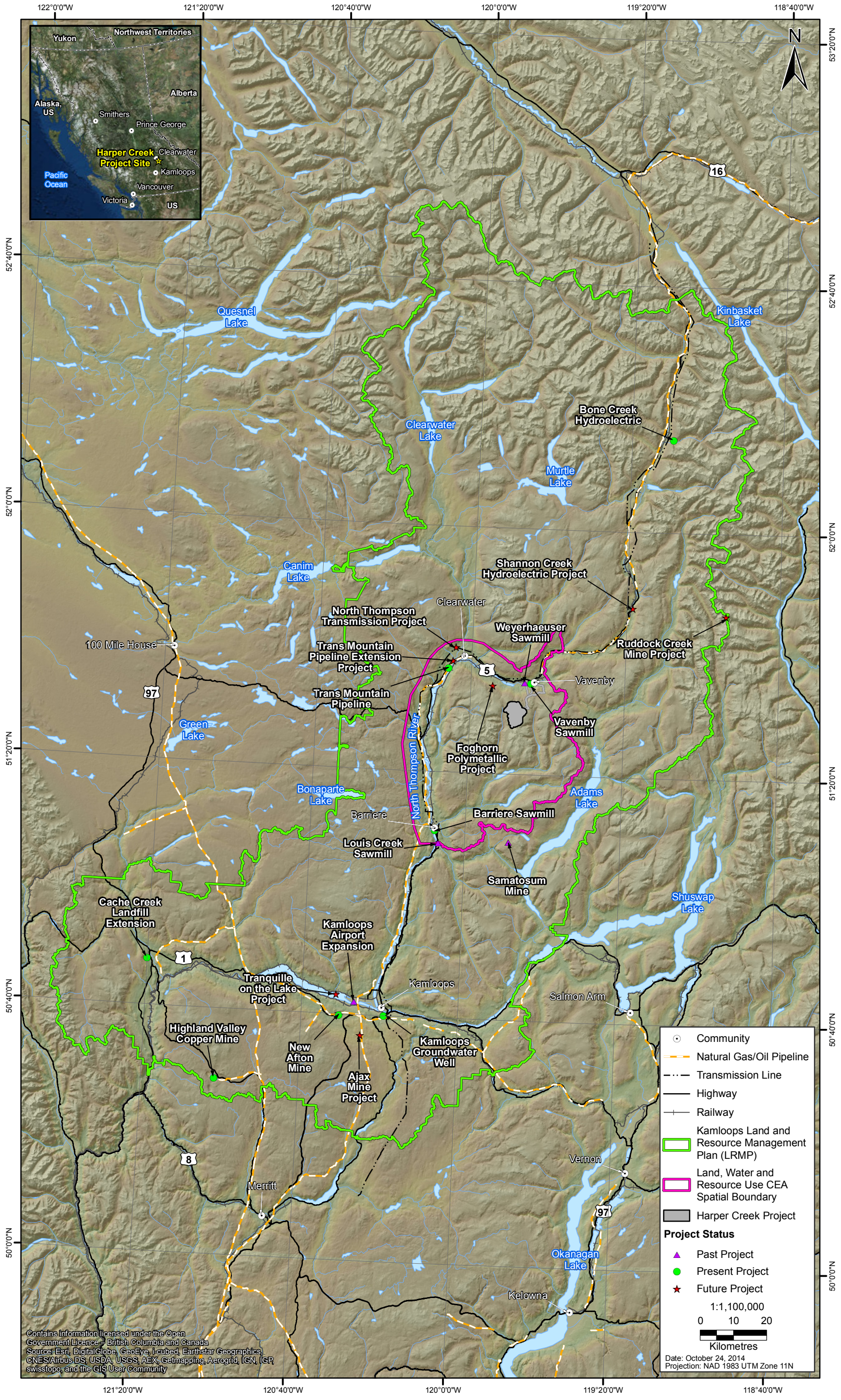
Spatial and Temporal Boundaries for Land Use Effects due to Changes in Noise Levels

Noise levels will immediately return to baseline levels after Project noise sources are removed. Therefore, the land use CEA only considers projects with construction and/or operation phases that overlap with the Project phases. As such, past projects or activities are not considered, and the assessment focuses on existing and potential future sources of noise. Moreover, noise impacts are typically restricted to within 10 km of the noise source; therefore, the land use CEA focuses on potential future projects and activities within 10 km of the Project.

[2] Far future effects are defined as effects that last more than 37 years, as per Table 8.6-2: Attributes for Characterization of Residual Effects.

Figure 18.6-1

Location of Past, Present and Reasonably Foreseeable Future Projects for the Land Use Cumulative Effects Assessment



Spatial and Temporal Boundaries for Land Use Effects due to Changes in Visual Quality

As discussed in Section 19.6.1 (Chapter 19, Visual Quality Effects Assessment), a viewer would not be able to discern infrastructure beyond a distance of 56 km, and 8 km is the nominal maximum distance at which the shape and pattern of an object emerges from the background. Therefore, the land use CEA considers projects within a 8 km radius of the Project. In scoping the projects and activities for the land use CEA, based on the considerations above, two project warranting consideration include the Vavenby sawmill, Foghorn polymetallic project.

18.6.2 Screening and Analyzing Cumulative Effects

Table 18.6-1 presents the projects and activities with the potential to interact cumulatively with the predicted residual effects due to a change in the experience of the natural environment. Table 18.6-2 summarizes key cumulative effects, mitigation, cumulative residual effects characterization criteria, likelihood, significance, and confidence.

Activities such as trapping, hunting, harvesting, fishing, use of recreation or private cabins, camping, trail riding or hiking, water extraction, and utility corridors would produce negligible noise levels compared to noise levels as a result of the Project and therefore there is no cumulative interaction.

The potential noise sources from the Vavenby sawmill may include lumber processing and traffic along the access road. Since the Traffic Impact Assessment (Appendix 5-E) was conducted in 2014, the existing traffic presented in the assessment includes the traffic from thesawmill. Moreover, the baseline noise monitoring conducted in 2012, would also include noise sources from thesawmill. Lumber processing noise is considered to be localized enough for there to be minimal interaction with noise produced by the activities associated with Project construction and operation, as evidenced by the noise levels found near the sawmill during baseline monitoring.

Although there is a possibility of interaction between the Project (Construction and Operations phases) and sawmill, this interaction is considered low-risk with the potential to result in a negligible to minor adverse effect. The visual impact of the sawmill is also considered to be low-risk given the disparate nature of the vistas from the sawmill. Therefore, it is unlikely the two Projects would interact to create a cumulative effect and further assessment is not warranted.

The only other reasonably foreseeable future project is the Foghorn polymetallic project. There has been a no registration reserve under the *Mineral Tenure Act* (1996f) Chapter 292 for uranium and thorium since 2008. As a result, there is a high level of uncertainty as to the timing for the development of this project and whether the project would be constructed during the life of the Harper Creek project. Therefore, it is unlikely that the two projects will interact to create a cumulative residual adverse effect; further assessment is not warranted.

Forestry may cumulatively interact with the land use residual effect by affecting visual quality, however, there is uncertainty regarding the location and size of future cutblocks as this information is not publically available.

Table 18.6-1. Impact Matrix for Screening and Ranking Potential Cumulative Effects

Residual Effects of the Harper Creek Project on Land use	Past Projects				Present Projects								Reasonably Foreseeable Future Projects							Activities										
	Weyerhaeuser Sawmill	Samatosum Project	Weyerhaeuser Sawmill	Louis Creek Sawmill	Highland Valley Copper	Bone Creek	Trans Mountain Pipeline	Kamloops Groundwater Project	New Afton	Cache Creek Landfill Extension	Vavenby Sawmill	Barriere Sawmill	North Thompson Transmission Project	Ruddock Creek Project	Trans Mountain Pipeline Expansion	Foghorn Polymtetallic Project	Tranquille on the Lake	Shannon Creek	Ajax Project	Aboriginal Harvesting	Hunting	Trapping	Fishing	Non-commercial Recreation	Commercial Recreation	Mineral Exploration	Utility Corridor (Gas/Oil pipeline)	Transportation	Agriculture	Forestry	Water Use
Change in quality and experience of the natural environment											🟡					🟡				🟢	🟢	🟢	🟢	🟢	🟢		🟢	🟢		🟢	🟢

Notes:

blank = No spatial or temporal interaction

🟢 = Negligible to minor risk of adverse cumulative effect; will not be carried forward in the assessment.

🟡 = Moderate risk of adverse cumulative effect; will be carried forward in the assessment.

🔴 = Major risk of adverse cumulative effect or significant concern; will be carried forward in the assessment.

N/A = Not Applicable

Table 18.6-2. Summary of Key Cumulative Effects, Mitigation, Cumulative Residual Effects Characterization Criteria, Likelihood, Significance, and Confidence

Key Cumulative Effect	**Mitigation Measures**	**Summary of Cumulative Residual Effects Characterization Criteria** *(Magnitude, Geographic Extent, Duration, Frequency, Reversibility, Resiliency)*	**Likelihood** *(High, Moderate, Low)*	**Significance of Adverse Cumulative Residual Effects**		**Confidence** *(High, Moderate, Low)*
				Scale (*Minor, Moderate, Major*)	**Rating** *(Not Significant; Significant)*	
Cumulative change in quality and experience of the natural environment			High	Moderate	Not Significant	Moderate

18.7 CONCLUSIONS FOR LAND USE

Within the LSA and RSA, there are commercial interests, including foresty, agriculture and trapping, public recreational use, navigable waters (Harper Creek and North Thompson River) as well as private land. Access to the Project Site will be via existing public roads, including the Vavenby Mountain, Vavenby Plateau and Vavenby-Saskum FSRs, and the new 2.5-km portion of the access road. With the implementation of the mitigation measures identified in Table 18.5-2, no effects on access and use of lands and resources by commercial interests, private landowners and the public, as well as effects on access to navigable waters by Aboriginal people and the public, are expected.

The results of the residual effects assessment and CEA for land use are summarized in Table 18.7-1. The effects assessment identifies a residual effect to the change in the quality and experience of the natural environment for public using the LSA for recreation. This effect is due to noise and visual quality effects from the Project. No cumulative residual effects are identified.

Table 18.7-1. Summary of Project and Cumulative Residual Effects, Mitigation, and Significance for Land Use

			Significance of Residual Effects	
Residual Effects	Project Phase	Mitigation Measures	Project	Cumulative
Change in quality and experience of the natural environment for public users	Construction and Operations	Noise Management Plan (Section 24.10); visual quality mitigation measures described in Section 19.5.4 of Chapter 19 (Visual Quality Effects Assessment)	Not significant (minor)	n/a

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1996g. *Mines Act*, RSBC. C. 293.

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