

## 8. EFFECTS ASSESSMENT METHODOLOGY

### 8.1 OBJECTIVES

The Harper Creek Project (the Project) is subject to both provincial and federal environmental assessment (EA) requirements and is undergoing a coordinated review in accordance with the regulatory process described in Chapter 2, Assessment Process. The coordinated EA process facilitates an integrated assessment for the identification and evaluation of potential adverse environmental, social, economic, heritage, and health effects that may result from the physical components and activities of the Project.

This chapter of the Application for an Environmental Assessment Certificate/Environmental Impact Statement (Application/EIS) describes the methodology used to identify and assess the potential effects of the Project, including any cumulative effects. The content included in this chapter is intended to:

- provide a general description of how baseline information was integrated into the Application/EIS;
- describe the methodology for the selection of valued components (VCs) to be assessed for potential adverse effects;
- describe the methodology used to evaluate the potential effects on VCs as a result of the Project; and
- describe the methodology used to evaluate the potential cumulative effects on VCs as a result of the interaction between the Project and other projects and activities in the vicinity of the Project.

### 8.2 ASSESSMENT FRAMEWORK

The methodology outlined in this chapter provides a structured framework that is consistently applied to all assessment topics. The methodology follows recommended federal and provincial guidelines and legislated requirements, pursuant to the BC *Environmental Assessment Act* (2002) and the *Canadian Environmental Assessment Act* (1992).<sup>1</sup> The following guidance documents were referenced when developing the assessment methodology:

- *Environmental Assessment Office User Guide* (BC EAO 2011);
- *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* (CEA Agency 1994b);
- *Assessing Environmental Effects on Physical and Cultural Heritage Resources* (CEA Agency 1996);

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<sup>1</sup> In July 2012, the *Canadian Environmental Assessment Act* (1992) was repealed and replaced by the *Canadian Environmental Assessment Act, 2012* (2012). Under transitional provisions in the *Canadian Environmental Assessment Act, 2012*, comprehensive studies initiated after the *Canadian Environmental Assessment Act* (1992) was amended in July 2010 are to be completed as if the former act had not been repealed.

- *Cumulative Effects Assessment Practitioners Guide* (Hegmann et al. 1999);
- *Reference Guide: Addressing Cumulative Environmental Effects* (CEA Agency 1994a); and
- *Operational Policy Statement: Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2013).

The detailed methods for the assessment of effects on the selected VCs are provided in the relevant chapters within the Application/EIS; Section 8.4.1 of this chapter describes the process for selecting the VCs.

Each chapter of the effects assessment considers the following four steps of the assessment methodology (Figure 8.2-1).

#### Step 1: Scoping

- Ensuring the effects assessment satisfies regulatory requirements for each assessment subject area.
- Selecting VCs with the greatest potential to interact with the proposed Project.
- Using consultation feedback to scope the effects assessment to issues and VCs of greatest concern.
- Identifying and describing appropriate components to assess each VC.
- Selecting appropriate assessment boundaries (temporal, spatial, administrative and technical) for each VC.

#### Step 2: Baseline Conditions

- Describing the environmental setting or baseline conditions relevant to each VC, including the regional and historical context of the Project Site and assessment subject area.

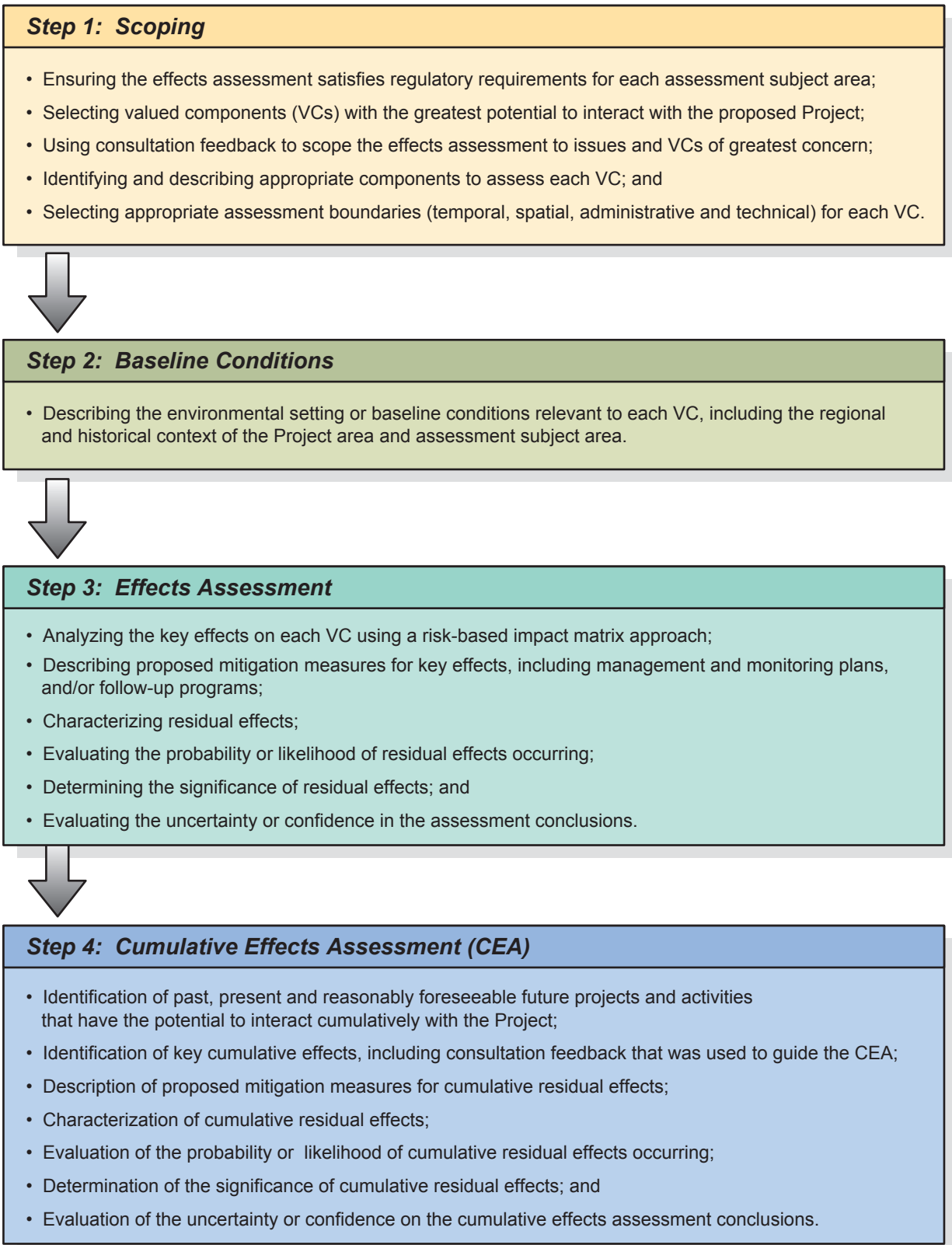
#### Step 3: Effects Assessment

- Analyzing the key effects on each VC using a risk-based impact matrix approach.
- Describing proposed mitigation measures for key effects, including management and monitoring plans, and/or follow-up programs.
- Characterizing residual effects.
- Evaluating the probability or likelihood of residual effects occurring.
- Determining the significance of residual effects.
- Evaluating the uncertainty or confidence in the assessment conclusions.

#### Step 4: Cumulative Effects Assessment (CEA)

- Identification of past, present and reasonably foreseeable future projects and activities that have the potential to interact cumulatively with the Project.

**Figure 8.2-1**  
**Effects Assessment Methodology**



- Identification of key cumulative effects, including consultation feedback that was used to guide the CEA.
- Description of proposed mitigation measures for cumulative residual effects.
- Characterization of cumulative residual effects.
- Evaluation of the probability or likelihood of cumulative residual effects occurring.
- Determination of the significance of cumulative residual effects.
- Evaluation of the uncertainty or confidence in the CEA conclusions.

### 8.3 REGULATORY CONTEXT

Each assessment chapter includes a separate description of the regulatory framework and regulatory requirements for each assessment topic. This includes laws, regulations, decrees, treaties and other instruments or declarations of relevance. In addition, the chapters discuss other plans and guidelines of importance to the Project or regional area, including jurisdictional policies. These include:

- *Kamloops Land and Resource Management Plan* (Kamloops Interagency Management Committee 1995);
- *District of Clearwater Official Community Plan* (District of Clearwater 2012); and
- North Thompson Economic Development Strategic Plan 2005-2010 (Westcoast CED Consulting Ltd. 2005).

### 8.4 SCOPING THE EFFECTS ASSESSMENT

Scoping is designed to ensure that the Application/EIS focuses on the issues with the greatest potential to cause significant adverse effects on the selected VCs. Each effects assessment chapter includes a description of the issues scoping process used to identify the VCs selected for assessment, including the indicators used to evaluate the effects, and the rationale for their selection. The chapters also describe the process used to select the assessment boundaries and the rationale for selecting those boundaries.

#### 8.4.1 Valued Components

The BC EAO and CEA Agency define 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 EA, there must be a perceived likelihood that the VC will be affected by the proposed Project.

##### 8.4.1.1 Consultation Feedback on 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, type of project being proposed, local area and regions where the proposed project would be located, and consultation with federal, provincial, and local agencies.

Each assessment chapter includes a summary of how scoping feedback was incorporated into the selection of assessment subject areas and VCs using the table format below (Table 8.4-1).

**Table 8.4-1. Consultation Feedback on Proposed Valued Component(s)**

Subject Area	Feedback by*				Issues Raised	Proponent Response
	AG	G	P/S	O		
VC1						
VC2						
VC3						

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

#### 8.4.1.2 Selecting Valued Components

VCs proposed for assessment were scoped into the EA and identified in the Application Information Requirements (AIR; Yellowhead Mining Inc. 2011) and Background Information (CEA Agency 2011) documents. Additional scoping was undertaken in 2014 to finalize the VCs selected for assessment. Each effects assessment chapter includes a description of the issues scoping process used to identify the VCs selected for assessment and the rationale for their selection or exclusion. The process for selecting VCs considers the following three criteria.

##### 1. Potential Interactions due to Spatial and Temporal Overlap of VCs with the Project

The Project components and activities associated with each phase of the Project are screened to identify potential interactions with proposed VCs. The list of key Project components and activities per phase has been developed from the Project's Technical Report and Feasibility Study (Merit 2014). The identification of potential interactions is based on issues or concerns raised to date during the EA process and through consultation activities (refer to Chapter 3, Information Distribution and Consultation), scientific knowledge, past experience on other mining projects (particularly in the interior of BC) and professional judgment. The preliminary evaluation of interactions will allow the assessment to scope in the VCs most likely to be affected. [Appendix 8-A](#) summarizes the VCs with the potential to interact with the Project.

The proposed VCs are then reviewed to ensure the assessment focuses on the most important components. Candidate VCs are screened for redundancy so that if multiple candidate VCs are affected in similar ways, one VC that is considered appropriate, relevant, and adequate to act as a proxy, is selected.

##### 2. Legislative or Regulatory Requirement or Government Management Priority

In each effects assessment chapter, the candidate VCs are evaluated to identify if:

- a legally binding government requirement exists to protect the component; and
- the component reflects a government management priority.

### 3. Availability of Adequate Data and Analytical Tools to Measure a Project related Effect on the VC

The potential effects of the Project on the VC must be measurable so that change in the condition of a VC can be detected.

Specific rationale for why each subject area and VC was selected is included in the relevant assessment chapter of this Application/EIS.

#### *8.4.1.3 Valued Components Selected for Assessment*

The proposed VCs that were selected for assessment for the Project are summarized in Table 8.4-2. The VCs are grouped into the five assessment pillars: environment, social, economic, heritage, and health.

Each of the effects assessment chapters will describe the VCs which are assessed within that chapter.

Effects of the Project on VCs that have the potential to affect Aboriginal groups' interests and rights are addressed in Chapter 23.

### **8.4.2 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. Each assessment chapter of the Application/EIS describes the spatial and temporal boundaries and rationale for their selection, as well as any administrative and technical boundaries if applicable.

#### *8.4.2.1 Temporal Boundaries*

Temporal boundaries are the time periods considered in the assessment for various Project phases and activities. Temporal boundaries should reflect those periods during which planned Project activities are reasonably expected to potentially affect a VC. These boundaries are adjusted as appropriate to reflect seasonal and annual variations, or biophysical constraints related to a VC.

Potential effects will be considered for each phase of the Project as described in Table 8.4-3. Note that the Operations phase will comprise a first stage of 23 years (Operations 1) and a second stage of five years (Operations 2).

#### *8.4.2.2 Spatial Boundaries*

Spatial boundaries are determined based on the anticipated magnitude and spatial extent of Project related effects. They are determined by the location and distribution of VCs and can be defined as the anticipated zone of influence between the Project component/activity and the VC being studied. There are three zones of influence between the Project and the VC being studied: the Project Site, the local study area (LSA), and the regional study area (RSA). The following spatial boundaries are considered in each of the effects assessment chapters.

**Table 8.4-2. Valued Components Selected for Assessment**

Assessment Category	Subject Area	Valued Components
Environment	Atmospherics	Air quality
	Noise	Noise
	Hydrogeology	Groundwater quality Groundwater quantity
	Surface water	Surface water quality
	Hydrology	Surface water quantity
	Aquatic environment	Fish Fish habitat Aquatic resources
	Vegetation	Rare plants Ecological communities at risk Wetlands Old-growth forest
	Wildlife and wildlife habitat	Terrestrial invertebrates Amphibians Migratory birds Raptors Bats Fur-bearers Large mammals Ungulates
Socio-economic	Economic	Community growth
	Social	Visual quality Community health and well-being
	Land use	Commercial interests Public use Navigable waters Private land
	Current use of lands and resources for traditional purposes	Current use of lands and resources for traditional purposes
Heritage	Heritage	Archaeology Paleontology Cultural heritage
Health	Health	Human health

**Table 8.4-3. Temporal Boundaries for the 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 to 23	23 years	Active mining in the open pit from year 1 through year 23.
Operations 2	24 to 28	5 years	Low-grade ore processing from the end of active mining through to the end of year 28.
Closure	29 to 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.

### Project Site

The Project Site is bound by a 500 m buffer around the proposed Project infrastructure, including:

- the open pit;
- the open pit haul road, primary crusher, and ore conveyor;
- mill plant site with ore processing facilities and intake/outtake pipelines;
- tailings management facility (TMF) with submerged PAG waste rock;
- overburden, topsoil, potentially acid generating (PAG) waste rock and non-PAG waste rock stockpiles, including water management ponds; and
- non-PAG and PAG low grade ore stockpiles.

The Project Site overlaps the boundary between the Headwaters Forest District and the Kamloops Forest District (refer to Figure 8.4-1).

The footprint of the Project extends beyond the main Project Site and includes the new 2.5-km portion of the access road, and the two power line route options.

### Local Study Area

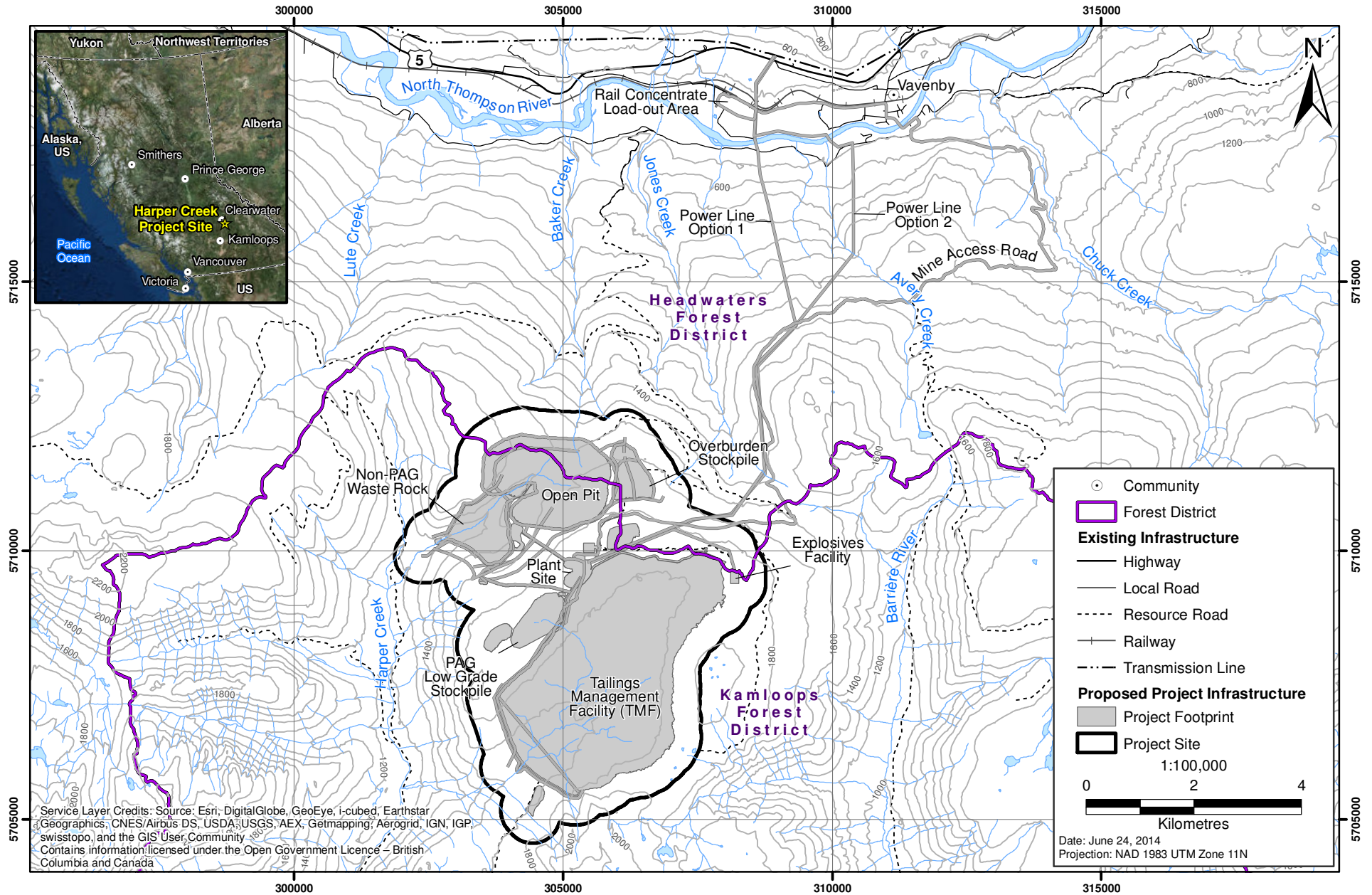
The LSA contains the Project Site and a buffer zone which varies for each VC; within the buffer zone there is a reasonable potential for direct and indirect effects on a specific VC due to an interaction with Project components or activities.

### Regional Study Area

The RSA is defined as the spatial area within which there is a potential for direct and indirect effects and/or cumulative effects to occur as a result of the Project. The RSA is typically based on a natural transition (e.g., watershed boundary, biogeoclimatic zone) or an artificial delineation (e.g., political or economic district or zone) that is relevant to the VC (BC EAO 2013). For the project effects assessment, qualitative analysis is more common than quantitative analysis at the RSA scale.



**Figure 8.4-1**  
**Project Location and Infrastructure**



#### 8.4.2.3 *Administrative and Technical Boundaries*

Administrative boundaries arise when jurisdictional (i.e., political) issues, or time and financial constraints influence the process of identifying Project effects. Examples of administrative boundaries include confidentiality associated with sensitive cultural sites or archaeological remains, or newly imposed policy requirements which were introduced after the studies for a VC were undertaken.

Technical boundaries limit the ability to sample the environment (e.g., a legal restriction prohibiting the sampling of Species at Risk), thereby limiting the ability to predict or measure change. For example, sampling may be compromised when dealing with large geographical settings, or sensitive species which may only practically be sampled by proxy, rather than by actual measurement.

## 8.5 BASELINE CONDITIONS

### 8.5.1 Regional and Historical Setting

Each effects assessment chapter provides a regional overview and description of historical activities relevant to the environmental, social, economic, heritage, and health conditions surrounding the Project or to the specific VC being assessed. Regional data are used to inform the assessment framework and to characterize Project-related and cumulative effects. The section also describes processes relevant to the environmental, social, economic, heritage and health regional settings including current conditions, trends and variability over time. Information described in each assessment chapter includes:

- available scientific studies to describe the regional conditions and processes, supplemented by Aboriginal traditional knowledge and community knowledge; and
- references to supporting documents, maps and technical reports, some of which are included as appendices to the Application/EIS.

### 8.5.2 Baseline Studies

Each effects assessment chapter provides an overview of the baseline studies undertaken to support the assessment. Key information on the baseline study area, data collection, analysis, limitations and methodology are provided for each VC. The detailed baseline study results and relevant supporting information are provided as appendices to the Application/EIS for each subject area.

A summary table of the Project-specific field baseline data collection programs undertaken for each subject area is provided below (Table 8.5-1).

### 8.5.3 Existing Conditions

Each effects assessment chapter provides key information on the results of the baseline studies. The existing conditions within both the LSA and RSA of the specific component, VC or discipline being assessed are presented, and a discussion on the results is included. The discussion details the significance of the baseline results and covers any unusual results or uncertainties encountered.

**Table 8.5-1. Summary of Field Baseline Studies for the Harper Creek Project**

Assessment Pillar	Subject Area	Baseline Data	Years of Available Data	
Environment	Atmospherics	Dustfall	2011 to 2014	
		Meteorological	2007 to 2014	
	Noise	Noise	September 2012	
	Hydrogeology	Groundwater quality	2010 to 2014	
		Groundwater quantity	2010 to 2014	
	Surface water	Surface water quality	2007 to 2014	
	Hydrology	Surface water quantity	2011 to 2014	
	Aquatic environment	Fisheries and aquatic studies	2011 to 2014	
	Terrestrial environment	Soil	Data from 2008 fieldwork, and 2011; 2012	
		Geohazards	Bioterrain mapping 2009; 2011	
	Vegetation	Rare plants	Data from 2005 to 2011, and 2011 to 2012 fieldwork	
		Terrestrial Ecosystem Mapping	2000; 2011	
	Wildlife and Wildlife Habitat	Butterflies, dragonflies, and damselflies		2011
			Western toad	2008; 2011
			Barn swallow	2008;2011
Common nighthawk			2012	
Great blue heron			2012	
Harlequin duck			2008	
Olive-sided flycatcher			2008; 2011	
Bald eagle			2012	
Northern goshawk			2011; 2012	
Western screech-owl			2011	
Bats			2011;2012	
Fisher			2008;2011	
Grizzly bear			2008; 2011; 2012	
Moose			2008; 2011	
Mountain caribou	2008; 2011			
Mountain goat	2008; 2011			
Mule deer	2008; 2011			
Wolverine	2008; 2011			
Socio-economic	Socio- economic	Socio-economic	2006; 2009 - 2013;	

*(continued)*

**Table 8.5-1. Summary of Field Baseline Studies for the Harper Creek Project (completed)**

Assessment Pillar	Subject Area	Baseline Data	Years of Available Data
Heritage	Heritage	Archeological impact assessment	2011, 2012
		Archaeological overview assessment	2014
		Paleontological potential	2014
		Historic information on LSA	Up to 2014
		Traditional land use and ecological knowledge study	2012
Health	Health – Country Foods Baseline	Soil data	2012
		Surface water quality data	2007 to 2014
		Vegetation data (huckleberry leaves and berries, Sitka valerian, willow, fireweed, and sorbus)	2012
		Fish data (Rainbow Trout and Bull Trout)	2011 to 2012
		Small terrestrial mammal data	2012

## 8.6 EFFECTS ASSESSMENT AND MITIGATION

### 8.6.1 Screening and Analyzing Project Effects

The relationship between Project components and activities and potential Project effects is established using an impact matrix. The impact matrix applies a risk-based approach to filter potential effects into low, moderate, or high risk ratings as a result of Project-VC interactions. This process serves to focus the effects assessment on the project components and activities which are likely to have the most influential effects on each VC, in accordance with the methodology described by the BC EAO (2013).

The impact matrix results are then supported by a range of qualitative and quantitative studies and analytical techniques (e.g., predictive modelling results) to evaluate the risk of effects on each VC being assessed. When data are lacking, professional judgement is used to inform this evaluation.

An impact matrix is provided in each effects assessment chapter using the example layout shown in Table 8.6-1; supporting rationale for the assigned risk ratings is also provided.

### 8.6.2 Mitigation Measures

Each effects assessment chapter of the Application/EIS discusses the availability and implementation of mitigation measures to avoid, minimize, control, restore on-site, or offset effects to VCs, in particular for those effects rated as moderate or high risk.

**Table 8.6-1. Example of Risk Ratings of Project Effects on <Subject Area> Valued Components**

Project Component/Activity and Potential Effects	VC 1	VC 2	VC 3	VC 4	VC 5
<b>Construction</b>					
Project Component/ Activity 1	●	●		●	●
Project Component/ Activity 2	●		●	●	
<b>Operations*</b>					
Project Component/ Activity 3	●	●	●	●	●
Project Component/ Activity 4		●	●	●	
<b>Closure</b>					
Project Component/ Activity 5	●	●		●	
Project Component/ Activity 6			●	●	
<b>Post-Closure</b>					
Project Component/ Activity 7	●		●	●	●
Project Component/ Activity 8		●		●	

● = 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.

Key approaches considered to mitigate potential effects include the following.

- **Optimizing Alternatives:** Preventing or reducing adverse effects by changing an aspect of the Project (e.g., choosing a new access route).
- **Design Changes:** Preventing or reducing adverse effects by redesigning aspects of the Project (e.g., changing the routing of the transmission line), or changing the timing of an activity (e.g., minimizing or prohibiting road usage during key migration periods).
- **Best Achievable Control Technology (BACT):** Eliminating, minimizing, controlling, or reducing adverse effects through the use of technological applications (e.g., high density sludge water treatment plants).
- **Management Practices:** Eliminating, minimizing, controlling, or reducing adverse effects on intermediate components or VCs through management practices (e.g., watering unpaved roads to control dust).
- **Restoration:** Restoration focuses on establishing appropriate composition, structure, pattern, and ecological processes necessary to make systems sustainable, resilient, and healthy under current and future conditions. Restoration is different from avoiding and minimizing residual effects because it can be implemented at a later date.
- **Offsetting:** Offsetting remaining effects that cannot be prevented or reduced through remedial actions, so that the net effect on the community or ecosystem is neutral or beneficial

(e.g., enhancement of similar habitat in another area, enhancement of other social/economic/cultural benefits).

The anticipated effectiveness of each mitigation measure to reduce the risk of adverse effects will be classified as low, moderate, high, or unknown. These criteria are defined as:

- Low effectiveness: After implementation of the mitigation measure, there is still a major change in the VC or indicator from the baseline condition.
- Moderate effectiveness: After implementation of the mitigation measure, there is a moderate change in the VC or indicator from the baseline condition.
- High effectiveness: After implementation of the mitigation measure, there is no change in the VC or indicator from the baseline, or an environmental enhancement is evident.
- Unknown effectiveness: The mitigation measure has not been tried elsewhere in similar circumstances and the response of the VC or indicator compared to the baseline is unknown.

#### 8.6.2.1 *Environmental Management Plans and Reporting*

Proposed frameworks for Environmental Management Plans and reporting for key subject areas are provided in Chapter 24 of the Application/EIS. Each plan applies a systematic approach for integrating Project-specific mitigation and monitoring activities throughout the life cycle of the Project (i.e., into each Project phase), as well as any proposed monitoring and reporting.

Plans included in Chapter 24 of the Application/EIS are:

- Air Quality Management Plan;
- Archaeology and Heritage Monitoring Plan;
- Emergency Response Plan;
- Explosives Handling Plan;
- Fish and Aquatic Effects Monitoring and Management Plan;
- Fuel and Hazardous Materials Management Plan;
- Groundwater Management Plan;
- Mine Waste and ML/ARD Management Plan;
- Noise Management Plan;
- Sediment and Erosion Control Plan;
- Selenium Management Plan;
- Site Water Management Plan;
- Soil Salvage and Storage Plan;
- Spill Prevention and Response Plan;
- Traffic and Access Management Plan;

- Vegetation Management Plan;
- Waste Management Plan; and
- Wildlife Management Plan.

If the implementation of mitigation measures will eliminate a potential effect (i.e., considered highly effective) and no residual effect is identified on that VC, the effect is eliminated from further analyses. If the proposed implementation controls and mitigation measure(s) are not sufficient to eliminate an effect, a residual effect is identified. Residual effects with moderate to high risk (or for which mitigation effectiveness is low, moderate, or unknown) are carried forward for additional characterization and a significance determination.

A summary of potential effects and proposed mitigation measures for each subject area and/or VC is provided in each assessment chapter.

### 8.6.3 Characterization of Residual Effects

Key residual effects are those effects of greater importance (i.e., moderate to high risk) that remain after mitigation has been applied. If results have not already been presented in the preceding analysis, the analysis of residual effects after mitigation is applied will be presented in this section. Best practice methods to predict the nature and extent of effects that could result from the Project will be used. These methods are described in each assessment chapter, including any relevant references, analyses, and explanations from scientific, engineering, community, and Aboriginal knowledge.

To determine whether a residual effect is adverse, a characterization of the residual effect is undertaken using the attributes defined below. Any modifications to these characterization criteria are discussed in the relevant Application/EIS chapter. Each assessment chapter describes individual ranking criteria pertaining to a particular effect, and where possible, assigns and rationalizes quantitative levels or values (e.g., threshold values). Table 8.6-2 presents the different attributes to characterize the residual effects; these include magnitude, geographic extent, duration, frequency, reversibility, and resiliency. These attributes are used to support the determination of significance.

### 8.6.4 Likelihood of Effects

Likelihood refers to the probability of the predicted residual effect occurring and is determined according to the attributes identified in Table 8.6-3. Narrative descriptions and justifications for the likelihood (probability) assessment are provided along with the valuation of these attributes in each of the chapters within the Application/EIS.

### 8.6.5 Significance of Residual Effects

The CEA Agency's (1994b) *Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* was used as guidance in evaluating the significance of the adverse residual effects for the Project. The significance of residual effects of the Project is founded on a comparison of the current VC if the Project does not proceed, with the predicted state of the VC if the Project proceeds, after mitigation measures described in Section 8.6.2 are applied.

**Table 8.6-2. Attributes for Characterization of Residual Effects**

Timing*	Magnitude	Geographic Extent		Duration	Frequency	Reversibility	Resiliency
		Biophysical	Socio-economic				
<i>When will the effect begin?</i>	<i>How severe will the effect be?</i>	<i>How far will the effect reach?</i>		<i>How long will the effect last?</i>	<i>How often will the effect occur?</i>	<i>To what degree is the effect reversible?</i>	<i>How resilient is the receiving environment or population? Will it be able to adapt to or absorb the change?</i>
<b>Construction Phase</b>	<b>Negligible:</b> no detectable change from baseline conditions.	<b>Discrete:</b> effect is limited to the Project Site.	<b>Individual/household:</b> effect is limited to individuals, families and/or households.	<b>Short term:</b> effect lasts less than 2 years (e.g., during the Construction Phase of the Project).	<b>One time:</b> effect is confined to one discrete event.	<b>Reversible:</b> effect can be reversed.	<b>High:</b> the receiving environment or population has a high natural resilience to imposed stresses, and can respond and adapt to the effect.
<b>Operations Phases (Stages 1 and 2)</b>	<b>Low:</b> differs from the average value for baseline conditions but remains within the range of natural variation and below a guideline or threshold value.	<b>Local:</b> effect is limited to the Local Study Area.	<b>Community:</b> effect extends to the community level.	<b>Medium term:</b> effect lasts from 2 to 30 years (i.e., encompassing both stages of the Operations phase).	<b>Sporadic:</b> effect occurs rarely and at sporadic intervals.	<b>Partially reversible:</b> effect can be partially reversed.	<b>Neutral:</b> the receiving environment or population has a neutral resilience to imposed stresses and may be able to respond and adapt to the effect.
<b>Closure Phase</b>	<b>Medium:</b> differs substantially from the average value for baseline conditions and approaches the limits of natural variation, but equal to or slightly above a guideline or threshold value.	<b>Regional:</b> effect occurs throughout the Regional Study Area.	<b>Regional/Aboriginal peoples:</b> effect extends across the broader regional community/economy, or across one or more First Nations group(s) territories.	<b>Long term:</b> effect lasts from 30 to 37 years (i.e., effects last into the closure phase)	<b>Regular:</b> effect occurs on a regular basis.	<b>Irreversible:</b> effect cannot be reversed, is of permanent duration.	<b>Low:</b> the receiving environment or population has a low resilience to imposed stresses, and will not easily adapt to the effect.
<b>Post-closure Phase</b>	<b>High:</b> differs substantially from baseline conditions and is significantly beyond a guideline or threshold value, resulting in a detectable change beyond the range of natural variation.	<b>Beyond regional:</b> effect extends beyond the Regional Study Area.	<b>Beyond regional:</b> effect extends beyond the regional scale, and may extend across or beyond the province.	<b>Far future:</b> effect lasts more than 37 years (i.e., effects last into the Post-closure Phase and beyond).	<b>Continuous:</b> effect occurs constantly.		

\*Timing has been included for information purposes but is not an attribute of the residual effects characterization criteria.



**Table 8.6-3. Attributes of Likelihood of Effects**

Probability Rating	Quantitative Threshold
High	> P80 (effect has > 80% chance of effect occurring)
Moderate	P40 - P80 (effect has 40-80% chance of effect occurring)
Low	< P40 (effect has < 40% chance of effect occurring)

To assess the significance of a residual effect, the Application/EIS relies on detailed information including statistical analysis or mathematical modelling, including predictive model results previously presented in the effects assessment. When defining and evaluating the significance of a moderate to high risk residual effect, characterization criteria thresholds (e.g., aquatic life receiving environment criteria, ambient air criteria, or land and resource management planning objectives) are considered and applied. Each assessment chapter defines these thresholds and provides the source literature for those thresholds as described above in Section 8.6.3.

The significance determination follows a two-step process; first the severity of residual effects is ranked according to a minor, moderate and major scale. Each assessment chapter clearly defines how the scale was determined, based on the specifics of the VC being assessed. Then, a consideration of whether minor, moderate, or major effects are significant is made, following the definitions below.

- **Not significant (minor or moderate scale):** 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 scale):** 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.

Each assessment chapter clearly defines how the terms “significant” and “not significant” were considered in relation to each VC, and provides a detailed rationale for the significance determination as illustrated in Plate 8.6-1.

### 8.6.6 Confidence and Uncertainty in Determination of Significance

Confidence, which can also be understood as the level of uncertainty associated with the assessment, is a measure of how well residual effects are understood. The reliability of data inputs and analytical methods used to predict Project effects, confidence regarding the effectiveness of mitigation measures, and certainty of the predicted outcome may all be considered. Confidence allows the decision-maker to evaluate risk associated with the Project. Confidence attributes are provided in Table 8.6-4 below.

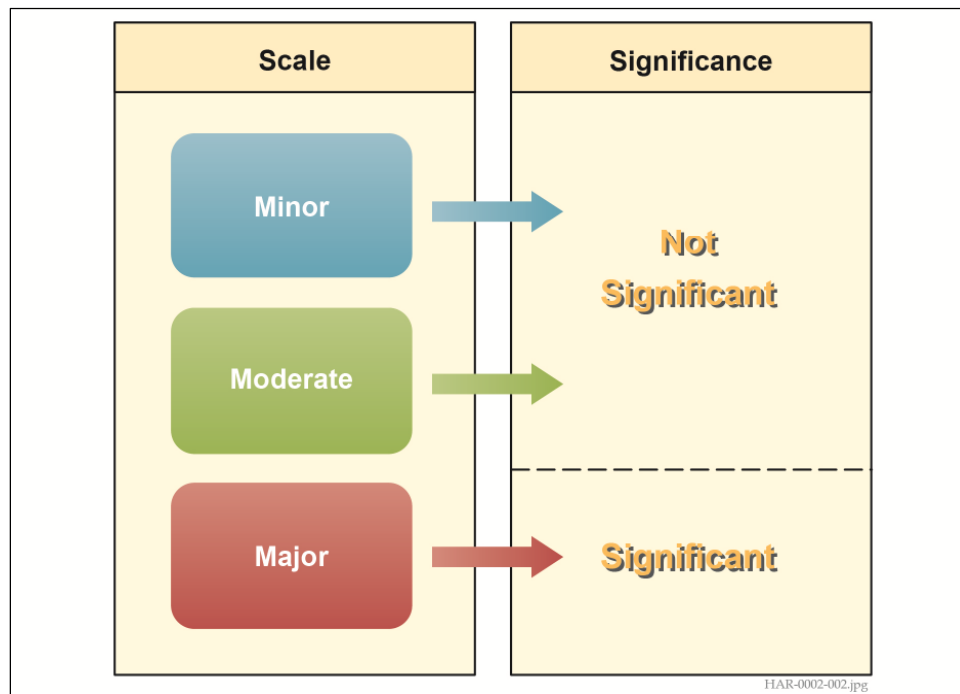


Plate 8.6-1. Determination of significance.

**Table 8.6-4. Attributes of the Confidence in the Significance or Likelihood of the Effects**

Confidence Rating	Qualitative Threshold
High	There is a good understanding of the cause-effect relationship and all necessary data are available for the Project Site. The effectiveness of the mitigation measures is well known. There is a low degree of uncertainty, and variation from the predicted effect is expected to be low.
Moderate	The cause-effect relationships are not fully understood, there are a number of unknown external variables, or data for the Project Site are incomplete. The effectiveness of mitigation measures is moderately well understood. There is a moderate degree of uncertainty; while results may vary, predictions are relatively confident.
Low	The cause-effect relationships are poorly understood, there are a number of unknown external variables, and data for the Project Site are incomplete. The effectiveness of the mitigation measures may not yet be proven. High degree of uncertainty and final results may vary considerably.

Each assessment chapter includes a discussion on how the identified uncertainties affect the confidence rating.

### 8.6.7 Summary of Project Effects Assessment

Residual effects on VCs, the characterization criteria, significance determination, likelihood, and confidence evaluations will be summarized for each assessment chapter using the format shown in Table 8.6-5.

**Table 8.6-5. Summary of Key Effects, Mitigation, Residual Effects, Likelihood, Significance, and Confidence**

Key Effect	Mitigation Measures	Summary of Residual Effects Characterization Criteria <i>(Magnitude, Geographic Extent, Duration, Frequency, Reversibility, Resiliency)</i>	Likelihood <i>(High, Moderate, Low)</i>	Significance of Adverse Residual Effects		Confidence <i>(High, Moderate, Low)</i>
				Scale <i>(Minor, Moderate, Major)</i>	Rating <i>(Not significant; Significant)</i>	

## 8.7 CUMULATIVE EFFECTS ASSESSMENT

Cumulative effects are the result of Project related residual effects interacting with the residual effects of other human actions (i.e., anthropogenic developments, projects, or activities) to produce a combined effect.

The approach to assessing cumulative effects generally follows the same steps as the Project-specific effects assessment, as described in Section 8.6, namely scoping, identification and analysis of potential cumulative effects, identification and description of mitigation measures, with subsequent identification of residual cumulative effects, and characterization of residual cumulative effects to determine significance.

The methodology, which is used throughout all assessment chapters, considers the following guidance documents specific to cumulative effects:

- *Operational Policy Statement: Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012* (CEA Agency 2013);
- *Operational Policy Statement: Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act* (CEA Agency 2007);
- *Cumulative Effects Practitioners Guide* (Hegmann et al. 1999);
- *A Reference Guide for the Canadian Environmental Assessment Act: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* (Federal Environmental Assessment Review Office 1994); and
- *Reference Guide: Addressing Cumulative Environmental Effects* (CEA Agency 1994a).

### 8.7.1 Scoping Cumulative Effects

#### 8.7.1.1 Valued Components and Residual Effects

The CEA considers the VCs for which residual effects are predicted. Each assessment chapter will clearly indicate the VCs and effects that are considered for assessment in this section.

#### 8.7.1.2 Defining Assessment Boundaries

Similar to the Project related effects, the assessment boundaries define the maximum limit within which the CEA is conducted. Each assessment chapter will include a description and identification of the temporal and spatial boundaries considered. These boundaries take into account the potential environmental effects that may combine or overlap with other physical projects and activities.

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 activities;<sup>2</sup>
- 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.

The spatial boundaries for the identification of other physical projects and activities for the assessment of cumulative effects have been identified in the AIR as the Kamloops Land and Resource Management Plan boundary, and are illustrated in Figure 8.7-1.

These boundaries are referred to as the CEA area.<sup>3</sup>

#### 8.7.1.3 *Projects and Activities Considered*

Past, present, and reasonably foreseeable future projects and activities within the CEA boundary described above were considered in the CEA. The project list was developed from a wide variety of information sources, including municipal, regional, provincial and federal government agencies, other stakeholders, and companies' and businesses' websites.

Details of projects included for consideration in the CEA are presented in Table 8.7-1 and details of land use activities are summarized in Table 8.7-2. Figure 8.7-1 shows the location of past, present, and reasonably foreseeable future projects, and the location of land-use activities are presented in Figures 8.7-2 to 8.7-5.

### 8.7.2 **Screening and Analyzing Cumulative Effects**

The relationship between past, present, and reasonably foreseeable future projects and activities, and the Project, is established using an impact matrix. The impact matrix applies a risk-based approach to filter potential effects into low, moderate, or high risk ratings as a result of past, present, and future project/activities-VC interactions. This process serves to focus the CEA on the project and activities which are likely to have the most influential effects on each VC.

The impact matrix uses a range of characterization and prediction methods, including qualitative and quantitative techniques to predict the nature of the effects. When data are lacking, professional judgement is used to determine the extent of potential cumulative effects. Screening criteria were

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<sup>2</sup> 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.

<sup>3</sup> Note that the CEA area only refers to the spatial boundaries for the identification of other physical projects and activities, i.e., the Kamloops LRMP boundary. Each assessment chapter will define its own spatial and temporal boundaries for the CEA.

applied to determine whether projects and activities should be included or excluded from the CEA, including some or all of the following considerations:

- a project/activity is within the regional study area of a VC;
- a project/activity is within zone of influence of Project effects;
- a project/activity is within or effects overlap with socio-economic influenced areas;
- a project/activity has an effect on migratory species; and
- a high degree of confidence exists that the other project or activity would not interact with the residual effects of the Project.

An impact matrix is provided in each effects assessment chapter using the example layout shown in Table 8.7-3; supporting rationale for the assigned risk ratings is also provided.

### **8.7.3 Mitigation Measures**

Mitigation measures for cumulative effects involves taking further action, where possible, to avoid or minimize cumulative effects on VCs. Because cumulative effects typically result from the combined effects of multiple developments, responsibility for their prevention and management is shared among the various contributing developments. It is usually beyond the responsibility or capability of any one party to implement all of the measures needed to reduce or eliminate cumulative effects; therefore, collaborative efforts are needed. The mitigation measures that can be implemented by Harper Creek Mining Corporation are described for each effect in the relevant chapters of the Application/EIS.

Mitigation measures are considered only for those effects identified in Section 8.7.2 as potential key cumulative interactions (moderate to major risk). If the proposed implementation controls and mitigation measure(s) eliminate or reduce the risk of a potential cumulative effect to a minor or negligible ranking, then the effect is eliminated from further analyses (as there is minimal risk of the cumulative effect being residual). If the proposed implementation controls and mitigation measure(s) are deemed insufficient to eliminate a key cumulative effect for a VC, a moderate or major risk of a cumulative residual effect is identified and carried through to the significance determination exercise.

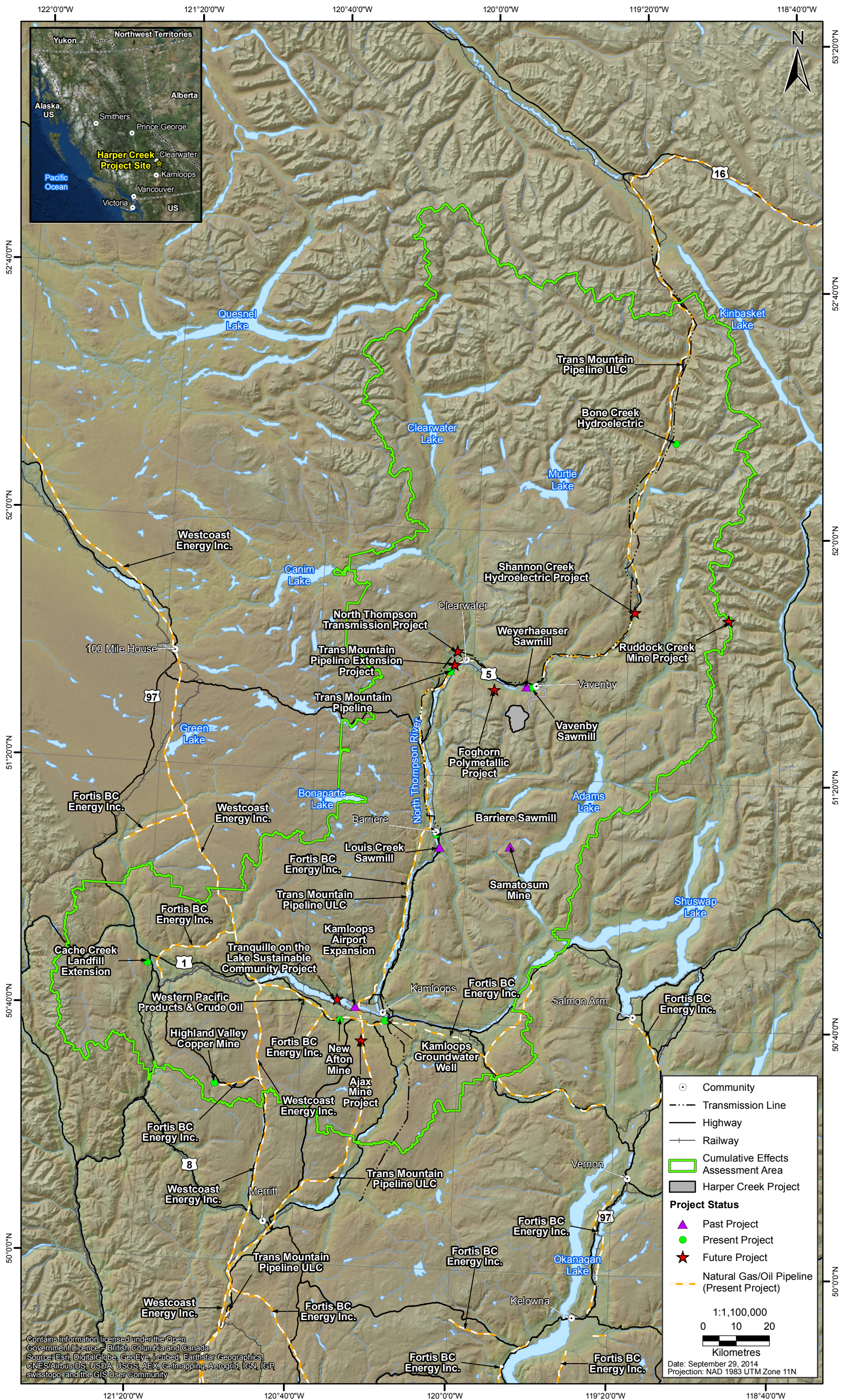
A summary of the proposed mitigation measures and their effectiveness on the VC is provided for each assessment category using the format shown in Table 8.7-4. The table uses the same definitions outlined in Section 8.6.3.

### **8.7.4 Cumulative Residual Effects, Characterization, Likelihood, and Significance**

Cumulative residual effects are characterized and evaluated using the same criteria and definition thresholds established for the project-specific effects assessment (see Table 8.6-2). Each assessment chapter describes individual ranking criteria pertaining to a particular effect, and where possible, assigns and rationalizes quantitative levels or values (e.g., threshold values).

Figure 8.7-1

Location of Past, Present and Reasonably Foreseeable Future Projects in the Cumulative Effects Assessment Area



**Table 8.7-1. Details of Past, Present, and Reasonably Foreseeable Future Projects**

	Project Name	Company/Organization	Project Type	Start Date	End Date	Footprint Size	Project Description	Current Regulatory Status	Throughput
Past	Weyerhaeuser Sawmill	Yellowhead Mining Inc.	Sawmill	1965	2003	79.3 ha	A sawmill operation, currently closed with no plans for resuming construction. The property is proposed for use for concentrate storage, rail access, and staging grounds for the Harper Creek Project.	Closed	25 million tonnes (Mt) per year
	Samatosum Mine	Inmet Mining	Mining	1989	1992	Unknown	A mine that produced gold, silver, copper, and base metals. Remaining infrastructure includes a small open pit, 32 ha waste rock dump, flooded tailings impoundment, several borrow pits, and plant site area.	Closed	465 t of ore per day
	Kamloops Airport Expansion	The Kamloops Airport Authority Society	Transportation	2007	2009	2,000-foot runway extension, improved navigation aids, and an expanded airport terminal.	Kamloops Airport Expansion. The Kamloops Airport Authority Society expanded the Kamloops Airport to accommodate larger jet aircraft. The project included expansion of the main runway and airport terminal building, as well as improvements to navigational aids.	Projects that do not require an EA certificate	n/a
	Louis Creek Sawmill	Tolko Industries	Sawmill	Unknown	2003	Unknown	Sawmill closed following destruction by forest fire.	Closed	Unknown
Present	Trans Mountain Pipeline	Kinder Morgan	Petroleum pipeline	1952	Unknown	1,150 km length	A pipeline system used to transport petroleum products from Strathcona County, AB to Burnaby, BC.	Active	300,000 barrels per day
	Vavenby Sawmill	Canfor	Sawmill	Unknown	Unknown	Unknown	A sawmill operation processing approximately 13% of the annual cut in the Kamloops Timber Supply Area.	Active	480 million board feet of SPF lumber per year
	Bone Creek Hydroelectric	Trans Alta	Clean Energy	2011	2031	Unknown	Run-of-river hydroelectric project. It is expected to have a long-term average generation of 72 GWh per year.	Active	19 megawatts (MW)
	Barriere Sawmill	Gilbert Smith Forest Products	Sawmill	1968	Unknown	28 acres	An operating cedar sawmill.	Active	Unknown
	New Afton Mine	New Gold Inc.	Mining	2012	2024	12,450 ha	A mine that produced gold, silver and copper. The mine occupies the site of the historic Afton Mine, a previous operation of Teck Resources Limited, and includes an open pit, underground workings, historic support facilities, a new concentrator and recently constructed tailings facility.	Active	85,000 ounces of gold and 75 million pounds of copper annually
	Cache Creek Landfill Extension	Village of Cache Creek and Wastech	Waste Disposal	2009	Unknown	7 ha annex (part of the 56 ha area)	Cache Creek Landfill Extension. An extension of the existing Cache Creek Landfill by 40 ha to provide an additional 15 Mt of disposal capacity. The filling rate is expected to range between 500,000 and 750,000 t per year and it has an expected lifespan of 20 to 30 years.	Certificate issued	Permitted to receive up to 500,000 t of municipal solid waste per year
	Kamloops Groundwater Well	City of Kamloops	Water Management	2001	Unknown	Unknown	Kamloops groundwater collector well project.	Certificate issued	The new well is designed to withdraw 40,000 to 48,000 m <sup>3</sup> /day of groundwater from the aquifer
Highland Valley Copper Mine	Teck	Mining	1963	2027	34,000 ha	An open-pit copper and molybdenum mine near Logan Lake, approximately 130 km southwest of the Project. The mine includes several open pits, a processing plant, and a tailings pond.	Active	45 Mt milled per year	
Future	Foghorn Polymetallic Project	International Ranger Corp.	Mining	Unknown	Unknown	3,129 ha	A mineral claim and proposed uranium mine, with the potential for future work mining other commodities including fluorite, celestite, rare earth metals, and molybdenum.	No registration reserve under the Mineral Tenure Act [RSBC 1996] Charter 292 for uranium and thorium	Unknown
	North Thompson Transmission Project	BC Hydro	Transmission line	2015/2016	Unknown	85 - 100 km length	An upgrade to the existing and active transmission line.	On hold	High voltage overhead 230 kV transmission line

(continued)



**Table 8.7-1. Details of Past, Present, and Reasonably Foreseeable Future Projects (completed)**

	Project Name	Company/Organization	Project Type	Start Date	End Date	Footprint Size	Project Description	Current Regulatory Status	Throughput
Future (cont'd)	Ruddock Creek Mine Project	Selkirk Metals Corp.	Mining	Unknown	Construction start date + 10 years	Mine site approximately 644 ha with a surface facilities footprint of 33 ha	A proposed lead-zinc underground mine.	Pre-application phase	Proposed production of 3,000 t per day
	Ajax Mine Project	KGHM International	Mining	2016	~2036	Unknown	A copper-gold mine located partially within the city limits of Kamloops.	Pre-application phase	Mill throughput of 60,000 t of ore per day
	Trans Mountain Pipeline Extension Project	Kinder Morgan	Petroleum pipeline	~ 2017	Unknown	900 km length	A proposed pipeline expansion of additional stations and increased storage capacity added to three of the existing storage terminals.	Application in review	Expected capacity of 890,000 barrels per day
	Shannon Creek Hydroelectric Project	Soler Logging Ltd.	Clean Energy	Unknown	Unknown	Water (run-of-river hydro project)	Run-of-river hydroelectric project.	EA Certificate not required	7.6 GWh per year
	Tranquille on the Lake Sustainable Community Project	BC Wilderness Tours Inc.	Community	Unknown	Unknown	190 ha	Sustainable agri-community that combines an urban farm and working waterfront with a mixed use village community.	EA Certificate not required	1,000 to 2,000 dwelling units (not including accessory uses, seasonal, or student housing), and approximately 9,300 to 40,000 m <sup>2</sup> of commercial space

Figure 8.7-2  
Forestry in the Cumulative Effects Assessment Area

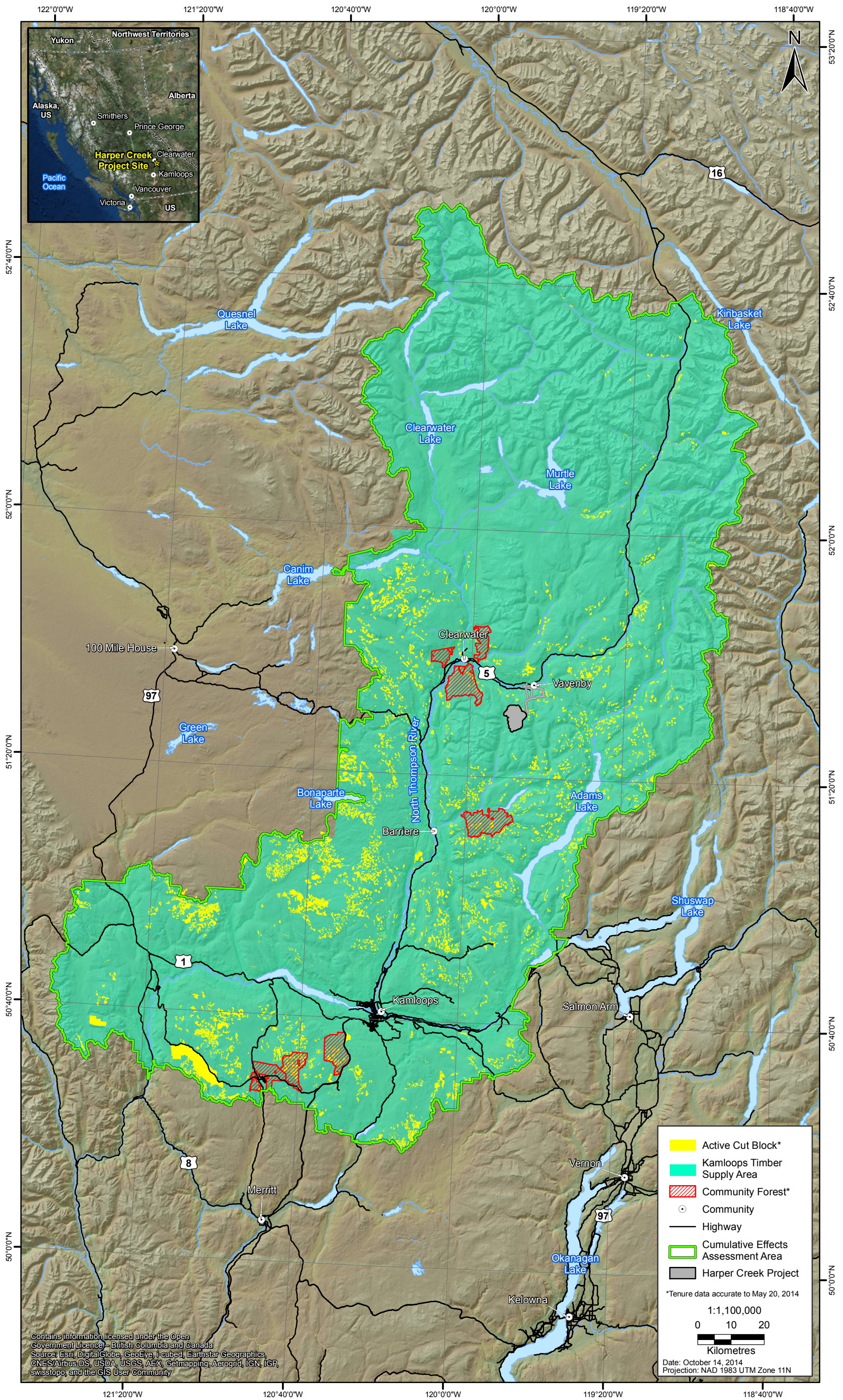
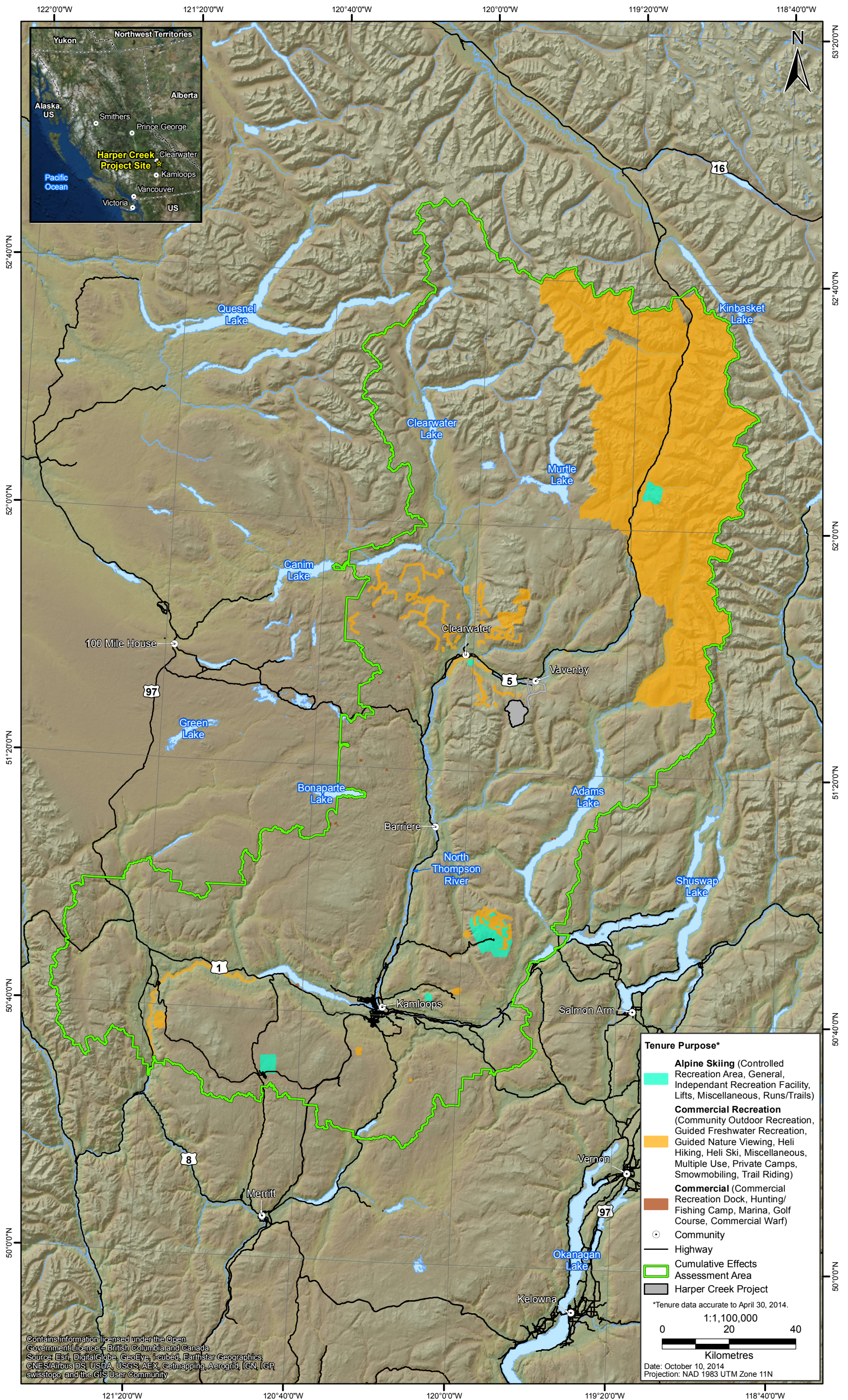


Figure 8.7-3

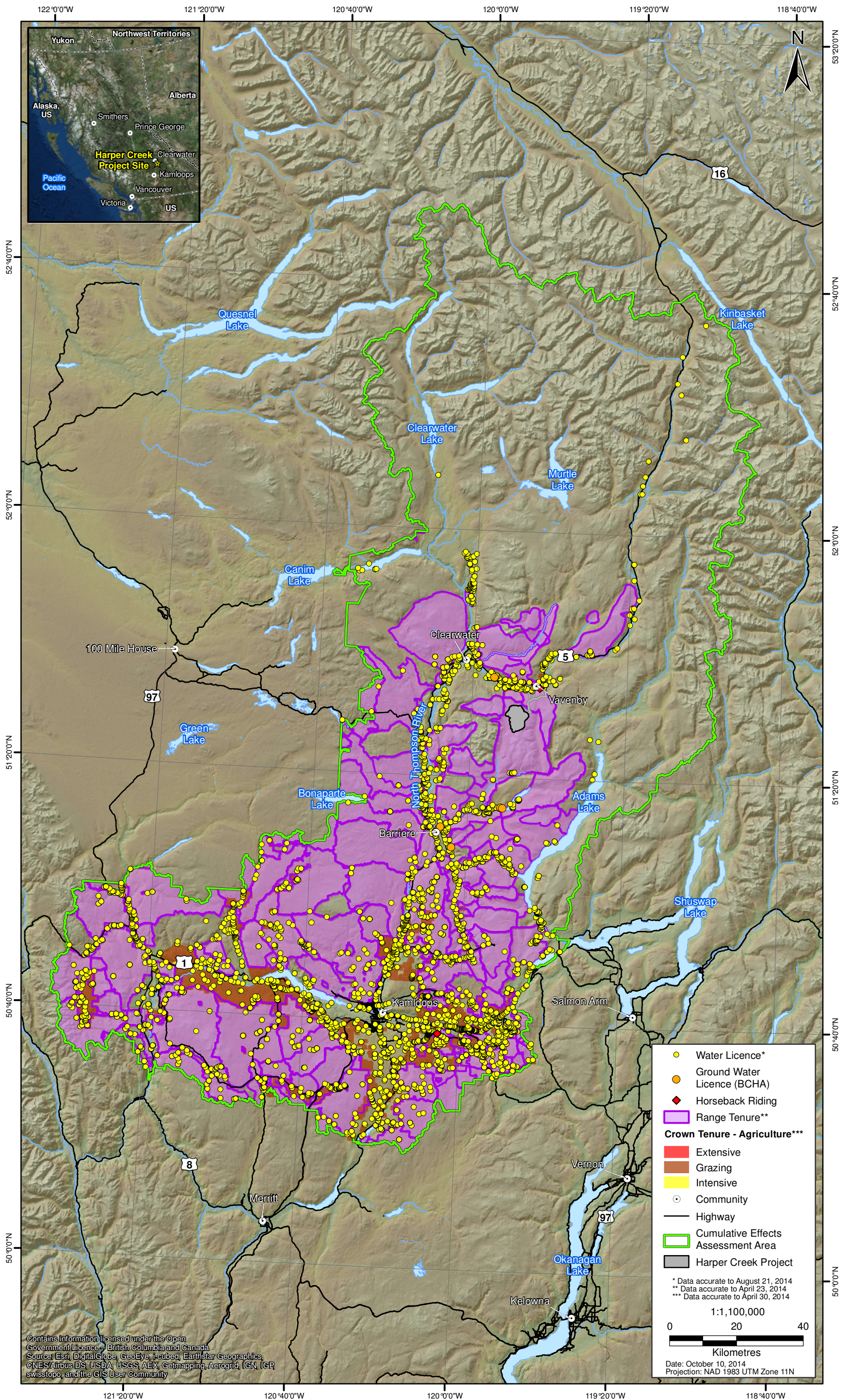
Commercial Recreation Tenures in the Cumulative Effects Assessment Area



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Figure 8.7-4

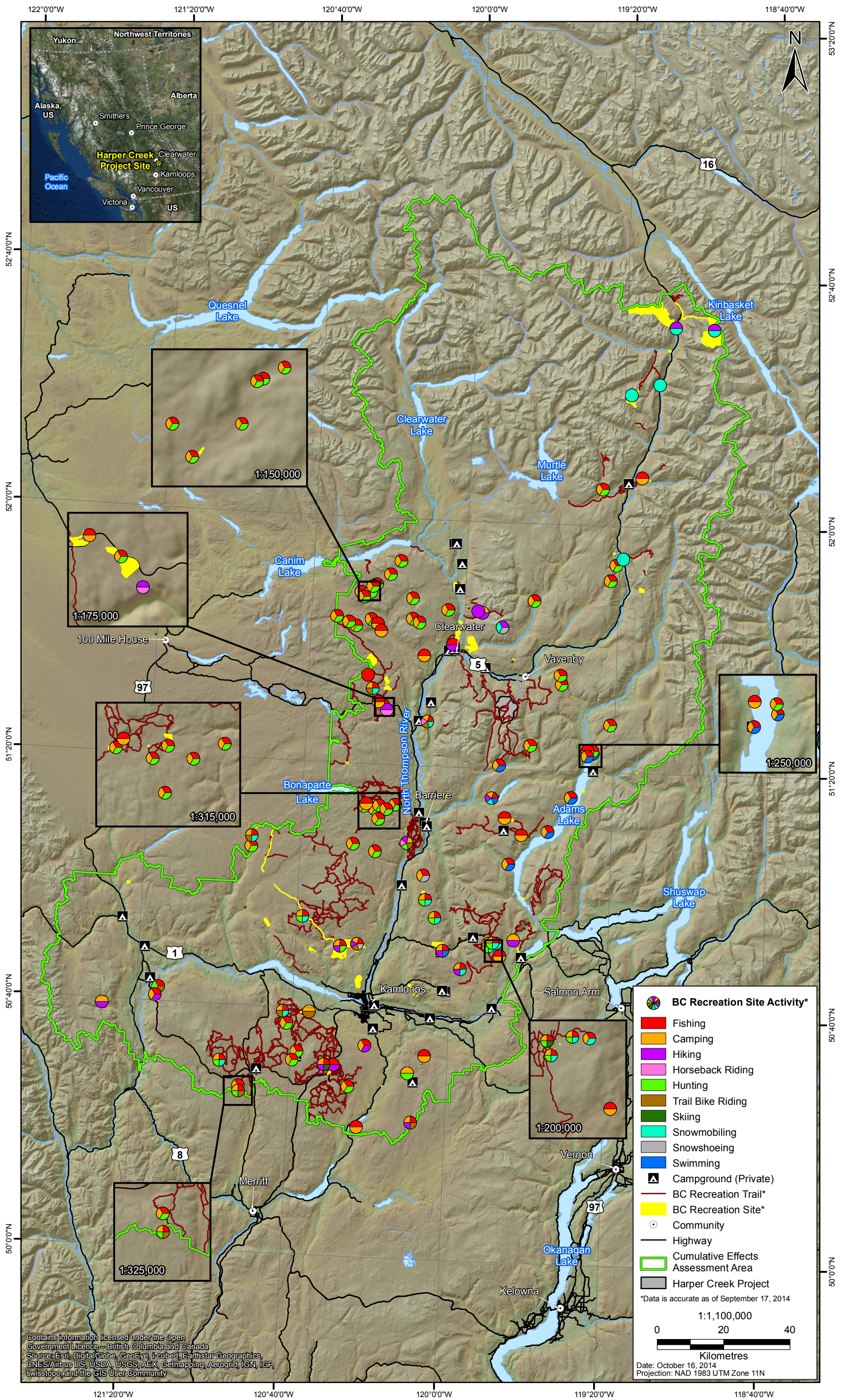
Water Licences and Range Tenures in the Cumulative Effects Assessment Area



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 Source: Esri, DigitalGlobe, GeoEye, iSatellite, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 8.7-5

BC Recreation Sites, Trails, and Private Campgrounds in the Cumulative Effects Assessment Area



**Table 8.7-2. Past, Present, and Reasonably Foreseeable Future Human Activities**

Activity	Past	Present	Future	Land Use Description
Forestry	X	X	X	The Project is located within the Kamloops Timber Supply Area and forestry is a prominent economic activity in the region. There are 4,389 active cut block tenures located within the CEA area and eight community forests.
Commercial recreation	X	X	X	There are 81 commercial recreation tenures within the CEA area including alpine skiing resorts, holiday resorts, guided freshwater recreation, fishing, hunting, camping and snowmobiling.
Water Use	X	X	X	Water use includes water licences and registered extraction points. There are 5,852 surface water licences and 2,401 registered water intake extraction points within the CEA area.
Agriculture	X	X	X	Dedicated Agricultural Land Reserve areas and range tenures are located within the CEA area. There are 196 range tenures within the CEA area.
Non-commercial recreation	X	X	X	Non-commercial recreation includes, for example, parks, backcountry tourism (ATV and quad use), snowmobiling, and recreation clubs (e.g., skiing, hiking). Within the CEA area there are 59 provincial parks, two ecological reserves, four protected areas, and 151 recreation sites, including a number of sites used by local recreational clubs. There are also several lakes commonly used for non-commercial recreational purposes (e.g., fishing, camping) within the CEA area.
Aboriginal harvesting	X	X	X	Aboriginal hunting, trapping, fishing, and gathering.
Hunting	X	X	X	Several hundred resident hunters access the CEA area for the purpose of hunting on an annual basis. The CEA area overlaps with 25 Wildlife Management Units.
Trapping	X	X	X	There are 83 trapline tenures and 13 trapline cabin tenures overlapping the CEA area.
Fishing	X	X	X	The Nicola-Thompson region is an important area for freshwater sport fishing, particularly of rainbow trout. Fishing occurs at lakes, rivers and streams in parks and recreation sites in the CEA area. Commercial fishing activities are described as part of commercial recreational licences including guided freshwater recreation, and recreational fishing is described as part of non-commercial recreation activities.
Mining and mineral exploration	X	X	X	Mining and mineral exploration has occurred in the past and present and is expected to continue in the foreseeable future. In total there are 2,795 mineral claims, 127 mineral leases and 70 placer claims in the CEA area.
Transportation	X	X	X	The Canadian National Railway passes through the North Thompson Valley; Highway 5 is located approximately 6 km north of the Project Site.

Notes: Table accurate to October 2014.

**Table 8.7-3. Example Impact Matrix for Screening and Ranking Potential Cumulative Effects**

Residual Effects of the Harper Creek Project on VCs	Past Projects			Present Projects			Reasonably Foreseeable Future Projects	Activities (Past, present, and reasonably foreseeable)											
	Samatsum Project	Weyerhaeuser Sawmill	Louis Creek Sawmill	Highland Valley Copper	Trans Mountain Pipeline	Vavenby Sawmill	North Thompson Transmission Project	Ruddock Creek Project	Aboriginal Harvesting	Hunting	Trapping	Fishing	Non-commercial Recreation	Commercial Recreation	Mining and Mineral Exploration	Transportation	Agriculture	Forestry	Water Use
<b>VC1</b>																			
Residual Effect 1	●	●		●	●	●		●	●	●	●	●	●	●	●		●	●	●
Residual Effect 2	●			●	●	●		●	●	●	●	●	●	●	●		●	●	●
<b>VC 2</b>																			
Residual Effect 1	●	●		●	●	●		●	●	●	●			●	●		●		
Residual Effect 2	●			●	●	●		●	●	●	●	●	●	●	●		●		

Notes: Table for example purposes only.

Blank cells indicate no potential for interaction and **will not be carried forward in the assessment.**

● = 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.**

**Table 8.7-4. Proposed Mitigation Measures for Potential Cumulative Effects and their Effectiveness**

Potential Cumulative Effect	Proposed Mitigation Measure	Mitigation Effectiveness (Low/Moderate/High/Unknown)	Cumulative Residual Effect (Y/N)
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The effects assessment chapters include a determination of the significance of cumulative residual effects using the same standards or thresholds established for the effects on individual VCs. As with Project residual effects, determination of significance for cumulative residual effects includes a discussion of how the likelihood has contributed to the determination, where appropriate.

### 8.7.5 Confidence

Once a significance determination is made, a discussion of the confidence in the CEA is provided, based on:

- scientific certainty relative to quantifying or estimating the effect, including the quality and/or quantity of data and the understanding of the effect mechanisms;
- scientific certainty relative to the effectiveness of the proposed mitigation measures; and
- professional judgement from prior experience including proven mitigation measures.

### 8.7.6 Follow-up Program

If applicable, the Application/EIS will identify any proposed follow-up programs required to verify the accuracy of the environmental assessment predictions and/or determine the effectiveness of any mitigation measures.

## 8.8 CONCLUSIONS

Each effects assessment chapter provides a summary of the residual effects and the cumulative residual effects and presents the results using Table 8.8-1 below.

**Table 8.8-1. Summary of Key Project and Cumulative Residual Effects, Mitigation, and Significance for <Assessment Topic>**

Residual Effects	Project Phase	Mitigation Measures	Significance of Residual Effects	
			Project	Cumulative
Valued Component 1				
<i>Residual Effect 1</i>				
<i>Residual Effect 2</i>				
Valued Component 2				
<i>Residual Effect 1</i>				
<i>Residual Effect 2</i>				



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Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

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