

**Environmental Report to Accompany Rezoning Application
Chute Lake Lodge**

Prepared for:

Chute Lake Holdings

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1. Introduction

Wildrock Environmental Consultants (WEC) was retained by Chute Lake Holdings (CLH) to complete an Environmental Assessment Report (EAR) to accompany a Rezoning and Official Community Plan (OCP) amendment application for their Chute Lake property located adjacent to Chute Lake approximately 10 kms east of Naramata BC. Zoning for their holdings is currently listed as Commercial Tourist 1 (CT 1) and Resource Area (RA). Neither zone allows for the type of future development envisioned by CLH for their Chute Lake Operations. In addition to rezoning, an amendment to the OCP will also be required to bring the creation of a new zone into compliance with the OCP.

The rezoning application pertains to lands currently held in fee simple (two lots separated by the KVR R/W) as well as for lands currently held under a Crown Land *License of Occupation* (LOC) (2 separate areas) and those under application (5 parcels) with the Province of British Columbia to be acquired as additional LOC tenures.

The purpose of this report is to comply with the requirements of the RDOS Terms of Reference (TOR) for Environmental Assessment Reports (2014) as dictated by the RDOS Official Community Plan (OCP). This report provides a summary of the current ecological features, including desktop review and site reconnaissance and provides recommendations to guide future development assessment and impacts.

1.1 Background Information

Site Inspection Date(s): *October 28th, 2020, May 4th, 2021*

Freehold Legal Descriptions: Lot 1, Plan KAP28183, Sublot 9, District Lot 2711, Similkameen Div of Yale Land District, District Lot 511S, Similkameen Div. of Yale Land District, COMMERCIAL RESORT AT CHUTE LAKE

Leased: License of Occupations - Various

PID: 004-625-293, 006-691-285

Zoning: *CT1, RA*

OCP: *CT, RA*

Biogeoclimatic Zone: Okanagan Dry Mild Montane Spruce Variant (MS DT1)

Chute lake is situated half-way between Penticton and Kelowna on the east side of Okanagan Lake (see Figure 1) and the land is administered by the province and RDOS.

Chute Lake has been accessed and occupied since the early 1900's. The KVR at this section was completed in 1915 and was a water refilling station for trains. A sawmill existed on the site as early as 1921. Until the 1950's, horse logging around the area up supported a box mill for the orchard industry in the South Okanagan. Steam trains and the sawmill secured water from Eleanor Creek and the four inch ductile iron pipe and water supply is still being used today by the CLL. The old bunk house for the sawmill is part of the existing Chute Lake Lodge

The area may have been occupied and used by the Okanagan Nation alliance tribes but recent field studies (2020) have found no evidence to date. The general area was logged and mined and local lakes were and are used for a gravity source of water to Naramata and Indian Rock residents.

The general area is used year-round for recreation, including cross country skiing, snowmobiling, hunting, fishing, mountain biking, and off-road vehicle exploring.

The property was purchased in 2018 by CLH, with current accommodation including seasonal dry camping with a variety of outdoor accommodation and recreational vehicle sites. The main lodge provides a seasonal restaurant and overnight accommodation.

CLH has applied to the Province for an expansion to the adjoining provincial lease property to provide space for an expanded outdoor liquor licence, staff housing and high-end year-round cabins

1.2 Proposed Development

CLH is proposing the following development:

Existing Fee-simple Properties

- Upgrading existing restaurant
- Construction of 5 cabins adjacent to Chute Lake
- Construction of 4 "bunkies"
- Construction of log cabin
- Restoration of riparian area adjacent to Chute Lake

Existing Leased Properties (License of Occupation)

- Additional Glam-tents

Additional Leased Properties (Pending License of Occupation)

- Construction of 4 RV sites
- Staff accommodations

The combined area above is referred to as the “Property” in this report.

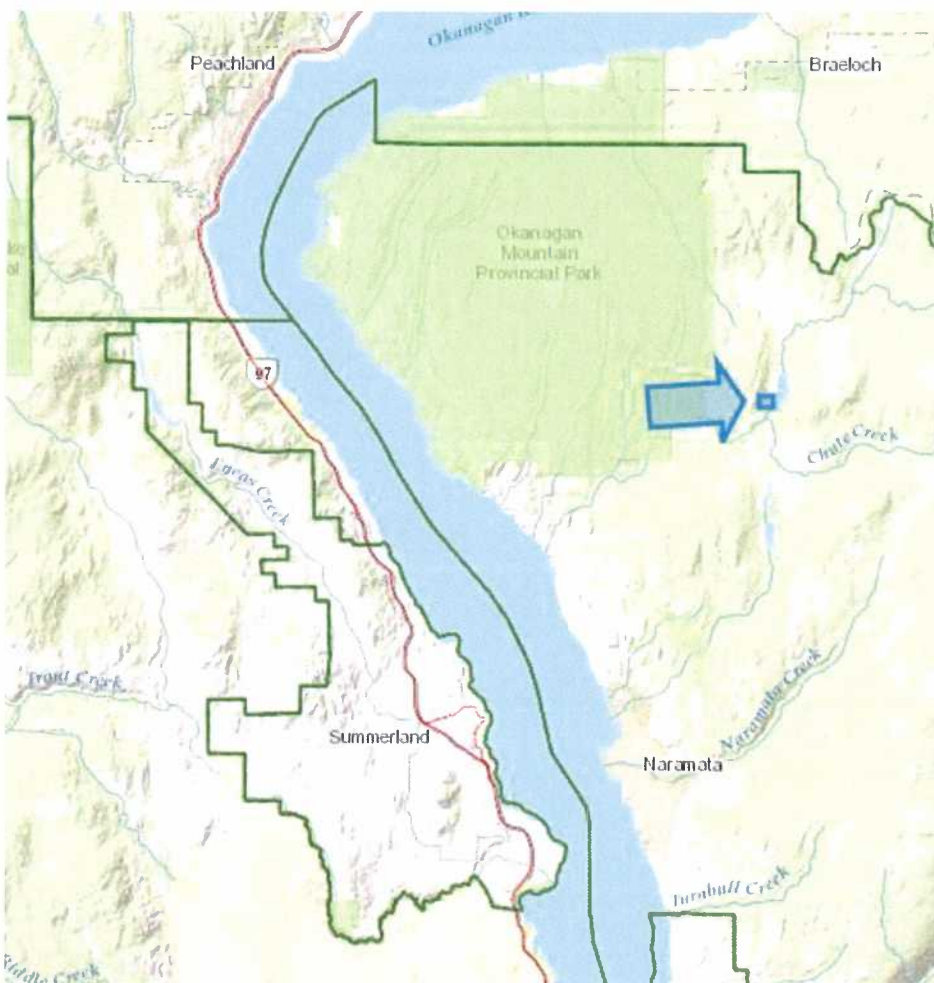


Figure 1: Location of the Property

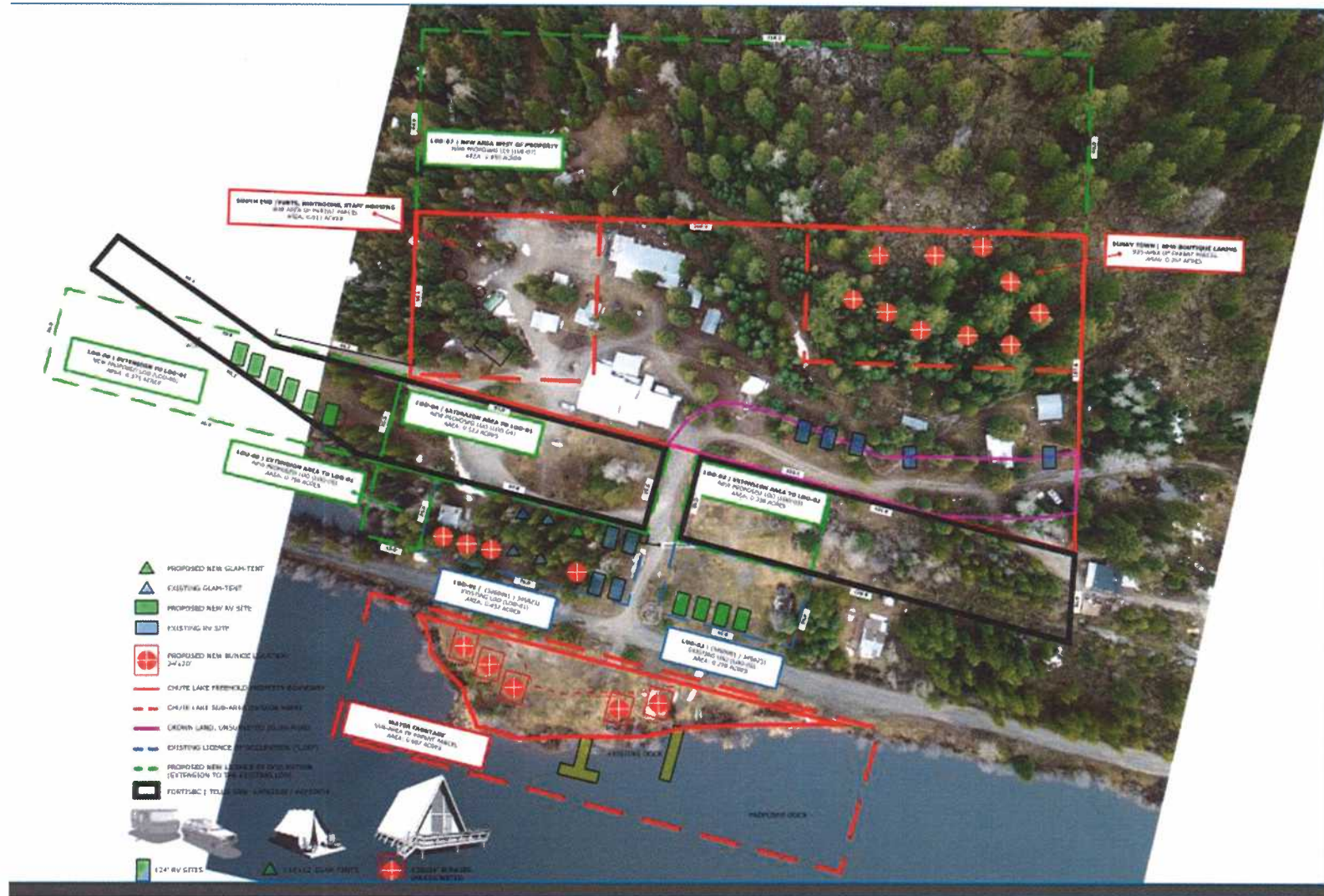


Figure 2: Proposed Development of the Subject Lot

1.3 Scope of Work

The assessment is based on the following scope of work:

- Review existing publicly available land parcel information including development permit areas and other potential constraints to development.
- Review the proposed Development Plan,
- Complete a desktop assessment of the Property, including review of previous assessments and planning studies, publicly available ecosystem mapping and inventory data, and other online resources to identify potential and known species and ecosystems at risk occurrences.
- Conduct liaison and consultation with other relevant agencies and persons of knowledge pertaining to the local area, including the provincial Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO), regional and municipal planners, and other stakeholders.
- Complete a site assessment of the Property, including documentation and inventory of existing terrestrial and riparian values, presence of unique or important wildlife species and/or habitat features, and identification of environmentally sensitive areas (ESA).
- Prepare a report and mapping deliverables to incorporate into mitigation planning and design of the proposed development within the Property.
- Provide an environmental guiding document to support an application for rezoning and OCP amendment.

2. Regulatory and Information Sources

The following section provides a summary of the regulatory context and sources of information used during the completion of the assessment.

2.1 Regulatory Overview

Environmental Assessment Report requirements are outlined in the TOR and the guidelines provided in the RDOS OCP and Operating Procedures. Legislation that pertains to the proposed development includes the following Provincial and Federal Acts and Regulations:

Table 2.1 Federal and Provincial Legislation Applicable to the Project

Jurisdiction	Applicable Legislation	Agency	Summary
Provincial	<i>Wildlife Act; Wildlife Amendment Act</i>	Ministry of Environment	Protection of wildlife and wildlife habitats including the protection of raptors, owls, herons and nests during nesting periods.
	<i>Water Sustainability Act</i>	Ministry of Forests, Lands and Natural Resource Operations	Ensures protection of water quality, quantity and riparian habitat for works in about a stream.
	<i>Environmental Management Act</i>	Ministry of Environment	Prohibits causing pollution by regulating the discharge or emissions of contaminants or waste and requires spill reporting regulations
	<i>Local Government Act</i>	Ministry of Environment	Provides local governments with a legal framework and foundation to represent the interests and acknowledge the needs of their communities.

Jurisdiction	Applicable Legislation	Agency	Summary
	<i>Land Act</i>	Ministry of Forests, Lands and Natural Resource Operations	Protection and conservation of any land owned by the Province such as foreshore and the beds of lakes, rivers and streams.
Federal	<i>Fisheries Act</i>	Fisheries and Oceans Canada (DFO)	Section 35 for the management through the conservation and protection of fish and fish habitat.
	<i>Migratory Birds Convention Act</i>	Environment Canada (Canadian Wildlife Service)	Prevents capturing, injuring, killing or disturbing migratory birds as well as damaging, destroying, removing or disturbing their nests.
	<i>Species at Risk Act</i>	Fisheries and Oceans Canada (DFO), Environment Canada (EC)	Provides legal protection of wildlife and their habitats designated under Schedule 1

Other relevant regulations include municipal bylaws and policies, as described in the OCP and regional Best Management Practices (BMP).

2.2 Information Sources

Information sources used in the desktop assessment and background review of the Property include:

- RDOS OCP (Bylaw No. 2014-002) and associated DP guidelines;
- RDOS Terms of Reference (TOR) for Environmental Assessment Reports (2014);
- RDOS Map Viewer <http://mapping.rdos.bc.ca>;
- BC Conservation Data Centre Species and Ecosystems Explorer (accessed March 22, 2021);
- BC Conservation Data Center: Request for Secured Data (March 22, 2021)
- Okanagan Habitat Atlas web application (March 22, 2021);

- Habitat Wizard iMapBC web application (accessed numerous times Feb., March, 2021);
- Sensitive Ecosystem Inventory (SEI) and Terrestrial Ecosystem Mapping (TEM) for the South Okanagan;
- *Species at Risk Act* Registry (2021)
- Provincial Best Management Practices (BMP), including Develop with Care (2014);
- Keeping Nature in Our Future: A Biodiversity Conservation Strategy for the South Okanagan Similkameen (2012).

2.2.1 Terrestrial Ecosystem Mapping and Sensitive Ecosystem Inventory

There are two ecological classification tools available to inform the process of determining the sensitivity of land to development and on-going human disturbances. These are Terrestrial Ecosystem (TEM) and Sensitive Ecosystem Inventory (SEI) Mapping

TEM is a landscape level inventory of ecological communities. Built upon the provincial BEC framework, TEM polygons represent vegetation communities that are the result of local climate, soils, and topographic characteristics (slope gradient and landscape position). While there is good TEM coverage throughout the Okanagan area at lower elevations, there is no TEM mapping for the subject area of this report.

SEI mapping provides an inventory of the rare ecosystems and wildlife habitat throughout the south Okanagan, an area with high biodiversity values and abundance of unique ecosystems, plants and animals. The objective of this process was to serve as a platform upon which to develop local land use plans and to ensure the effective stewardship of private lands. Consistent with other EAs throughout the Okanagan valley, the SEI was referenced as a management planning tool.

Sensitive Ecosystems Inventory mapping was carried out for the area over the period 2006-2008. The project maps sensitive ecosystems in the Naramata area on the east side of Okanagan Lake. It is a re-map and upgrade of an earlier project completed in 2004. The project covers portions of map-sheets 082E074, 073, 064, 063, 054, 053, 044 and 043. Upgrades include the removal of non-SEI components of polygons where possible, the application of deciles to all polygon components and the better capture of riparian and wetland ecosystems. This project does not follow the RISC standard for Mapping Ecosystems at Risk although it does have the same database structure. Spatial and polygon attribute data are available through the Habitat Wizard Online Mapping tool but it is unknown whether a final report was ever finalized. Indicated SEI polygons are summarized in Table 3.1 and shown in Figure 3.2.

The polygons determined for the project have been used to define ecological values for this report and as a basis for Environmentally Sensitive Area (ESA) ranking.

2.2.2 Species and Ecosystems of Conservation Concern

The Okanagan Habitat Atlas and Habitat Wizard web applications were queried for sensitive environmental occurrences and areas of conservation concern. Conservation rankings (shown as Important Ecosystems on RDOS mapping layer) provided by the Biodiversity Conservation Strategy for the South Okanagan Similkameen (2012) were also reviewed.

Species at risk are determined using the provincial and national ranking systems. The provincial system applies to species that have been assessed by the BC Conservation Data Centre Species and Ecosystems Explorer (CDC) and are categorized as Yellow (Not Considered At Risk), Blue (Of special concern), or Red (Endangered or Threatened).

The results of a query of sensitive wildlife species occurrence records using the CDC data and the Wildlife Species Inventory (WSI) data are displayed in Table 3.2.

The national ranking system applies to species that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and registered under the *Species at Risk Act* (SARA). The purposes of the Species at Risk Act (SARA) are to prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened.

A series of measures applicable across Canada provides the means to accomplish these goals. Some of these measures establish how governments, organizations, and individuals in Canada work together, while others implement a species assessment process to ensure the protection and recovery of species. Some measures provide for sanctions for offences under SARA.

2.3 Environmentally Sensitive Areas

The TOR defines a four-class Environmentally Sensitive Area (ESA) ranking system. Factors considered during the refinement of the Property ecosystem mapping include professional judgment, provincial status (i.e., Red or Blue listed), rare and endangered species occurrence and/or potential, general landscape condition (i.e., degradation, disturbance, isolation, connectivity, fragmentation), successional stage, regional rarity, and relative biodiversity. Figure 3.2 depicts the ESA mapping within the Property. The four classes of ESA classification from the TOR are described below:

ESA 1 (High) – areas that provide significant environmental value, due to the presence of rare physical features, rare ecosystems, or rare plants and animals. These areas represent habitat of

great importance to the functioning of natural ecosystems. Various types of habitat will qualify as ESA 1 on the basis of sensitivity, vulnerability, connectivity and biodiversity. For example, all wetlands, rare plant communities, and habitat for rare animal species have high value.

ESA 2 (Moderate) – areas that contain physical features, plants, animals and habitat characteristics that contribute toward the overall diversity and contiguous nature of the surrounding natural features. These will include sensitive ecosystems, as refined according to the ESA stratification criteria for the scale of mapping. These may also include areas used to buffer ecological functions of high value ecosystems.

ESA 3 (Low) – areas that may contain important features or remnant stands/sites with ecological value but are not identified in the SEI nor considered neither locally nor regionally rare. Areas mapped as ESA 3 may be in a stage of succession that provides limited value to local wildlife species and expresses a level of previous disturbance.

ESA 4 (Not Sensitive) – areas that contribute little or no value to the overall diversity of vegetation, soils, terrain and wildlife characteristics of the area. Areas mapped as ESA 4 typically include heavily disturbed ecosystems, previously cleared areas (gravel pits, exposed soil, etc.) and areas of existing infrastructure such as roads.

The goal of establishing ESAs is to direct detrimental development activities away from higher valued habitats and ecological communities. Development should be focused within ESA 4 areas, unless reviewed and approved by a Qualified Environmental Professional.

3. Environmental Assessment

WEC conducted field reviews of the Property on April 28th, 20120 and May 4th, 2021. The assessments included a reconnaissance and inventory of ecosystems, vegetation communities and wildlife habitats, and identification of other potential sensitive features and natural resources within or adjacent to the Property. The results of the site visit are summarized below.

3.1 Ecosystem Communities

Ecosystem community types were classified using the available Sensitive Ecosystem Inventory (SEI) polygons and the RDOS Important Ecosystems mapping layer. A summary of each is provided below.

3.1.1 Sensitive Ecosystem Inventory (SEI)

SEI mapping for the property show a number of polygons representing 6 ecological communities and 1 predominantly anthropogenic unit. These are broad polygons that also include areas beyond the boundaries of the Property.

The existing polygon lines were refined and re-drawn following site inspection to better reflect actual ecological site conditions and vegetation composition.

The revised SEI polygons and codes summarized in the Table 3.1 below and shown on Figure 3.1. The table presents the ecosystem map codes, and the provincial status for each ecological community characterized within the Property.

Table 3.1 Summary of ecological communities within the Property

SEI Code	Name	Provincial Stratus
SV:ta	Sparsely Vegetated, talus slope	Red
MF:co	Mature Forest	Red
WD:co	Coniferous Woodlands	
OF:co	Old Forest	
RI:ff	Riparian, fluvial fringe	
RI:ri	Riparian, river	
N/A	Highly disturbed	



Figure 3.1: Orthophoto of Subject Lot showing respective SEI Designations

The extreme western edge of the property is slightly to predominantly rocky, sparsely vegetated with a relatively sparse overstory of uneven aged Douglas fir (*Pseudotsuga Menziesii* var. *glauca*). The remaining portions of the subject lot range from moderately disturbed (location of cabins, yurts and glam tents) to a large degree of alteration (e.g. main lodge, skating rink and parking areas). This clearly reflects the fact that the Property is actively managed as a resort operation.

As identified by the SEI the undisturbed portion of the Property is considered sensitive to development. The remaining areas classified as Not Sensitive. The Conservation Framework (CF) was applied to the south Okanagan using the Sensitive Ecosystem Ranking (SER) previously completed for the region. The entire site has been identified as moderate Conservation Rank.

3.1.2 Important Ecosystems

Figure 3.2 shows Important Ecosystems as identified with the RDOS GIS mapping layers. These were considered in the establishment of Environmentally Sensitive Areas (ESA's) and were subject to ground truthing during site inspection.



Figure 3.2: Important Ecosystems (diagonal crosshatch) as Shown on RDOS Environmentally Sensitive Development Permit layer.

3.2 Vegetation

Vegetation associated with the Property include a predominant overstory of Douglas fir (*Pseudotsuga Menziesii* var. *glauca*), Black and White spruce (*Picea* spp.) with the occasional occurrence of Lodgepole pine (*Pinus contorta*) and Western Larch (*Larix occidentalis*).

Understory vegetation includes birch leaved spirea (*Spiraea betulifolia*), Trapper's tea (*Ledum glandulosum*), Sitka Alder (*Alnus viridis*) and black gooseberry (*Ribes lacustre*). Herbs observed include kinnikinnick (*Festuca idahoensis*) pinegrass (*Calamagrostis rubescens*) and grouseberry (*Vaccinium scoarium*). There are some invasive species such as knapweed (*Centaurea spp.*) within the subject lot.

3.2.1 Riparian Area(s)

Riparian areas within the Property have been highly degraded being the former location of industrial activity (wood mills and railway facilities). There is narrow band of existing native riparian vegetation (1.5 m) that parallels the water's edge with the remaining riparian area of comprised primarily of domestic grass.

3.3 Wildlife and Habitat

The Property provides low to moderate value wildlife habitats within currently disturbed areas, moderate wildlife habitat value in undisturbed areas including some high value wildlife trees.

Wildlife observed during the assessments include the following bird species: Immature Bald Eagle (*Haliaeetus leucocephalus*), house sparrow (*Passer domesticus*), house finch (*Haemorhous mexicanus*), black-billed magpie (*Pica hudsonia*), Common crow (*Corvus brachyrhynchos*) and white-crowned sparrow (*Zonotrichia leucophrys*).

Mammals were not observed within the Property during the field visits, although some sign was observed of deer and moose use and the presence of small mammals such as ground squirrel and marmots (e.g., tracks, scat, burrows, etc.).

The Property provides some habitats for amphibians and reptiles, although none were observed during the site visit. The significant presence of rock outcrops and talus above the western side of the Property suggests high potential for snake dens or hibernacula. Rock outcrops also provide valuable habitat for bat and bird species.

3.3.1 Species and Ecosystems at Risk and Wildlife Survey Information Records (WSI)

Prior to the site visit, WEC conducted a background review of the BC CDC's Species and Ecosystems Explorer and the iMapBC web application Habitat Wizard to identify the blue- and red-listed vertebrate and invertebrate species with potential to occur within or near the Property. The results of the query were based on the following parameters:

- Regional District Okanagan Similkameen (RDOS);
- Montane Spruce BEC Zone; and
- Habitat Types: Agriculture, Anthropogenic, Forest, Grassland/Shrub, Riparian
- CDC Endangered Species and Ecosystems

Table 3.2 displays the results of a search of CDC data using the public iMapBC and Species Explorer online database. A 100 m radius was searched surrounding the Property boundaries. The search included both the publicly available and masked (confidential) records and indicate potential for the existence of these species. The search yielded the potential for one vertebrate wildlife species, the American badger.

There are no known occurrences of American badger in the CDC record. A CDC element occurrence polygon established for the red-listed American badger (*Taxidea taxus*) overlaps the subject property. However, the representational accuracy of this element occurrence polygon is considered very low. Badger occurrence has been recorded consistently throughout the polygon, with concentrations described in grassland and agricultural areas in the Vernon, Lumby, Mission Creek, Osoyoos, Anarchist Mountain/Rock Creek and Grand Forks areas, as well as mid-elevation forests in the Aberdeen Plateau, Upper Kettle River, Beaverdell and Venner Meadows areas. Current habitat conditions for American badger are low for the subject property.

There is also one masked sensitive occurrence (35912) which overlaps with the Property and covers a large area of the south and central Okanagan. The CDC was contacted for information regarding the masked occurrence and was informed that there was no need for the CDC to provide information or details pertaining to the occurrence.

Table 3.2 CDC Search Records 100 m of the of the Property Boundaries

English Name	Latin Name	Species Group	Species Code	BC List	Cosewic Status	Habitat Subtypes
American Badger	<i>Taxidea taxus</i>	vertebrate animal	M-TATA	Red	E(2012)	Agriculture/Pasture/Old Field/Alpine/Tundra/Alpine Grassland Krummholtz/Forest/Conifer Forest/Grassland/Shrub/ Antelope-

English Name	Latin Name	Species Group	Species Code	BC List	Cosewic Status	Habitat Subtypes
						brush Steppe/Rock/Sparsely Vegetated Rock/Talus

Table 3.3 show the following species occurrence records found on the Wildlife Survey Information (WSI) records within the provincial database CDC IMap

Table 3.3 WSI Records for wildlife species found within 500 meters of the Property

Common Name	Latin Name	Observation Date
Grizzly bear	<i>Ursus arctos</i>	1997
Gartersnake	<i>Thamnophis</i> sp.	1996
Moose	<i>Alces americanus</i>	2012
Great blue heron	<i>Ardea herodias</i>	2010
Paddle-tailed Darner	<i>Aeshna palmata</i>	1997
White-faced meadowlark	<i>Sympetrum obtrusum</i>	1997
Ringed emerald	<i>Somatochlora obtrusum</i>	1997
Boreal bluet	<i>Emallagma boreale</i>	

3.3.2 Species at Risk Act (SARA) Results

Table 3.3 describes known information regarding species identified under the federal *Species at Risk Act* (SARA). The table includes all species where Critical Habitat (CH) is indicated within SARA spatial datafiles and found within or adjacent to the Property.

The subject property is contained within the CH polygon for two listed snake (ECCC, 2019). While CH has been largely identified and mapped at a large scale for listed species in the South Okanagan, not all sites contain the attributes for the identified CH. Therefore, site inspection is necessary to confirm that the attributes associated with the CH are in fact present onsite.

Site inspection confirmed that attributes do exist (albeit marginally) for the listed species on a small portion of the Property. The area to the west of the Property however displays a significant presence of CH attributes, (i.e. Rocky habitats - Cliff, talus, rock outcrop, or earth covered rock outcrop). These areas to the west of the Property are considered critical habitat for the snake species listed in the following table (Table 3.3)

Table 3.3: Summary of Critical Habitat (CH) Attributes for Species found within the Species at Risk Act (SARA) Registry for the Subject Property

Species	Main Attributes or Biophysical Features	Within Property	Within Existing or Proposed Disturbed Areas
Western Rattlesnake (<i>Crotalus oreganus</i>) Great Basin Gopher Snake (<i>Pituophis catenifer deserticola</i>)	<ul style="list-style-type: none"> • Rocky habitats - Cliff, talus, rock outcrop, or earth covered rock outcrop • Grassland or Open shrub-steppe Grassland, shrub-steppe, open coniferous forest, rock outcrop, cliff, talus, riparian, wetland (core and connective) 	yes	yes

3.4 Environmentally Sensitive Areas

Environmentally Sensitive Area (ESA) rankings (from 1 to 4) were established (see Figure 3.4, Table 3.3) for ecological units based on the SEI polygons assigned from mapping exercises and revised by field. Cross-referencing with Provincial Red and blue lists was undertaken where possible, as well as WSI records, SARA CH polygons, and field observations. This ranking system of sensitive ecological communities was developed to guide proposed development of the subject lot.

The ESA criteria/rating system used in the evaluation of ESAs include the following components:

- i. habitat suitability for provincially ranked and/or federally listed or significant species;
- ii. rarity in the region, province, country, including historical loss;
- iii. high degree of structural diversity, and/or advanced seral association or condition; favors older more complex ecosystems e.g. old, mixed or multi-stand forests diverse multi species shrub communities.
- iv. presence of important environmentally valuable resources (e.g. breeding/spawning areas, hibernacula, migration stop over, connectivity corridors, reported sightings of uncommon species, ungulate winter range, high value wildlife trees);
- v. ecosystems at risk in the Okanagan including riparian (including subsurface flow and recharge areas), wetlands, grasslands, rock outcrops, talus and cliffs, old growth, and low elevation forests;
- vi. conservation ranking

ESA-1 (High): Occurrence-based Critical Habitat, locally and provincially significant ecosystems, extremely rare and/or of critical importance to rare wildlife species. **Meets a minimum of 4 of the above criteria or is a SARA listed critical habitat or listed on the BC Red List. eg. critical habitat for yellow-breasted chat or red listed ecological community.**

ESA-2 (Moderate): Attribute-based Critical Habitat, locally or provincially significant ecosystems, uncommon and important to rare wildlife species. **Meets a minimum of 2 of the above criteria**

ESA-3 (Low): Ecosystems that may have low to moderate conservation values because of importance to wildlife. **Meets at least 1 of the above criteria**

ESA-4: Areas with little or no inherent ecological value or importance as wildlife habitat (e.g. highly disturbed, modified or fragmented ecosystems or habitat features).

The results of the ESA analysis for the Property are and shown in Figure 3.4. Table 3.3 shows the ESA ranking criteria on which that ESA was assigned and the percentage of the Property

occupied by that ESA. It should be noted that this ESA analysis is shown on an orthophoto (Figure 3.3) that is dated and does not reflect the current state of the property. The ESA rankings however, have been based on current site conditions following a recent site visit.



Figure 3.4: ESA Designations for the Property

Table 3.3 Results of ESA analysis for the Property

ESA Value	ESA Area m ²	Criteria Present	Percentage of Property (%)
ESA 1	0	n/a	0
ESA 2	13,598	i,iii,vi	14
ESA 3	6,963	vi	27
ESA 4	28,803	n/a	58

4. Proposed Mitigation and Recommendations

The proposed development (see section 1.1) will include construction-related activities with potential to directly or indirectly impact environmental resources as described below:

- Clearing and grubbing for proposed building sites;
- Earthworks, including excavation, hauling, dumping, grading, and packing;
- Installation of site services, which may include stormwater, septic, manholes, and culverts;
- Construction of retaining walls, parking lots and driveways; and
- Site remediation, including hydroseeding.
- Disturbances from recreational guests and associated activities

Potential environmental impacts may arise during the construction and other activities described above. The avoidance and protection of identified environmental values within the Property will help mitigate potential adverse environmental impacts. Provincial best management practices (BMP) and other suitable mitigation measures must be incorporated into the development planning to avoid the following impacts:

- Release of fine sediments to adjacent natural habitats (i.e., down slope towards the gully feature) during clearing, grading, stripping, hauling, and other onsite construction works.
- Improper handling, storage, or disposal of waste materials and/or construction debris that results in the release of deleterious substances to aquatic, riparian, or terrestrial habitats and causes subsequent negative impacts to wildlife and/or habitat.
- Spills or leaks of deleterious substances (e.g., fuel, oil, hydraulic fluid) to the environment as a result of improper storage, vehicle and equipment re-fueling, and/or poorly maintained equipment.
- Direct (e.g., injury, harassment, habitat loss) or indirect impacts (e.g., noise, dust) to wildlife and wildlife habitat, including species at risk, important habitats, and other sensitive features (e.g., dens, burrows, nests, wildlife trees, etc.) during construction activities.
- Disturbance beyond the identified development limits that facilitates encroachment of non-native and invasive plant species, which degrades the ecological values of adjacent natural communities.

The following recommendations and mitigation strategies for proposed development within the Property are based on the current condition of the Property and results of the environmental sensitivity analysis.

Recommendations are provided to reduce or avoid potential impacts and to maintain consistency with municipal and regional guidance documents and provincial Best Management Practices (BMP), as described in *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2014)* and *Keeping Nature in Our Future: A Biodiversity Conservation Strategy for the South Okanagan Similkameen (2012)*.

4.1 Careful Consideration of Future Development

All present and future development should be carefully planned to minimize any significant future impacts. This is especially important in the areas identified as ESA 2 adjacent to Chute Lake and Ratnip Creek and the area along the western boundary of the Property. Future development plans should be reviewed and signed off by a Qualified Environmental Professional.

4.2 Implement a Riparian Restoration Plan.

A Riparian Restoration Plan should be developed by a QEP to restore some natural function to the highly degraded area along Chute Lake and Ratnip Creek. A preliminary plan is presented in Appendix 1. and should be used as a starting point to integrate planned development with riparian restoration.

4.3 Develop an Environmental Management Framework

It is recommended that CLH develop an Environmental Management Framework to direct their operation and future development. This would involve developing a series of criteria in which to evaluate ongoing environmental management. It should involve independent annual audits to ensure compliance with the stated criteria. The framework will form the basis of these audits and be a benchmark for management and staff to evaluate their progress. It will also serve guests with an assurance that there has been considered thought into how the Property is managed and how their activities and CLL's design and management have been integrated into responsible sustainable management.

4.4 Environmental Monitoring

It is recommended that CLH retain an Environmental Monitor (EM) for the project. The EM should have a strong background in wildlife habitats and ecological communities associated with the Property and be able to provide advice to CLH and their staff in regards to such habitats and communities as needed. The EM should be a Qualified Environmental Professional (QEP) or be approved by an QEP.

The EM should develop a monitoring program suitable to the development and conduct briefings to relevant staff prior to development commencing. This monitoring program should include the requirement for routine inspections and a protocol for on-site personnel to engage the EM as needed.

4.5 Wildlife Trees and Nesting Birds

Birds, eggs, and nest trees (wildlife trees) are protected by Federal and Provincial Law. Removal of trees during bird nesting season may be in contravention of such law. In the Okanagan, the general nesting period may start as early as mid-March and extend until mid August. A Registered Professional Biologist must be retained to confirm nesting or the lack thereof on the site prior to any tree removal alteration and/or removal. This may entail nest surveys to confirm that active nests will not be affected. A nest survey protocol should be developed and implemented by a Registered Professional Biologist and follow acceptable Ministry of Environment methodology. A vegetation buffer may also be required around active nests trees, including both mature coniferous (pine and fir) and deciduous (cottonwood) trees. Eggs are present from May-June and then hatch approximately two weeks later (MOE 2014). If active nests are observed within 100 meters of the proposed development a buffer will be established around the nest until such time that the that nest has become inactive.

4.6 Plants and Ecosystems

The clearing and grubbing limits will be minimized wherever possible and unnecessary impacts to native vegetation and soils must be avoided.

Existing native vegetation, including trees, snags, shrubs, grasses, and groundcover, must be retained as much as possible. Soil disturbance must be limited to the identified disturbance footprint approved by the EM.

Flagging or snow fencing will be used to clearly delineate the construction limits prior to the commencement of works. Areas at risk of sediment and erosion and related issues will be identified and silt fencing or other appropriate mitigation measures will be installed.

4.7 Site Preparation

All mitigation measures must be in place and functioning as required prior to the initiation of construction activities. Mitigation measures must be maintained, repaired, replaced, or otherwise adapted as necessary to ensure appropriate protection of the natural environment.

- Staging, parking, storing of equipment, and stockpiling of materials must be within designated areas within the construction footprint and not encroaching beyond the disturbance limits associated with the construction project. Staging, parking, and storage areas must be situated at least 10 m from watercourses and drainage features.

- Phasing of construction activities should be utilized as feasible to reduce the amount of time soils remain exposed to erosion potential. Clearing, stripping, grubbing and other earthworks should be completed in as short a time period as possible.

4.8 Erosion and Sediment Control

The Erosion and Sediment Control Plan (ESCP) described below provides mitigation measures that must be followed throughout construction to protect environmentally sensitive habitats. This plan should be developed and approved by the EM.

Construction activities must not be conducted during heavy rains to reduce the potential for conveying silt and other sediment beyond the construction limits and/or Property boundary. Exposed soils and stockpiles must be stabilized and covered where appropriate using geotextile fabric, poly sheeting, tarps, or other suitable materials to reduce the potential for erosion and/or mobilization of sediment resulting from rainfall, seepage, or other sources of surface water flows. Exposed embankments shall be covered and stabilized as soon as possible.

- Silt fencing should be installed as directed by the EM along the construction limits to mitigate the risks associated with surface runoff and sediment transport and to provide a visual barrier delineating the disturbance boundary. Fencing will be staked into the ground and trenched a minimum of 10 cm to prevent flow underneath the fence, as per the manufacturer's specifications. Silt fencing will be monitored on a regular basis and any damages or areas where the integrity and function of the fencing have been compromised will be promptly repaired or replaced. It will remain in place until the completion of the project.
- The contractor must have the following erosion and sediment control measures readily available onsite:
 - Several rolls of non-woven geotextile fabric of various grades; Several rolls of silt fencing with sufficient wooden stakes to allow for installation;
 - Tarps, poly sheeting; and clean drain rock.
- Other suitable erosion control measures may include: slope drains and interceptor ditches, berms, check dams, grass seeding, and mulch. Sediment control measures that may be employed include check dams, erosion control fabrics and logs, sumps and sediment traps, and rip-rap. Hay bales and straw must be certified weed free if they are to be used onsite.
- Stockpiled soils and fill material must be stored away (i.e., > 30 m) from watercourses, ditches, and other aquatic habitats and must be covered with poly sheeting or tarps or surrounded with silt fencing to prevent sediment from being conveyed offsite,



particularly during rain events. Stockpiled material must not be allowed to slough beyond the disturbance limits.

- All access roads must be kept clean and free of fine materials throughout construction works. Sediment accumulation upon the road surfaces must be removed (i.e., swept or scraped) on a regular basis and disposed of appropriately.
- The release of silt, sediment, sediment-laden water, or any other deleterious substances into any ditch, watercourse, ravine, or other drainage feature that discharges to the lake must be prevented at all times.

4.9 Equipment Maintenance and Fueling

The contractor will ensure all onsite equipment and machinery is in good operating condition, and free of leaks, excess oil, and grease. The contractor shall perform and record the daily inspections of all equipment, vehicles, and storage containers used on site for leaks, staining, or other signs of discharge.

- Vehicles and equipment must be serviced, inspected, and pressure washed off-site, prior to construction works to remove surface oil, grease, weed seeds, and other undesirable or deleterious materials.
- Fueling or vehicle maintenance must be conducted on impermeable (i.e., paved) surfaces and must be at least 30 m from any surface drainage or tributary channel.
- The contractor will ensure that fuel, oil, hydraulic fluid, and other hazardous or deleterious materials are stored at least 30 m away from any watercourse or surface water drainage. This includes tanks, barrels, drums, generators, and other equipment.
- The contractor will ensure all hydraulic machinery working within or directly adjacent to any watercourse or surface water drainage utilizes environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and that are readily or inherently biodegradable.

4.10 Emergency Spill/Response

Spills of deleterious substances can be prevented through awareness of the potential for negative impact on aquatic habitats and with responsible housekeeping practices onsite. Maintenance of a clean site and the proper use, storage and disposal of deleterious liquids and their containers are important to mitigate the potentially harmful effects of spills and/or leaks. The following BMPs are adapted from the Standards and Best Practices for Instream Works (MOE and DFO 2014). Materials Safety Data Sheets (MSDS/SDS) for all potentially hazardous materials will be kept onsite during construction activities.

- Preventative measures the contractor will undertake to prevent spills from occurring include safe containment, labelling, and storage of all deleterious substances present

onsite, securing stored hazardous or toxic materials to prevent vandalism or theft, disposing of used containers properly, and using appropriate personal protective equipment when handling, transporting, or disposing of hazardous or toxic substances.

- Stand-alone fuel tanks, generators, and other potential spill sources will be surrounded by an impervious berm designed to holdback 110% of the volume of the container materials.
- All spill events will be recorded and reported to the site supervisor and EM. In the event of a spill, the site supervisor (Contractor) will be immediately notified by workers onsite. The supervisor will then be responsible for contacting a mechanic (if necessary) and the EM.
- Spills shall be contained, absorbed, and disposed of in accordance with the regulations outlined in the provincial *Environmental Management Act* and using the following general steps:
 - Assess, monitor and prevent the hazard or threat;
 - Stabilize, contain, remove and clean up the hazard or threat;
 - Evacuate persons;
 - Recover and rehabilitate wildlife;
 - Restore wildlife habitat;
 - Take other steps to address the long term impacts resulting from the spill; and
 - Report the spill event (within 48 hours). Reportable quantities are provided in the Spill Reporting Regulation of the Environmental Management Act.
- Copies of contact phone numbers for notification of all of the required authorities in the event of a spill/emergency response will be posted and clearly visible at the site.
- Spill containment kits will be kept in machines operating onsite or readily available during construction activities in case of the accidental release of a deleterious substance to the environment. Kits will generally include absorbent pads and/or socks, pillows, disposal bags, disposable gloves, and goggles.
- Any spills of a toxic substance shall be immediately reported to the EM and the Emergency Management BC's Emergency Coordination Centre 24-hour hotline at 1-800-663-3456. Reporting of spills should include the following information:
 - Name and phone number;
 - Location and time of the spill;
 - Type and quantity of the substance spilled;
 - Cause and effect of the spill;
 - Details of action taken or proposed;

- Description of the spill location and the surrounding area.

4.11 Noxious Weed Control

As part of the maintenance of the site and prevention of ecological degradation, a noxious weed management plan is provided below. The intent of the weed management plan is to reduce the potential to spread noxious weeds within or beyond the construction site boundaries.

- Species of management concern observed onsite include Russian olive, knapweed, summer cypress, and Russian thistle. Where possible, these species should be removed and the spread of invasive plants, seeds, and/or soil that contains invasive plant seeds must be prevented to the greatest extent possible.
- The basic principles of the weed management plan include:
 - Suppression of weed growth;
 - Prevention or suppression of weed seed production;
 - Reduction of weed seed reserves in the soil; and
 - Prevention or reduction of weed spread.
- Identification of existing weed populations and prevention of spread is the most efficient form of weed management. The EM will identify and delineate the extents of existing weed species of local or regional concern. The EM will inform and educate the contractor about the weed species and locations onsite. If necessary, weed infested areas will be delineated with flagging tape or snow fencing to prevent access.
- Areas where weed populations have been identified will not be used for excavation and placement of fill. If excavation of weed infested areas is required, the soils will be disposed of offsite.
- Pesticides, herbicides, or other chemical control measures should not be used on the Property (with the exception of approved mosquito larvae control sanctioned and administered by approved RDOS contractor).
- Hay bales and straw must be certified weed free if they are to be used onsite.
- The contractor will ensure that all equipment and vehicles are washed and free of weed seeds prior to mobilization and de-mobilization. Vehicles and equipment will not be stored, parked, or staged within weed infested areas. Contractor clothing will also be inspected daily for signs of weed seeds. If found, weed seeds must be disposed of in a contained refuse bin for offsite disposal.



4.12 Site Cleanup and Restoration

Site cleanup and restoration refers to activities used to return disturbed areas within the project site to a state resembling the original habitat characteristics. Protection of existing ecosystems is generally much more efficient than ecosystem enhancement and restoration following construction.

- Restoration measures will be implemented at all disturbed areas, including cut/fill slopes (if any) and other exposed soils. At a minimum, re-graded slopes must be stabilized and covered with a suitable dry land native mixture. Restoration measures will be overseen by the EM and will include additional measures, as appropriate and based upon the final disturbance footprint and/or performance of the contractor.
- Native plants, if required, will be installed under the direction of the EM to restore natural areas and/or to improve ecological conditions following construction. Plant numbers and densities will be based on an approximate spacing of 3 m on-center (i.e., each plant has a radius of 1.5 m surrounding the center of the plant). A list of suitable plants, planting locations, extents, and timing for restoration efforts will be provided by the EM, as required.
- Silt fencing and other temporary mitigation features will be removed upon substantial completion of works as long as the risk of surface erosion and sediment transport has been adequately mitigated with other permanent measures.
- All equipment, supplies, waste, and other non-biodegradable materials will be removed from the site by the contractor.

5. Conclusion

This report addresses the requirements of the Environmental Assessment Report (EAR) developed by the RDOS. In order to satisfy the provisions of the OCP, an EAR prepared by a Qualified Environmental Professional in accordance with the Regional District's approved Terms of Reference (TOR) must be submitted to the RDOS. The development proposal is for the construction of additional facilities as follows:

Within the freehold properties:

- Upgrading existing restaurant
- Construction of 5 cabins adjacent to Chute Lake
- Construction of 4 "bunkies"
- Construction of log cabin
- Restoration of riparian area adjacent to Chute Lake

Within the leased (or pending) properties:

- Additional Glam-tents
- Construction of 4 RV sites
- Staff accommodations
- Low impact guest housing

Overall, the proposed development as outlined on the site plan (Figure 2) is considered a reasonable development for the Property if the proposed mitigation and measures as outlined in Section 4 are followed. While all guidance provided in section 4 are important, the following recommendations should be emphasized.

- ✓ **4.1 Careful Consideration of Future Development**
- ✓ **4.2 Develop a Riparian Restoration Plan for Affected portions of Chute Lake and Ratnip Creek.**
- ✓ **4.3 Develop an Environmental Management Framework**
- ✓ **4.4 Environmental Monitoring**

6. Closure

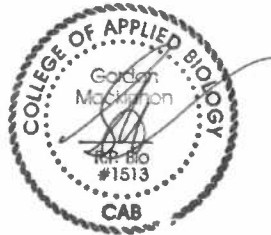
This report has been prepared for the exclusive use of Chute Lake Holdings (CLH). Wildrock Environmental Consultants (WEC) has prepared this report with the understanding that all available information on the present and proposed use of the subject area has been disclosed.

CLH has acknowledged that for WEC to properly provide the professional service, WEC is relying upon full disclosure and accuracy of this information.

If you have any questions or comments, please contact the undersigned at your convenience.

respectfully submitted

Gordon Mackinnon QEP, R.P.Bio # 1513



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8. Photos



Photo 1: Chute Lake Main Lodge



Photo 2: Example of “Yurt” Accommodation



Photo 3: ESA 2 Area along Western Property line



Photo 4: Looking North Along KVR



Photo 5: Riparian Area within Property along Chute Lake

Appendix 1:
Preliminary Riparian Restoration Plan



Riparian Planting List	
trees	<ul style="list-style-type: none"> lodgepole pine (<i>Pinus contorta</i>), white spruce (<i>Picea engelmannii</i>), Western larch (<i>Larix occidentalis</i>)
shrubs	<ul style="list-style-type: none"> Nootka rose (<i>Rosa nutkana</i>), Black twinberry (<i>Lonicera involucrata</i>) oregon grape (<i>Mehonia aquifolium</i>), kinnikinnick (<i>Arctostaphylos uva-ursi</i>) Douglas maple (<i>Acer douglasii</i>), Sitka Alder (<i>Alnus viridis</i>) Bebb's willow (<i>Salix bebbiana</i>), red osier dogwood (<i>Cornus stolonifera</i>)
grasses	<ul style="list-style-type: none"> dryland mix suitable MS dm 1 Biogeoclimatic Zone
	<ul style="list-style-type: none"> Bark-mulch trails Benches