

Ecological Assessment of the Krestova Regional Park

PRESENTED TO:

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1. PROJECT OVERVIEW

This report was created to inventory and map the ecological values and physical characteristics of the newly formed Krestova Regional Park. The intent was to provide a baseline assessment of current conditions to be used for future park planning and management initiatives. All field studies and mapping were completed by Ryan Durand, M.Sc., R.P.Bio. (EcoLogic Consultants Ltd.) and Tyson Ehlers, B.Sc., R.P.Bio. (Masse Environmental Ltd.).

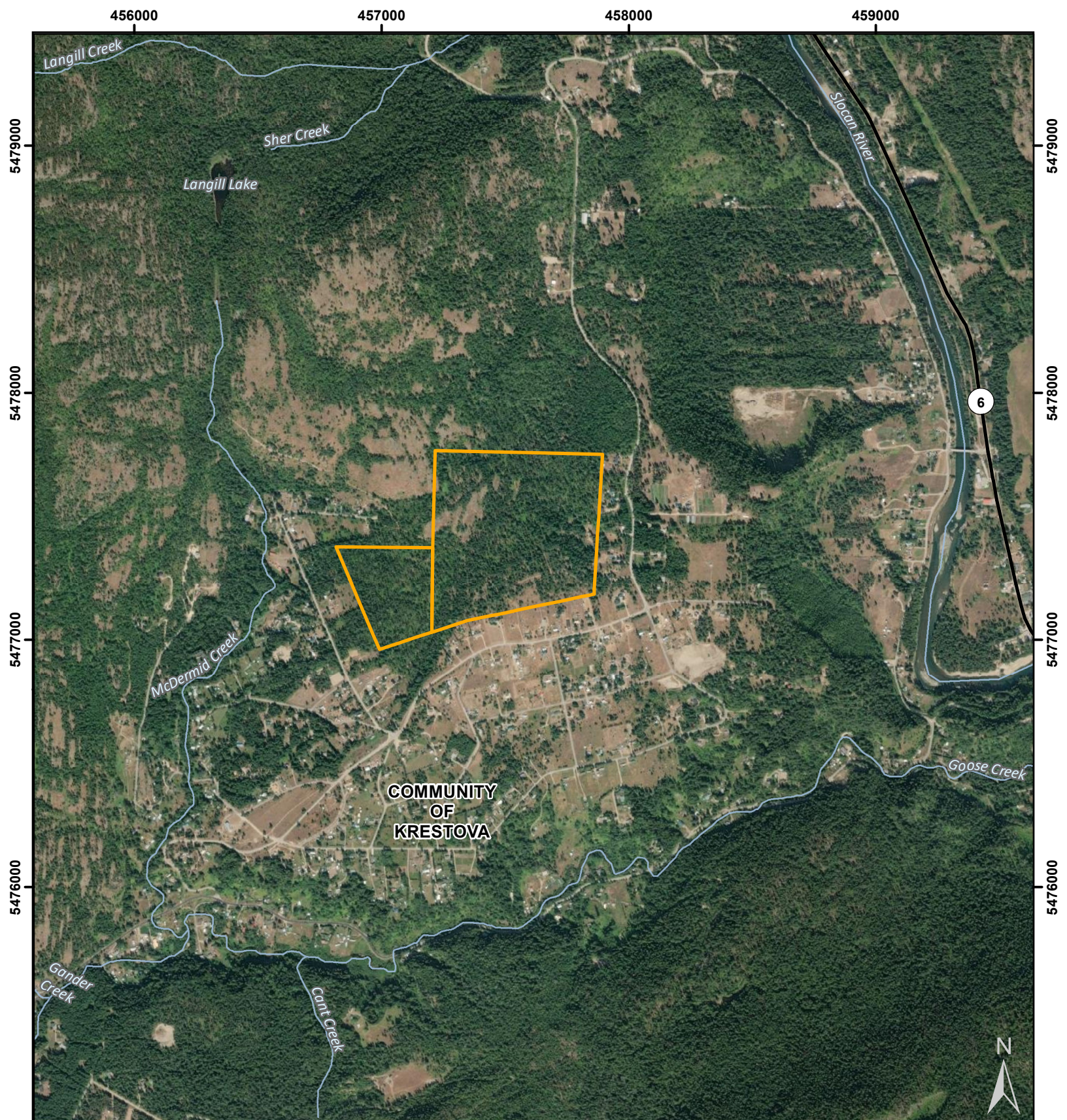
1.1 STUDY AREA

Krestova Regional Park is a 55-hectare property (Plate 1.1-1) located within the unincorporated community of Krestova (Figure 1.1-1) in Electoral Area H of the Regional District of Central Kootenay (RDCK). It is located on the edge of a rural residential area, with the northern boundary backing onto crown land. The park was established in 2022 after a significant community-led fundraising effort and a Development Grant from Area H of the RDCK enabled the purchase of private land.

Krestova Regional Park was established on two parcels that were owned by local families for decades. While privately owned, the property has been used by the local community for a variety of recreational uses, including hiking, motorbiking, and horse riding. The property is not developed; however numerous old roads and informal trails are present, as well as evidence of historic clearing and buildings.



Plate 1.1-1. Drone photo of the grasslands in the northwest portion of the park.



Krestova Regional Park

Property Location

Figure 1.1-1

0 150 300 450
1:20,000 m

Legend

- Property Boundary
- Streams
- Highway

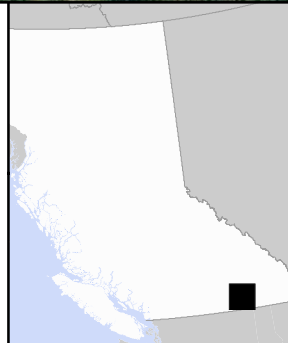
Date: 2024-02-02

Map Number: KRP-001

Coordinate System: NAD 1983 UTM Zone 11N

Projection: Transverse Mercator

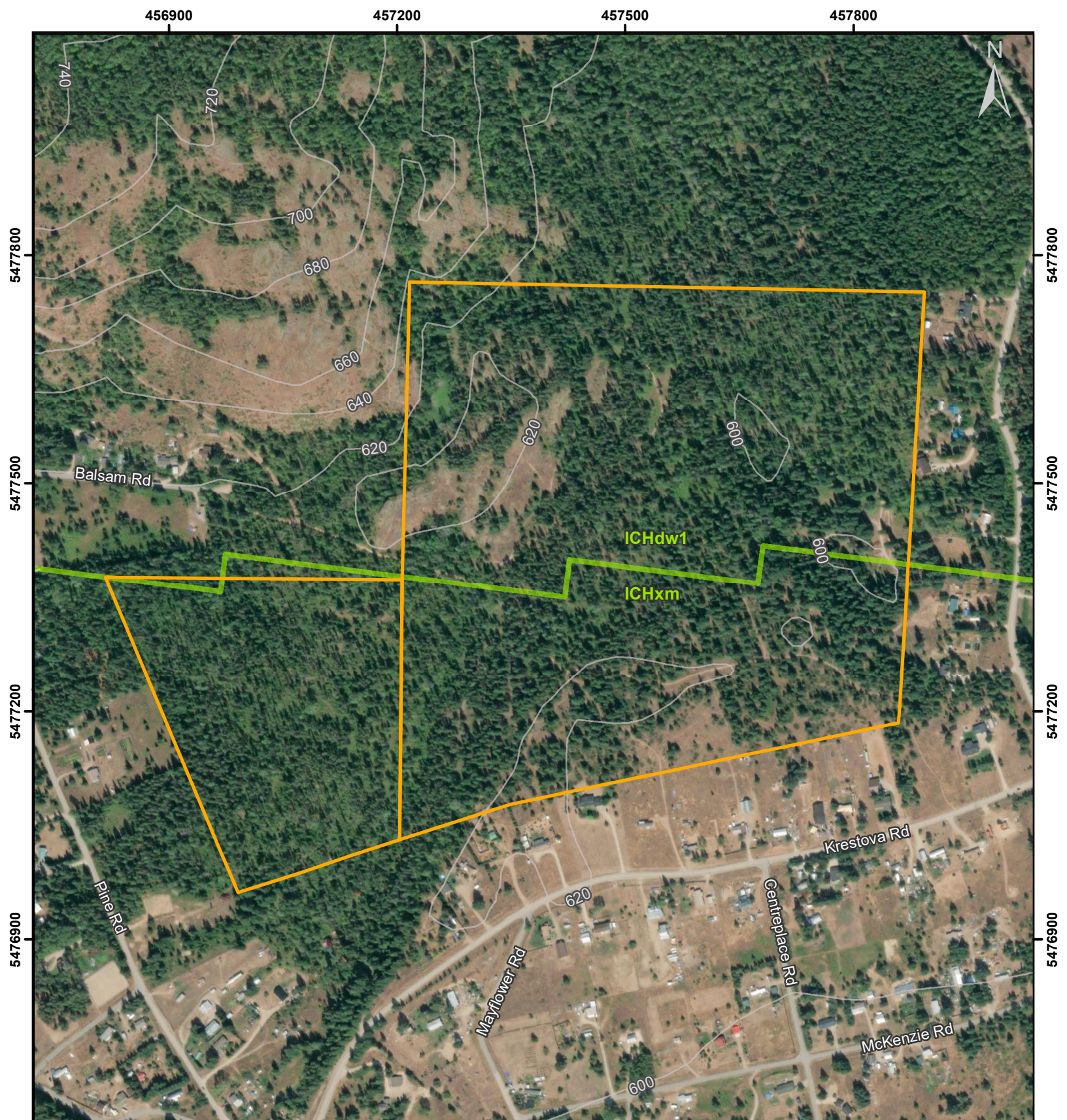
Datum: North American 1983



1.2 BIOGEOCLIMATIC ECOSYSTEM CLASSIFICATION

Krestova Regional Park spans elevations between 610 - 640 m and overlaps two mapped biogeoclimatic subzones: the Very Dry Warm Interior Cedar - Hemlock (ICHxw) and the Dry Warm Interior Cedar - Hemlock (ICHdw1). The ICHxw is a relatively small subzone occurring at low elevations (450 – 1,100 m) in the southernmost parts of the Columbia Basin in BC (MacKillop and Ehman 2016). This subzone has very hot dry summers, and very mild winters with very light snowfall. Snowpacks are shallow and of short duration. It is characterized by open stands of interior Douglas-fir (Fd; *Pseudotsuga menziesii*), ponderosa pine (Py; *Pinus ponderosa*) and lodgepole pine (Pl; *Pinus contorta*), with a variety of drought resistant shrubs and grasses, and supports numerous wildlife and plant species at risk (MacKillop and Ehman 2016).

The ICHdw1 occurs above the ICHxw at elevations between 600 to 1,000 m, depending on aspect (MacKillop and Ehman 2016). It is characterized by moist warm springs, hot to very hot dry summers, and mild dry winters with a moderately shallow snowpack. This subzone is highly productive with a wide variety of tree species including western redcedar (Cw; *Thuja plicata*), Douglas-fir, western hemlock (Hw; *Tsuga heterophylla*), lodgepole pine, grand fir (Bg; *Abies grandis*), western white pine (Pw; *Pinus monticola*), western larch (Lw; *Larix occidentalis*), ponderosa pine, paper birch (Ep; *Betula papyrifera*), trembling aspen (At; *Populus tremuloides*), and black cottonwood (Act; *Populus trichocarpa*). The majority of the ICHdw1 has been disturbed by human use, including development, logging, mining, and flooding from hydroelectric development.



Krestova Regional Park

Study Area

Figure 1.2-1

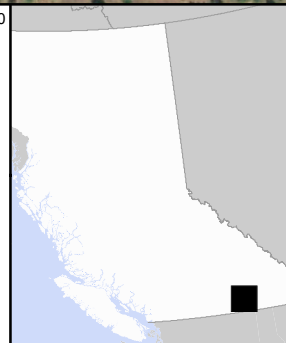


Date: 2024-02-05
Map Number: KRP-002
Coordinate System: NAD 1983 UTM Zone 11N
Projection: Transverse Mercator
Datum: North American 1983

Legend

- Property Boundary
- Biogeoclimatic Zone
- Contours

0 50 100 150
1:6,500 m



1.3 TERRAIN OVERVIEW

Krestova Regional Park is characterized by glacial features, mainly part of a large kame terrace that extends along portions of Slocan River, as well as rock outcrops and glacial till. The majority of the park occurs on the kame terrace, while rock outcrops and morainal blankets occur along the northern boundary of the property at the base of the mountain slope.

A kame terrace is a landform that develops from a stream or river that flows upon a glacier, depositing sand and gravel in depressions in the ice. As the glacier melts, this material settles on the ground surface, forming a kame terrace. Very often kames are formed along the margin of a receding glacier and valley wall (Huggett 2011; Singh et al. 2011). While this system is bound by a glacier, the stream or river deposit coarse-textured sand and gravelly material in the same manner that a typical active fluvial system would. As the glacier begins to retreat the system is no longer supported by the glacier on one side so it leaves a perched plateau or terrace along the wall of a valley. Over time this terrace can erode and subside as glacial recession continues. A kame terrace can be easily identified under post glacial conditions when reviewing elevation data such as a digital elevation model, since the landform is very flat on top and has smoothly sloped edges. It is common to find multiple kame terraces stacked on top of each other along a valley where glacial advance and retreat occurs frequently.

When a glacier retreats, there can be instances where buried ice gets separated from the glacier and becomes stranded in place and does not advance or retreat with the rest of the glacier (Huggett 2011; Singh et al. 2011). This type of ice is known as ‘dead’ ice. A kettle is a pit or hole that has formed due to the subsidence of land as buried ice melts. Kettles can vary in size and can sometimes be poorly drained and hold water while others that are in elevated positions will be dry. A kettle can form within a kame terrace when ice breaks off from the glacier and is buried at depth. Generally, a kettle on a kame terrace will be dry due to the coarse texture of many glaciofluvial deposits. Multiple kettle holes of various sizes can be found within and near the park.

Rock outcrops along the northern portion of the park are likely post glacial remnants that resisted erosion from glacial movement. They extend above the glaciofluvial deposition that created the kame terrace. Small amounts of glacial till occur along the base of the mountain in areas that were above the influence of glacial meltwaters. The till is likely intermixed with some more recent post-glacial colluvial material that has moved downslope from the mountains above.

2. METHODS

2.1 ECOSYSTEM MAPPING AND CLASSIFICATION

Terrestrial Ecosystem Mapping (TEM) is the standardized method for ecological classification and mapping in British Columbia. It uses the provincial Biogeoclimatic Ecosystem Classification (BEC) system to describe the type and extent of ecosystems within a given study area. BEC groups ecosystems at regional, local, and chronological levels using a combination of current and expected vegetation, soil, climate, and

topography. Ecosystems are classified at a local level that represents specific localized ecosystem units based on vegetation composition and soils, with site series used to describe terrestrial ecosystems and site associations to describe wetland ecosystems. Multiple site series are described for each regional subzone reflecting the landscape level distribution of ecosystems based on regional climate, elevation, and physiography, while site associations are used to describe non-forested ecosystems at a provincial level. Vegetation is the primary factor for describing ecosystems; however, it is based on climax and zonal theories, where the vegetation observed in a young or disturbed site may not necessarily reflect the species composition of a mature or old site (MoF and MoE 2010; RIC 1999).

Ecosystems were identified in the study area by visual assessment from vegetation and site characteristics, including slope, aspect, soil moisture/drainage, and vegetation structure and composition. Sample plots used modified FS882 cards (MoF and MoE 2010) for the site, vegetation, and soils component. All plot data were collected using the ESRI Survey123 app, and the ESRI Field Maps app was used for mapping.

Ecosystems were delineated in ArcGIS using heads-up digitization on orthomosaic imagery. Mapping was generally completed at a scale of 1:2,500 overall; as scale is a relative term using digital imagery, where the user can readily zoom in and out to identify features. Ecosystem mapping and classification generally followed provincial methodology, including:

- ♦ *Field Manual for Describing Terrestrial Ecosystems; 2nd Edition* (BC Ministry of Forests and Range and BC Ministry of Environment 2010);
- ♦ *Standards for Terrestrial Ecosystem Mapping in BC* (RIC 1999);
- ♦ *Biogeoclimatic Ecosystem Classification of Non-Forested Ecosystems in British Columbia* (MacKenzie 2012);
- ♦ *A Field Guide to Site Identification and Interpretation for Southeast British Columbia* (MacKillop and Ehman 2016);
- ♦ *A Field Guide for Site Identification and Interpretation in the Nelson Forest Region* (Braumandl and Curran 2002).

2.2 BIODIVERSITY AND WILDLIFE HABITAT

All species observed during field surveys were recorded with a focus on identifying species at risk and exotic species. A background review was conducted to identify additional species documented in the park or the immediate surrounding area from the following resources:

- ♦ British Columbia Data Catalogue;
 - British Columbia Conservation Data Centre (BC CDC) - Species and Ecosystems Explorer Tool
 - iMap BC web-based mapping application
- ♦ Global Biodiversity Information Facility (GBIF) – open access international biodiversity data from multiple data sources; and

- ♦ iNaturalist - online community biodiversity information sharing network.

Species lists generated from the field surveys and the background review were combined to produce a list of all unique taxa with known or potential occurrence in the park. Each species is recorded as field observations, documented observations (from sources such as iNaturalist), anecdotal observations (for species known to occur, but have not been formally documented), and potential to occur (species documented in the general area within similar habitat). Observations were recorded to the highest level of taxonomic certainty, linked to the data source with geospatial and temporal information where available, and sorted by lifeform: amphibians and reptiles, birds, fungi and lichens, invertebrate animals, mammals, and slime moulds. Taxonomy and nomenclature follow the BC Conservation Data Centre (BC CDC 2024a) for plants and animals, GBIF for fungi, and Lado et al. (2005 - 2024) for slime moulds. Additional habitat information was supplied for major wildlife species.

2.3 SPECIES AND ECOLOGICAL COMMUNITIES AT RISK

A species at risk (SAR) “means an extirpated, endangered or threatened species or a species of special concern” (*Species at Risk Act*, 2002¹). Legal protection for species and their habitats in Canada is enacted through the *Species at Risk Act* (SARA) based on research and recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In British Columbia, species and ecological communities are assigned to provincial lists according to conservation status determined by the British Columbia Conservation Data Centre (BC CDC 2024a).

The BC CDC database and iMap application (BC CDC 2024b) were queried for species and ecological communities at risk with known or potential occurrences in the park according to the following criteria:

- ♦ BC Conservation Status: Red (Extirpated, Endangered, Threatened) or Blue (Special Concern);
- ♦ COSEWIC/SARA Status: Extinct, Extirpated, Endangered, Threatened or Special Concern; and
- ♦ Area of Interest: User Defined Polygon (~1 km overlapping the immediate area of the park).

The query results were reviewed, and SAR were assessed as confirmed if the species had documented occurrence on the property, or possibly occurring according to knowledge of species distributions, habitat relationships, and availability of suitable habitat within the assessment area.

2.4 FUEL HAZARD ASSESSMENT

The wildfire threat assessment process incorporates fuel hazard, topography, and values at risk to assess wildfire behaviour and threat of fire to the Wildland Urban Interface (WUI). Fuel management is part of a multi-faceted strategy to reduce wildfire threat on public lands in the WUI. Interface forests provide many important ecological services as well as numerous community values such as clean drinking water, cultural heritage, and recreation and education opportunities. Fuel management strives to reduce the risk of

¹ Species at Risk Act (2002). <https://laws.justice.gc.ca/eng/acts/S-15.3/>

catastrophic wildfires while maintaining ecological integrity and protecting community values. Within the RDCK, priority fuel treatment areas have been identified in Community Wildfire Protection Plans (CWPP) developed to help identify and reduce wildfire risk to communities. The CWPPs provide a high-level assessment of environmental values and recommend further assessments be done during site level operational planning using the most current information on species at risk and consulting with a biologist or qualified professional. The Slocan Integrated Forestry Cooperative (SIFCo) developed a CWPP for RDCK Area H South (SIFCo 2020). Wildfire threat was determined through a combination of field reconnaissance and spatial data analysis. The CWPP incorporated the Provincial Strategic Threat Analysis (PTSA), which is a “high-level spatial estimate of the wildfire threat throughout BC.” Threat ratings were assigned according to vegetation cover data, historical fire occurrence data, topography, and historic weather data.

Stand characteristics and fuel loading were assessed at nine plots in relation to wildfire threat in the park. Stand density by canopy layer was assessed according to diameter at breast height (DBH) and height classes:

- ♦ Layer 1 (L1) >17.5 cm DBH. Dominant overstory trees with merchantable volume.
- ♦ Layer 2 (L2) 12.5-17.5 cm DBH. Co-dominant overstory trees with sub-merchantable volume.
- ♦ Layer 3 (L3) >1.3 m height, <17.5 cm DBH. Understory saplings.
- ♦ Layer 4 (L4) <1.3 m height. Regeneration layer.

Other stand attributes that were recorded included percent crown closure, understory composition, fuel loading (low, moderate, high), and dead and down trees. Observations were summarized to assess treatment priority and fuel management strategies that could be used.

2.5 TRAIL MAPPING

All established trails and old roads were mapped using a Bad Elf GPS and iPad. Mapping accuracy was generally less than +/-5 m. Faint trails and overgrown roads that did not show signs of recent use were not mapped. A DJI Mavic drone was also used to create an orthomosaic photo of the park to assist with the location of trails.

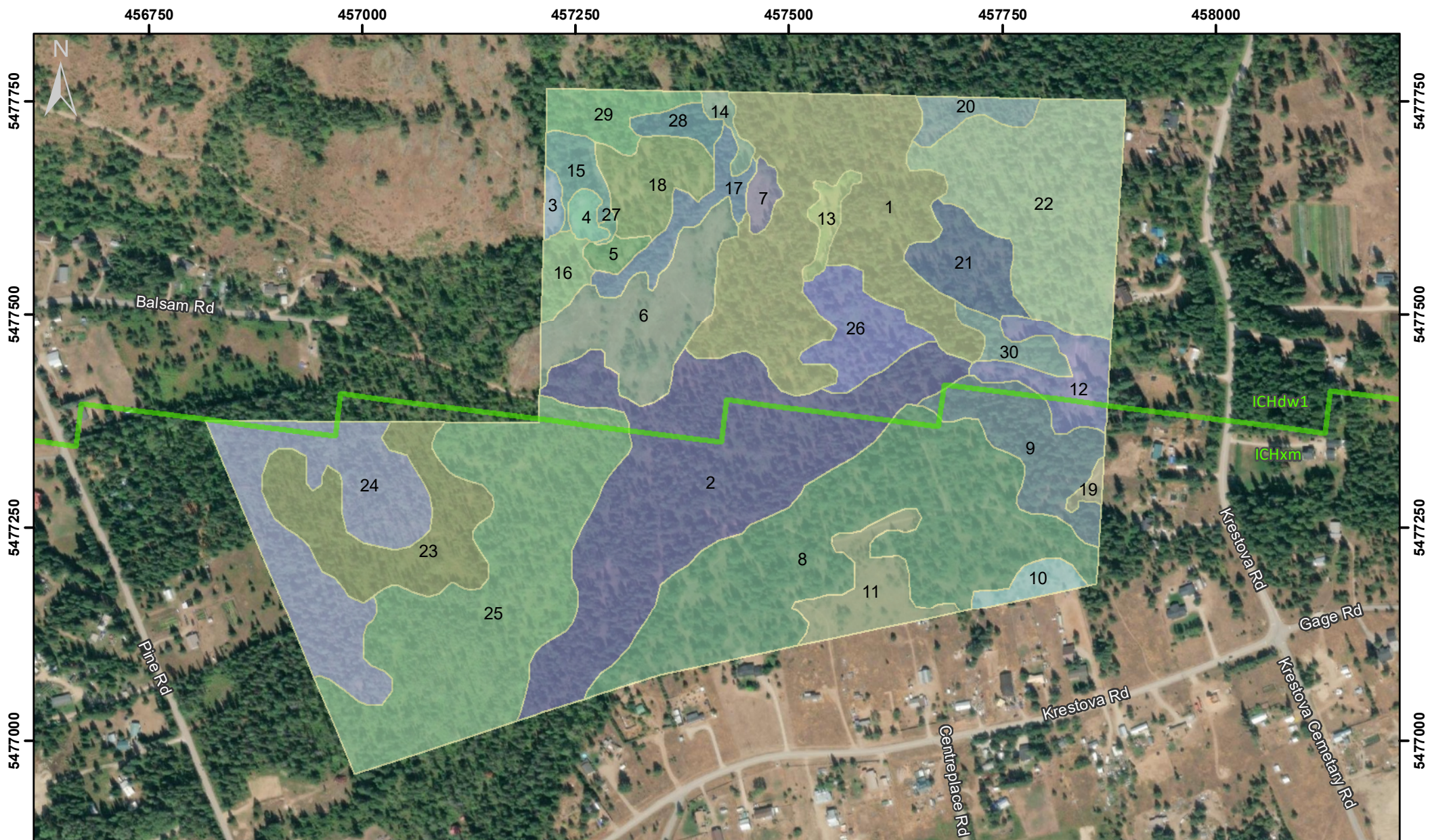
3. RESULTS

3.1 ECOSYSTEM MAPPING AND CLASSIFICATION

A total of 14 ecological communities, and two anthropogenic features, were mapped in the park (Table 3.1-1; Figure 3.1-1). Field studies to ground truth the mapping, confirm spatial accuracy of the mapped ecosystems, and classify ecosystems, included 46 sample plots (Figure 3.1-2). Young zonal (ICHdw1 101 and ICHxw 101 site series) conifer and mixed stands and young conifer submesic sites (ICHxm 104 site series) are the dominant ecosystem types found in the park. Other ecosystems included wetlands, grasslands, rock outcrops, dry shrublands, and a tiny cottonwood floodplain.

Table 3.1-1. Summary of ecosystem mapping

Site Series / Map Code	Description	Structural Stage	Area (ha)
ICHdw1			
101	CwFd – Prince’s pine – Twinflower	2a	0.5
		5C	1.4
		5M	6.9
		6C	0.4
102	FdPy - Pinegrass - Rock-moss	5C	0.5
		5M	0.2
		6C	0.4
103	Fd(Py) – Douglas maple – Pinegrass	5M	0.3
104	FdCw – Douglas maple – Prince’s pine	5C	0.9
		5M	1.1
110	CwHw – Oak fern	5M	0.4
Fm00	Mid-bench Floodplain (unclassified)	5B	<0.1
Gb03	Ninebark – Oceanspray – Bluebunch wheatgrass	3a	0.1
		3b	0.2
Gg11	Idaho fescue – Bluebunch wheatgrass – Junegrass	2b	2.1
Ro9.1	Saskatoon – Rock-moss – Clad lichen	3a	0.1
RP	Road		<0.1
Wm00	Marsh (unclassified)	2b	0.1
Ww	Shallow Water		0.1
ICHdw1 Total			15.8
ICHxw			
101	CwFd – Hazelnut – Sarsaparilla	4C	0.5
		5C	10.7
		5M	9.2
103	FdPy – Oregon-grape – Pinegrass	6C	0.7
104	Fd(Py) – Douglas maple – Pinegrass	2a	0.9
		3a	0.7
		5C	13.2
		5M	1.7
RR	Rural Residential		1.2
ICH xw Total			38.7



Krestova Regional Park

Ecosystem Mapping

Figure 3.1-1

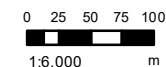


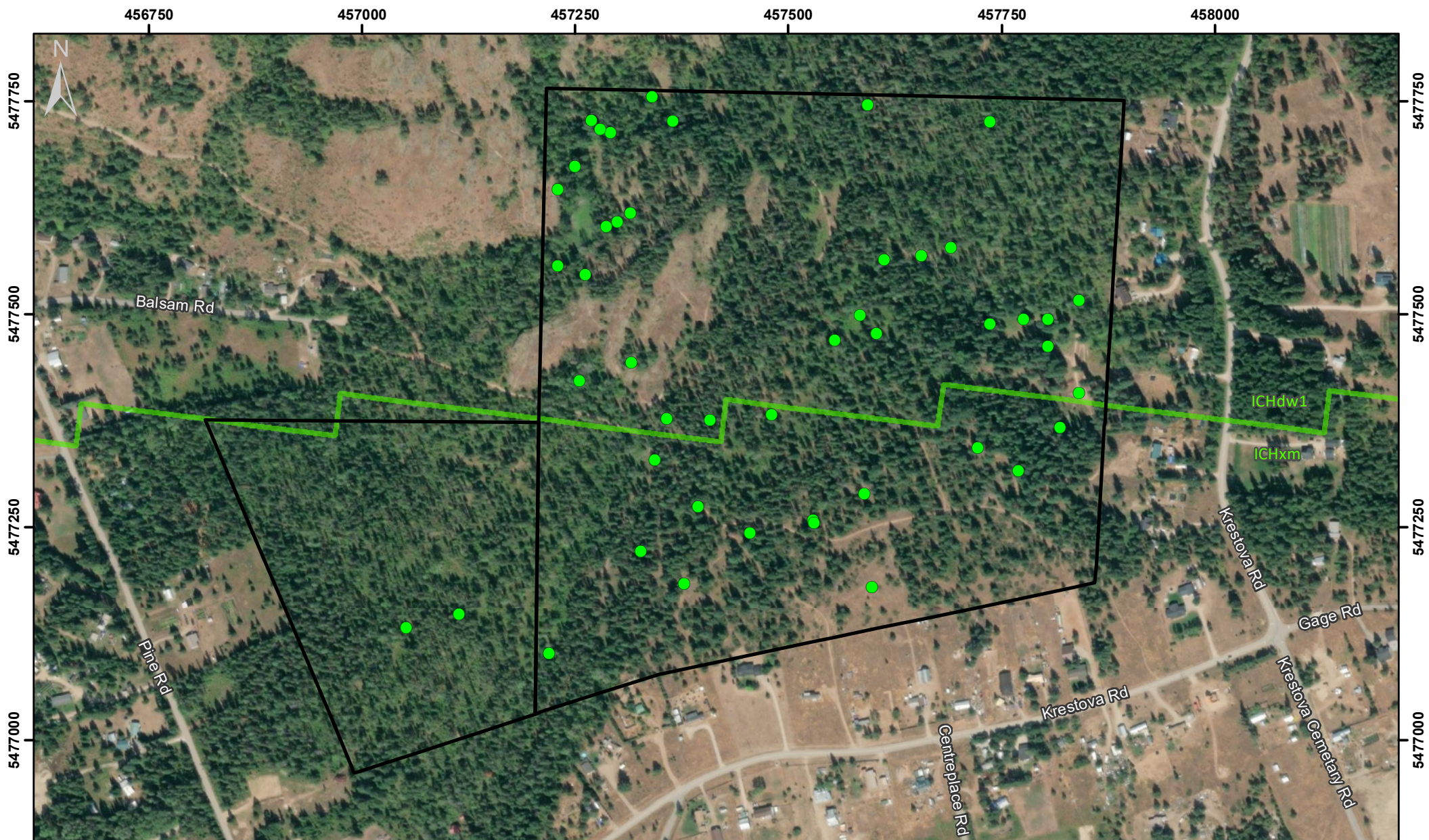
Date: 2024-02-14
 Map Number: KRP-003
 Coordinate System: NAD 1983 UTM Zone 11N
 Projection: Transverse Mercator
 Datum: North American 1983

Biogeoclimatic Zone

Ecosystem Mapping

1 - 10 101 5M	10 - 6 104 3a 4 104 2a	21 - 10 104 5M
2 - 6 104 5C 4 101 5C	11 - 6 104 2a 4 104 3a	22 - 6 101 5C 4 104 5M
3 - 6 Gb03 3a 4 Ro09.1 3a	12 - 10 RR	23 - 8 101 5M 2 101 4C
4 - 7 Ww 3 Wm00 2b	13 - 10 101 2a	24 - 10 101 5M
5 - 6 102 5C 4 104 5C	14 - 10 101 2a	25 - 7 101 5C 3 101 5M
6 - 8 Gg11 2b 1 Gb03 3b 1 102 5M	15 - 9 101 6C 1 102 5C	26 - 10 101 5M
7 - 8 Gg11 2b 2 Gb03 3a	16 - 9 101 5C 1 RP	27 - 10 Fm00 5B
8 - 10 104 5C	17 - 10 101 5M	28 - 10 110 5M
9 - 6 104 5C 4 103 6C	18 - 7 104 5C 3 102 5C	29 - 6 101 5C 4 103 5M
	19 - 10 RR	30 - 10 102 6C
	20 - 10 101 5C	





Krestova Regional Park

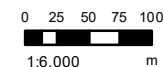
2023 Sample Plots

Figure 3.1-2



Date: 2024-02-15
 Map Number: KRP-005
 Coordinate System: NAD 1983 UTM Zone 11N
 Projection: Transverse Mercator
 Datum: North American 1983

- 2023 Sample Plots
- Property Boundary
- Biogeoclimatic Zone



3.1.1 Forested Ecosystems

Conifer forests are the dominant ecosystem type within the park. Stands are typically mixed with Douglas-fir dominating on mesic-submesic sites (101, 104 site series; Plate 3.1-1), with lesser amounts of grand fir, ponderosa pine, spruce, and western white pine. Some western redcedar occurs in the overstory on subhygric sites (110 site series; Plate 3.1-2). The driest forested sites (102 site series) and 103 site series; Plate 3.1-3) have open stands of ponderosa pine and Douglas-fir with minor amounts of lodgepole pine. Dense seral stands of young-mature lodgepole pine occur at lower elevations within the park. Trembling aspen and paper birch form a component of mixed stands on moist sites, and a black cottonwood forested site surrounding a small wetland in the west-central part of the park was characterised as an undifferentiated middle-bench flood ecosystem (Fm00; Plate 3.1-4).



Plate 3.1-1. Mesic forest (101) site with maturing FdPl(Sxw) stand (measured 85 years-old).



Plate 3.1-2. Western redcedar forest on a subhygric (110) site.



Plate 3.1-3. Submesic forest (103) site with open growing Douglas-fir and ponderosa pine.



Plate 3.1-4. Black cottonwood forest (Fm00) surrounding wetlands.

3.1.2 Non-forested Ecosystems

3.1.2.1 Grassland/Brushland/Rock Outcrop

The driest non-forested sites are a complex of grassland, brushland and rock outcrop sites (Plates 3.1-5 and 3.1-6). Grasslands and brushlands have overlapping vegetation conditions and are differentiated primarily by shallower, rockier soils found in brushland sites. Grassland and brushland ecosystems are rare in the West Kootenay region, and largely found within the ICHxw BEC subzone near valley bottoms. They occupy 2.5 ha within the park and are classified as the Gg11 Idaho fescue - bluebunch wheatgrass - silky lupine – junegrass (*Festuca idahoensis* - *Pseudoroegneria spicata* - *Lupinus sericeus* - *Koeleria*

macrantha) and the Gb03 mallow nine-bark - oceanspray - bluebunch wheatgrass (*Physocarpus malvaceus* - *Holodiscus discolor* - *Pseudoroegneria spicata*). Rock outcrop sites were classified as the Ro9.1 saskatoon – rock-moss – clad lichen (*Amelanchier alnifolia* – *Racomitrium* spp. – *Cladonia* spp.) site association/variant.



Plate 3.1-5. Dry site with Gg11 grassland and Gb03 brushland ecosystems.



Plate 3.1-6. Gg11 grassland with dry 102 forests in the background.

3.1.2.2 Wetland

A small wetland complex occurs in the west-central part of the park (Plate 3.1-7 and 3.1-8). The complex consists of an ephemeral shallow-water community (Ww) with a thin marsh fringe (Wm00). Neither wetland type is recognized in the provincial biogeoclimatic ecosystem classification system. The site is

well used by a wide range of wildlife, particularly ungulates and birds as it is the only surface water source in the area.



Plate 3.1-7. Shallow water wetland (Ww) with marsh (Wm00) fringe in the spring.



Plate 3.1-8. Early summer drying of pond and associated wetlands.

3.1.2.3 Disturbed Areas

Two small, disturbed areas were mapped: roads (RP) and rural residential (RR). Both disturbed areas are located along the southern boundary of the park where current and historic use has resulted in extensive soil disturbance and a small amount of debris and refuse including abandon vehicles (Plates 3.1-9 and 3.1-10).



Plate 3.1-9. Example of the numerous trails and soil disturbance in a large old kettle hole on the eastern edge of the park.



Plate 3.1-10. An old, wrecked car near the southeast corner of the park.

3.2 BIODIVERSITY AND WILDLIFE HABITAT

A total of 274 taxa were identified for the park, including 224 documented during field surveys and an additional 52 from the background review. Table 3.2-1 summarizes the number of taxa identified in each group; Appendix A provides a list of all taxa identified.

Table 3.2-1. Number of taxa by group identified for Krestova Regional Park

Taxonomic Group	Number of Taxa
Arthropods	25
Birds	51
Mammals	6
Molluscs	3
Reptiles	3
Lichens	7
Macrofungi	13
Plants	159
Slime Moulds	7
Total	274

3.2.1 Mammals

Six mammal species were documented for the park: American black bear (*Ursus americanus*), cougar (*Puma concolor*), red squirrel (*Tamiasciurus hudsonicus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), snowshoe hare (*Lepus americanus*), and white-tailed deer (*Odocoileus virginianus*).

The park falls within the Valhalla Grizzly Bear (*Ursus arctos*) Population Unit, ranked High Conservation Concern (M2), based on a combination of population size, isolation, trend and threats (BC CDC 2024a). No records of grizzly bear occurrences in the park were sourced, though grizzly bears are expected to have historically moved through the area. American black bear scat was observed during field surveys, and there are several nearby occurrences reported on iNaturalist (2024). Black bears likely frequent the park for foraging and cover, and potentially for denning.

No official documented occurrences for cougar in the park were sourced, however there are anecdotal records from local residents.

Mapped ungulate winter range U-4-001 (UWR Unit Number 224) for Rocky Mountain elk established by Ministerial Order under the *Forest & Range Practices Act, Government Actions Regulation* Order (Province of British Columbia 2004) overlaps the park, although parks and protected areas are excluded from the general wildlife measures specified under the Order. Rocky Mountain elk are frequently observed in the Krestova area, which is within a broad ecosystem inventory polygon rated Low (4) for elk summer habitat suitability and Very Low (5) for winter habitat suitability compared to the provincial benchmark (BC CDC 2024b, RIC 1999). Old forests at low elevations on south-facing slopes with moderate to high crown closure are preferred winter range sites for elk. Preferred forage is primarily grasses and forbs, though they may feed on shrubs and deciduous trees during winter as their preferred forage is covered with snow. Security habitat is provided by dense forested thickets with vegetation capable of hiding the animal from a distance. Thermal habitat is most critical in winter and is provided by closed canopy conifer stands with

understory vegetation, which provides a windbreak. Overall, the park currently has abundant thermal and security cover, and moderate forage and open range habitat for elk and other ungulates.

White-tailed deer scat and tracks were observed during field surveys. No records of mule deer (*O. hemionus*) were sourced for the park, though the species has potential to occur. Moose (*Alces alces*) have been tracked in the vicinity of Langill Lake above the park (BC CDC 2024b; Poole et al. 2003). The small wetland pond provides some foraging and wallowing values for moose.

Other mammal species with potential to occur in the park include bobcat (*Lynx rufus*), chipmunks (*Neotamias* spp.), Columbian ground squirrel (*Urocitellus columbianus*), coyote (*Canis latrans*), North American deer mouse (*Peromyscus maniculatus*), northern flying squirrel (*Glaucomys sabrinus*), northern pocket gopher (*Thomomys talpoides*), shrews (*Sorex* spp.), yellow-bellied marmot (*Marmota flaviventris*), and voles (*Microtus* spp.). Wolverine (*Gulo gulo*) is unlikely to occur but may occasionally migrate through the park. Eleven bat species are found in the Kootenays (KCBP 2013), some of which have potential to occur in the park. Typical winter roosts including caves, buildings, and abandoned mines are lacking within the park, however summer roosts including snags and rock crevices may be available.

3.2.2 Amphibians and Reptiles

No amphibian occurrences were identified for the park, though the small pond has potential to support species such as long-toed salamander (*Ambystoma macrodactylum*), Pacific treefrog (*Pseudacris regilla*), and western toad (*Anaxyrus boreas*). Common gartersnake (*Thamnophis sirtalis*) and terrestrial gartersnake (*T. elegans*) were both observed during field surveys. Northern alligator lizard (*Elgaria coerulea*), rubber boa (*Charina bottae*), and western skink (*Plestiodon skiltonianus*) have nearby occurrences (iNaturalist 2024) and suitable habitat exists within the park to support these species.

3.2.3 Birds

A total of 51 bird species were documented. Seventeen species were observed during field surveys and 34 additional species have been documented nearby (GBIF 2024). Diverse vegetation communities with abundant shrubs that are present provide good songbird nesting and foraging habitat. Numerous snags provide potential cavity nester habitat for woodpeckers and other species.

3.2.4 Invertebrate Animals

Twenty-five arthropod species were documented in and around the park, 15 of which were recorded during field surveys, including boreal long-lipped tiger beetle (*Cicindela longilabris longilabris*) and oblique-lined tiger beetle (*Cicindela tranquebarica vibex*; Plate 3.2-1). Mollusc species found during surveys included two snails, banded tigersnail (*Anguispira kochi* ssp. *occidentalis*) and Coeur d'Alene Oregonian (*Cryptomastix mullani*), and one slug, reticulate tailed dropper (*Prophysaon andersoni*).



Plate 3.2-1. Oblique-lined tiger beetle (*Cicindela tranquebarica vibex*).

3.2.5 Plants

One hundred and fifty-nine plant species were documented in the park, including 142 vascular plant species. The high diversity of plants reflects the wide range in site conditions, including wetland, grassland, and forested sites. Dry grassland ecosystems support a unique flora with a variety of spring wildflowers such as slender phlox (*Microsteris gracilis*; Plate 3.2-2) and Sutherland's larkspur (*Delphinium sutherlandii*; Plate 3.2-3) that add colour to the landscape and nectar sources for pollinating insects. Bryophytes accounted for 17 species, not all of which were identified to the species level.



Plate 3.2-2. Slender phlox (*Microsteris gracilis*).



Plate 3.2-3. Sutherland's larkspur (*Delphinium sutherlandii*).

3.2.6 Fungi and Lichens

Thirteen fungi species and seven lichen species were identified, most of which were found during field surveys. Examples include morels (*Morchella* spp., Plate 3.2-4) and trembling crust (*Merulius tremellosus*; Plate 3.2-5).



Plate 3.2-4. Morel (*Morchella* sp.).



Plate 3.2-5. Trembling crust (*Merulius tremellosus*).

3.2.7 Slime Moulds

Five species of slime mould (Myxomycetes) were documented during field surveys. Examples include coral slime mould (*Ceratiomyxa fruticulosa*; Plate 3.2-6) and false puffball (*Reticularia lycoperdon*; Plate 3.2-7). Myxomycetes are generally a poorly inventoried group of organisms in BC, and many more species are likely to occur in the park than are reported here.



Plate 3.2-6. Coral slime mould (*Ceratiomyxa fruticulosa*).



Plate 3.2-7. False puffball (*Reticularia lycoperdon*).

3.3 SPECIES AND ECOLOGICAL COMMUNITIES AT RISK

3.3.1 Species at Risk

Three SAR were confirmed in the park, including two snails and one bird. Banded tigersnail (Blue-listed; Plate 3.3-1) and Coeur d'Alene Oregonian (*Cryptomastix mullani*; Blue-listed, Plate 3.3-2) were found in moist mixed forest near the pond in the west-central portion of the park. Evening Grosbeak (*Coccothraustes vespertinus*; SARA-Special Concern) was observed during field surveys. Both snails likely occur in numerous locations in the moister portions of the park. Twenty-seven SAR were identified with potential occurrences in the park: vertebrates (15), invertebrates (6), vascular plants (3), and lichens (3). Table 3.3-1 provides a list of SAR with confirmed or potential occurrences in the park.



Plate 3.3-1. Blue-listed banded tigersnail (*Anguispira kochi* ssp. *occidentalis*).



Plate 3.3-2. Blue-listed Coeur d'Alene Oregonian (Cryptomastix mullani).

Table 3.3-1. Species at Risk in Krestova Regional Park.

Scientific Name	Common Name	Provincial Status ¹	BC List ¹	COSEWIC ²	SARA ²	Likelihood of Occurrence	Comment/Reference ³
Invertebrates							
<i>Aeshna constricta</i>	Lance-tipped darner	S3	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).
<i>Anguispira kochi</i> ssp. <i>occidentalis</i>	banded tigersnail	S3	Blue	NAR		confirmed	Confirmed during field surveys (2023).
<i>Cryptomastix mullani</i>	Coeur d'Alene Oregonian	S3	Blue			confirmed	Confirmed during field surveys (2023).
<i>Cupido comyntas</i>	eastern tailed blue	S3	Blue			possible	Caterpillar hosts included many plants in the pea family (BC CDC 2024); reported near Taghum (GBIF 2024).
<i>Danaus plexippus</i>	monarch	S1?B	Red	E	SC	possible	Nearby observations in Robson, Blewett, and Little Slocan (GBIF 2024). May migrate through property if milkweed is present.
<i>Epargyreus clarus clarus</i>	silver-spotted skipper	S3	Blue			possible	Nearby occurrence in Crescent Valley (GBIF 2024). Possibly strays into park if larval host plants (legumes) available (BC CDC 2024).
<i>Euptoieta claudia</i>	variegated fritillary	S3N	Blue			possible	Nearby occurrence in Blewett (GBIF 2024). Virtually any open to sparsely treed habitat (BC CDC 2024).
<i>Kootenaia burkei</i>	pygmy slug	S3	Blue	SC	SC	possible	Found nearby in lower Krestova on Langill Creek (R. Durand); potentially suitable habitat exists in park.
Lichens							
<i>Cladonia cyanipes</i>	blue-footed pixie	S2S4	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).
<i>Cladonia luteoalba</i>	lemon pixie	S2S3	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).
<i>Evernia divaricata</i>	mountain oakmoss	S3	Blue			possible	Reported near Robson (GBIF 2024); potentially suitable habitat exists within the ICHdw (BC CDC 2024).
Vascular Plants							
<i>Botrychium michiganense</i>	Michigan moonwort	S3	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).
<i>Botrychium montanum</i>	mountain moonwort	S3	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).

Scientific Name	Common Name	Provincial Status ¹	BC List ¹	COSEWIC ²	SARA ²	Likelihood of Occurrence	Comment/Reference ³
<i>Botrychium paradoxum</i>	two-spiked moonwort	S3?	Blue			possible	Potentially suitable habitat exists (BC CDC 2024).
Vertebrates							
<i>Accipiter gentilis atricapillus</i>	Northern Goshawk	S3S4	Blue	NAR		possible	Nearby observations in Krestova/Goose Creek (GBIF 2024).
<i>Anaxyrus boreas</i>	western toad	S4	Yellow	SC	SC	possible	Potentially suitable habitat exists.
<i>Charadrius vociferus</i>	killdeer	S3S5B	Blue			possible	Nearby occurrence in Krestova (GBIF 2024), though unlikely to occur in park due to lack of suitable habitat near water.
<i>Charina bottae</i>	northern rubber boa	S4	Yellow	SC	SC	possible	Found nearby in Winlaw, South Slokan, and Brilliant (GBIF 2024) and potentially suitable habitat exists.
<i>Chordeiles minor</i>	Common Nighthawk	S3S5B	Blue	SC	SC	possible	Reported from Krestova (GBIF 2024), suitable habitat exists.
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	S5	Yellow	SC	SC	confirmed	Confirmed during field surveys (2023).
<i>Contopus cooperi</i>	Olive-sided Flycatcher	S4B	Yellow	SC	SC	possible	Reported in South Slokan (GBIF 2024), suitable habitat exists.
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	S3	Blue			possible	Within the range of the species, typical roosts include caves, rock crevices, mines, and buildings. Has been found roosting in black cottonwood tree (Lausen et al. 2022).
<i>Gulo gulo luscus</i>	wolverine	S3	Blue	SC	SC	possible	Potentially migrates through area.
<i>Hirundo rustica</i>	barn swallow	S4B	Yellow	SC	T	possible	Suitable habitat exists and nearby observations (BC CDC 2024, GBIF 2024).
<i>Icteria virens</i>	yellow-breasted chat	S2B	Red	E	E	possible	Potentially suitable habitat exists, though no nearby occurrences, typically associated with shrubby and riparian habitats with open canopies and dense subcanopy layers (BC CDC 2024).
<i>Lasionycteris noctivagans</i>	silver-haired bat	S4S5	Yellow	E		possible	Within the range of the species, uses a diversity of forest types, summer roosts include under tree bark, in crevices of tree trunks and abandoned cavities or in rock crevices (Lausen et al. 2022).

Scientific Name	Common Name	Provincial Status ¹	BC List ¹	COSEWIC ²	SARA ²	Likelihood of Occurrence	Comment/Reference ³
<i>Lasiurus cinereus</i>	hoary bat	S3S4	Blue	E		possible	Within the range of the species; roosts in foliage of conifer and deciduous trees (Lausen et al. 2022). Habitat includes deciduous and coniferous forests and woodlands, including areas altered by humans (BC CDC 2024).
<i>Megascops kennicottii macfarlanei</i>	Western Screech-Owl	S3	Blue	T	T	possible	Mapped occurrence and home range within 500 m of the park (Hausleitner 2013), suitable habitat exists.
<i>Melanerpes lewis</i>	Lewis's Woodpecker	S2S3B	Blue	T	T	possible	Nearby observations (GBIF 2024); suitable habitat exists.
<i>Plestiodon skiltonianus</i>	Western Skink	S3S4	Blue	SC	SC	possible	Found nearby in Crescent Valley and Brilliant (T. Ehlers, BC CDC 2024); suitable habitat exists.

¹SX = presumed extirpated. SH = historical. S1 = critically imperiled. S2 = imperiled. S3 = special concern. S4 = apparently secure. S5 = demonstrably widespread, abundant, and secure. NA = not applicable. NR = unranked. SU = unrankable. Red = Species that are at risk of being lost (extirpated, endangered, or threatened) within BC. Blue = special concern within BC. Yellow = apparently secure. ²E = Endangered (facing imminent extirpation or extinction). T = Threatened (likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction). SC = Special concern (may become a threatened or an endangered species because of a combination of biological characteristics and identified threats). NAR = Not at Risk federally. SNR = Status not reviewed. ³British Columbia Conservation Data Centre (BC CDC 2024); Global Biodiversity Information Facility (GBIF 2024); Krestova Park Field Surveys (R. Durand and T. Ehlers 2023).

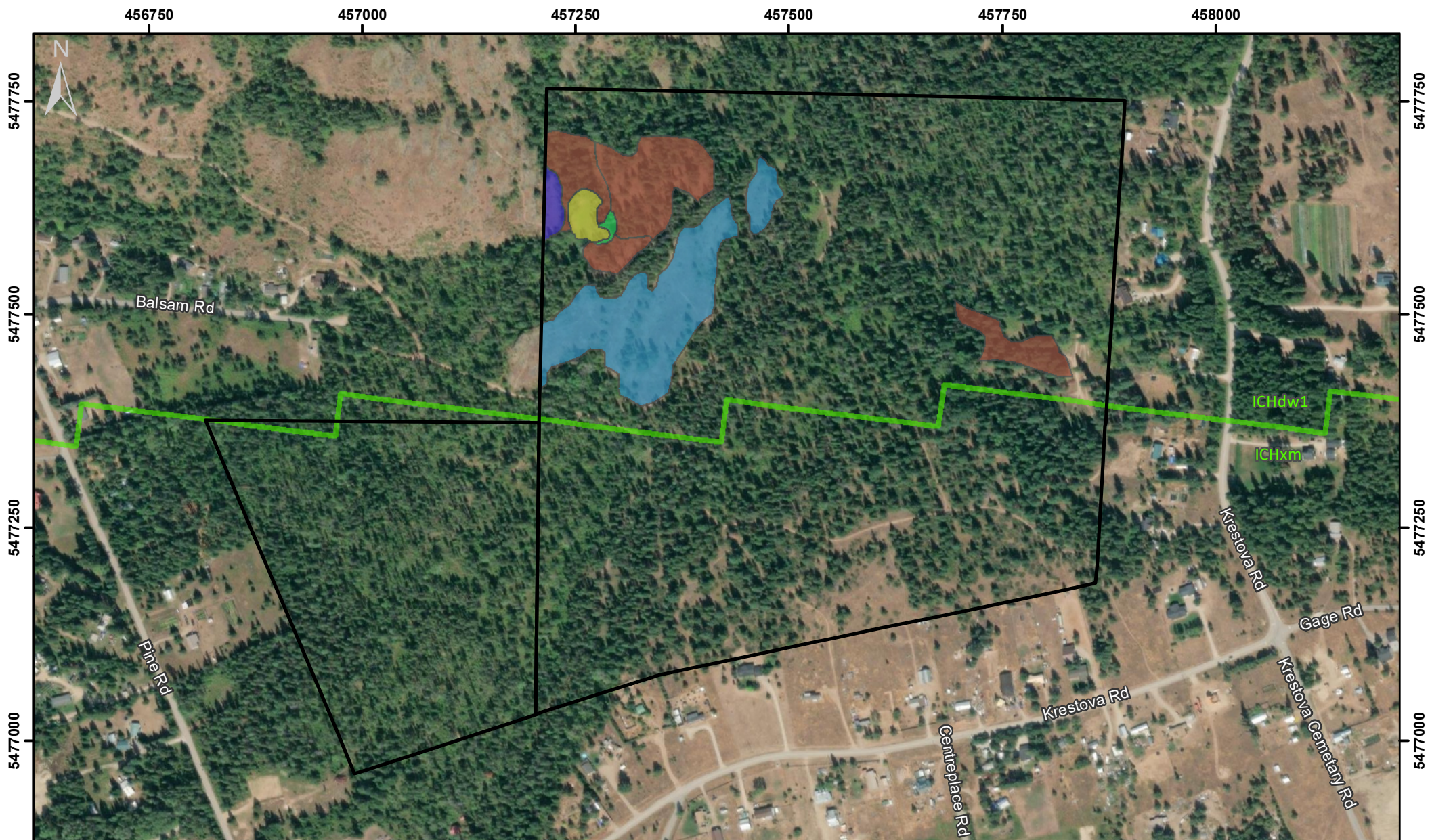
3.3.2 Ecological Communities at Risk

Three Red-listed ecological communities at risk were identified in the park (Table 3.3-2), as well as two sensitive communities (Figure 3.3-1). The ICHdw1/102 Douglas-fir / tall Oregon-grape / parsley fern (*Pseudotsuga menziesii* / *Mahonia aquifolium* / *Cryptogramma acrostichoides*) ecological community occurs on very dry rocky sites with sparse tree cover. The grassland community, Gg11 Idaho fescue - bluebunch wheatgrass - silky lupine – junegrass (Plate 3.3-3) and the brushland community, Gb03 mallow nine-bark - oceanspray - bluebunch wheatgrass (Plate 3.3-4). This grassland community has limited distribution in the Kootenays and has experienced significant declines over its historic range due to overgrazing, invasive plants, fire suppression and subsequent conifer encroachment (BC CDC 2018). There is a large area of Gg11 within the park (Figure 3.3-1; Plate 3.3-5) that is largely in disturbed condition with a high abundance of invasive plants and trail erosion (Plate 3.3-6). The two sensitive communities include the middle bench black cottonwood flood (Fm00) ecosystem (Plate 3.1-4); this is considered rare but has not been described in provincial ecosystem classifications. The pond and unclassified marsh communities are also sensitive ecosystem types that are both uncommon in the area and easily disturbed.

Table 3.3-2. Ecological communities at risk present in the park.

Scientific Name	English Name	Mapping Code	Prov Status	BC List
<i>Festuca idahoensis</i> - <i>Pseudoroegneria spicata</i> - <i>Lupinus sericeus</i> - <i>Koeleria macrantha</i>	Idaho fescue - bluebunch wheatgrass - silky lupine - junegrass	ICHxw/Gg11*	S2	Red
<i>Physocarpus malvaceus</i> - <i>Holodiscus discolor</i> - <i>Pseudoroegneria spicata</i>	mallow nine-bark - oceanspray - bluebunch wheatgrass	Gb03	S2?	Red
<i>Pseudotsuga menziesii</i> / <i>Mahonia aquifolium</i> / <i>Cryptogramma acrostichoides</i>	Douglas-fir / tall Oregon-grape / parsley fern	ICHdw1/102	S2?	Red

*Gg11 is red-listed in the ICHxw but not currently assessed for the ICHdw1. As the park occurs in a transitional area between the ICHxm and ICHwd1, it should be considered to be at-risk in the park.



Krestova Regional Park

At Risk and Sensitiive Ecosystems

Figure 3.3-1



Date: 2024-02-15
 Map Number: KRP-005
 Coordinate System: NAD 1983 UTM Zone 11N
 Projection: Transverse Mercator
 Datum: North American 1983

- | | |
|-----------------------|---------------|
| Property Boundary | Fm00 |
| Biogeoclimatic Zone | Gb03 |
| Ecosystem Type | Gg11 and Gb03 |
| ICHdw1/102 | Ww and Wm00 |

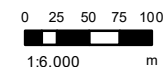




Plate 3.3-3. Mosaic of Gg11 grassland and Gb03 brushland communities.



Plate 3.3-4. Ro9.1 Rock outcrop with dry 102 forest above and Gg11 grassland below.



Plate 3.3-5. Largely intact portion of a red-listed Gg11 grassland in the park.



Plate 3.3-6. Example of extensive soil erosion of a red-listed Gg11 grassland complex beside the park.

3.4 EXOTIC SPECIES

Twenty-three exotic vascular plant species were identified in and around the park (Table 3.4-1). Seven of these are considered priority invasive species with various management strategies proposed by Central Kootenay Invasive Species Society (CKISS). Invasive species, including sulphur cinquefoil (*Potentilla recta*) and spotted knapweed (*Centaurea stoebe*) are particularly abundant in the drier sensitive grassland areas. Japanese knotweed is a priority species for containment assessed by CKISS; it was not observed in the park but has a nearby occurrence in Krestova (GBIF 2024). Two exotic invertebrates, bronze ground beetle (*Carabus nemoralis*) and zebra jumping spider (*Salticus scenicus*), and two exotic birds, Wild Turkey (*Meleagris gallopavo*) and European Starling (*Sturnus vulgaris*) have also been documented in the area.

Table 3.4-1. Exotic species documented in and around Krestova Regional Park.

Scientific Name	English Name	CKISS Priority	Reference
Animals			
<i>Carabus nemoralis</i>	bronze ground beetle		Field Survey
<i>Meleagris gallopavo</i>	Wild Turkey		GBIF
<i>Salticus scenicus</i>	zebra jumping spider		iNaturalist
<i>Sturnus vulgaris</i>	European Starling		GBIF
Plants			
<i>Arctium minus</i>	common burdock	Strategic Control	Field Survey
<i>Arenaria serpyllifolia</i> var. <i>serpyllifolia</i>	thyme-leaved sandwort		Field Survey
<i>Bromus tectorum</i>	cheatgrass	Insufficient Information	Field Survey
<i>Centaurea stoebe</i> ssp. <i>australis</i>	spotted knapweed	Strategic Control	Field Survey
<i>Mycelis muralis</i>	wall lettuce	Insufficient Information	Field Survey
<i>Myosotis stricta</i>	blue forget-me-not		Field Survey
<i>Pilosella caespitosa</i>	yellow king devil		Field Survey
<i>Plantago major</i>	common plantain		Field Survey
<i>Potentilla argentea</i>	silvery cinquefoil		Field Survey
<i>Potentilla recta</i>	sulphur cinquefoil	Strategic Control	Field Survey
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i>	self-heal		iNaturalist
<i>Ranunculus acris</i>	meadow buttercup		Field Survey
<i>Reynoutria japonica</i> var. <i>japonica</i>	Japanese knotweed	Contain	GBIF
<i>Rosa canina</i>	dog rose		Field Survey
<i>Rumex acetosella</i>	sheep sorrel		Field Survey
<i>Scleranthus annuus</i> ssp. <i>annuus</i>	annual knawel		Field Survey
<i>Sonchus arvensis</i> ssp. <i>arvensis</i>	perennial sow-thistle		Field Survey
<i>Tanacetum vulgare</i>	common tansy	Strategic Control	Field Survey
<i>Tragopogon dubius</i>	yellow salsify		Field Survey
<i>Trifolium pratense</i>	red clover		Field Survey

Scientific Name	English Name	CKISS Priority	Reference
<i>Veronica officinalis</i>	common speedwell		Field Survey
<i>Vicia cracca</i> ssp. <i>cracca</i>	tufted vetch		Field Survey
<i>Vicia villosa</i> var. <i>villosa</i>	hairy vetch		Field Survey

3.5 FUEL HAZARD ASSESSMENT

Krestova has been identified as a notable area of high wildfire threat where wildfires have the potential to exhibit high intensity fire behaviour that could challenge direct fire suppression efforts (SIFCo 2020). Figure 3.5-1 shows a summary of proposed fuel treatments for the adjacent crown land north of the park (from SIFCo 2020), which is expected to have similar wildfire threat hazard according to topography and values at risk, and fuel hazard observations. This area was rated high priority for treatment, and the BC Wildfire PSTA Fire Threat Rating over the same area included polygons rated moderate to an extreme wildfire threat class (iMapBC 2023). Krestova Regional Park was not included in the BC PSTA threat analysis or the 2020 CWPP as it was private land at the time, which is excluded from the PSTA analysis.

Treatment Unit	Treatment Type(s)	Total Area
26 - Krestova Map Code: 26-KrsP	Primary Fuel Break. 60% Type 1 WUI or Type 3 Machine Based Cleanup 40% Type 2 Post Harvest Fuel Management	55.7 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	21% High 79% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.		
Treatment Rationale		
Mid sized treatment unit of open coniferous and some deciduous forests on rolling, rock based slopes. Area has suffered significant mountain pine beetle mortality. Unit is located to treat a patch of forested crown land between open rocky slopes with lower fuel loads that is close to values at risk. Managing fuel loads in this area will improve suppression opportunities and reduce the chance of a landscape scale fire and high intensity ember shower near to and upwind/upslope of Krestova. Densely populated portions of Krestova are within 1 km of treatment unit. Unit works in conjunction with unit 25-Kresova to form a strategic, landscape scale treatment unit. Area is accessible along two surveyed rights of way through crown land, neither of which contain a road at this time. Access across adjacent private land with cooperation of private landowners may be more practical.		
Overlapping Values		
Visuals, ungulate winter range, ungulate foraging area.		
Treatment Constraints		
Need to maintain forest canopy for visual management. Rocky terrain may limit machine based treatment options. Possible access limitations.		

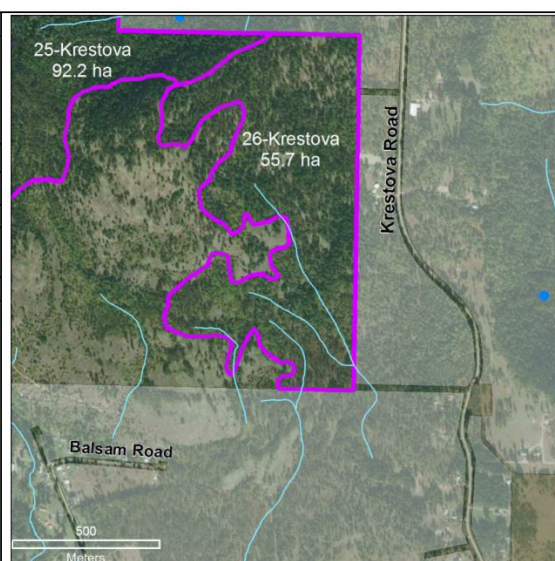


Figure 3.5-1. Proposed fuel treatments for adjacent area north of Krestova Regional Park. From the RDCK Area H South CWPP (from SIFCo 2020).

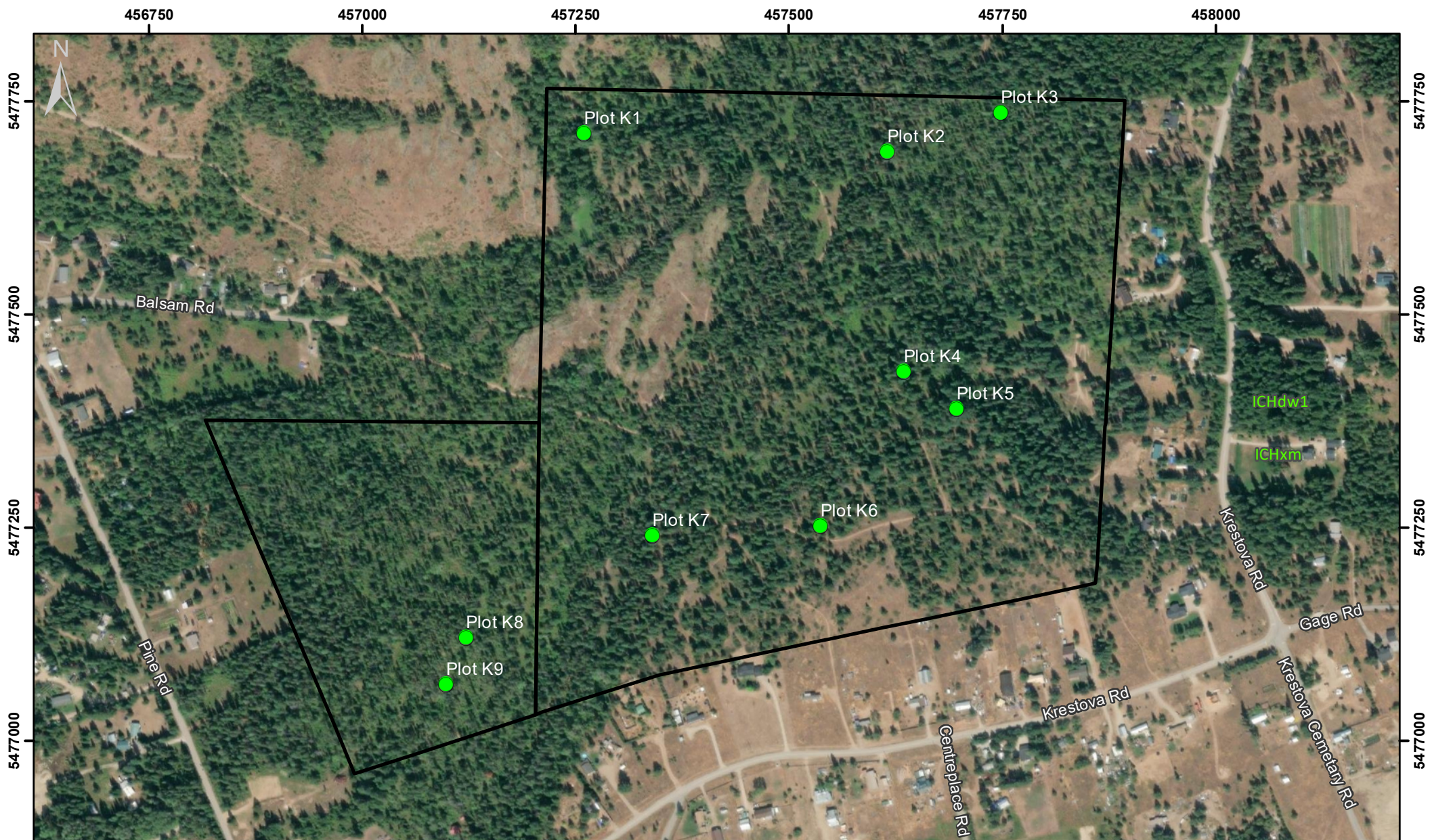
Fuel hazard within the park is variable, given the variety of forest types, past disturbances, and site conditions that are present. Following the Canadian Forest Fire Behavior Prediction (FBP) System², fuel

²<https://cwffis.cfs.nrcan.gc.ca/background/fueltypes/c1>

types identified in the park included C3 (Mature Lodgepole Pine), C5 (Red and White Pine), and C7 (Ponderosa Pine–Douglas-fir), which are generally associated with moderate potential for crown fire and spotting. Provincial fuel type mapping indicates C5 (Red and White Pine), D1/2 (Leafless Aspen), and M-1/2 (Boreal Mixedwood-Leafless); however, as noted by SIFCo (2020), the FBP system was developed at a national level, and vegetation communities in BC are often a poor match with any of the FBP fuel types. Therefore, future classification of fuel types should incorporate local experience and site-specific information.

Overall, fuel hazard was rated *Moderate* across nine plots following the 2020 Wildfire Threat Assessment Guide³ (Figure 3.5-2; Appendix B). Our field observations generally concur with SIFCo's wildfire threat analysis on adjacent lands that were deemed high priority fuel treatment. The existing fuel hazard, combined with weather, topography, and proximity to values, results in potential for high wildfire behaviour in the area. The greatest fuel hazard was observed in lodgepole pine stands to the south where mountain pine beetle has created a surplus of dead and down trees (Plates 3.5-1 to 3.5-3), and in dry Douglas-fir and ponderosa pine stands to the east with abundant surface and ladder fuels (Plate 3.5-4). Dead juvenile western white pine and grand fir were noted frequently and contribute to fuel hazard (Plate 3.5-5).

³<https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020-wildfire-threat-assesment-guide-final.pdf>



Krestova Regional Park

Fuel Hazard Assessment Plots

Figure 3.5-2



Date: 2024-02-15
Map Number: KRP-006
Coordinate System: NAD 1983 UTM Zone 11N
Projection: Transverse Mercator
Datum: North American 1983

 Fuel Assessment Plots
 Property Boundary

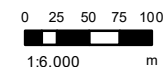




Plate 3.5-1. Plot 7. Dense maturing PI-dominated stand with lots of dead and down trees. Recommend an overstory thin to remove dead stems and hand treat to reduce ladder and surface fuels.



Plate 3.5-2. Plot 8. Young, dense lodgepole pine forest with moderate to high fuel hazard. Treat by removing dead standing, reducing ladder and surface fuels. Excess CWD could be made available as firewood or chipped.



Plate 3.5-3. Plot 9. Open mature lodgepole pine/aspen stand impacted by pine beetle with a lot of dead and down trees and a well-used trail running through. Treat by removing dead standing trees, reducing surface fuels and thinning understory to remove dead Bg.



Plate 3.5-4. Plot 5. Dry Douglas-fir and ponderosa pine stand to the east with abundant surface and ladder fuels. Could be hand treated to reduce surface and ladder fuels through pruning, piling, and chipping or burning.



Plate 3.5-5. Plot 2. Open young Pl(At) stand that has been logged with residual surface fuels and dead juvenile Pw. A surface fire could carry through this grassy open area, although the open canopy and small trees would limit crown fire spread.

3.6 TRAIL MAPPING

A total of 6,430 m of trails were mapped in the park (Figure 3.6-1; Plates 3.6-1 to 3.6-8). Due to the nature of many of the trails, it is assumed that the total number and distance of trails is larger, and new trails or changes to existing trails, may occur at any time. While many of the main trails are located on old roads, a large number are informal trails created by horse riding, ATV, and motorbike users.

While most of the trails are in relatively good condition, the large number and informal creation of trails is creating negative effects, including:

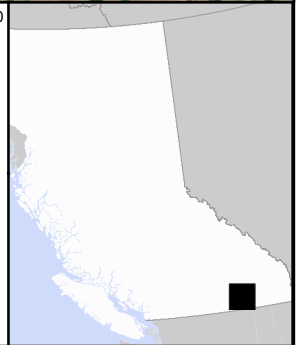
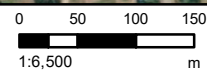
- ♦ **Habitat fragmentation.** The total number and length of trails in the park is high and likely impacts overall wildlife habitat. The creation and use of trails without planning and assessment may cause additional impact to wildlife habitat.
- ♦ **Soil erosion.** Multiple trails have been established on rock outcrops and soft sandy soils. Soil development on the rock outcrops is very slow and easily eroded.
- ♦ **Introduced and invasive species.** A high cover of multiple introduced species, including regionally invasive species, occurs along many of the trails, especially on rock outcrops. Motorized users and horses are potential sources for existing and newly introduced species.



Krestova Regional Park

Trail Mapping

Figure 3.6-1



Date: 2024-02-05
Map Number: KRP-004
Coordinate System: NAD 1983 UTM Zone 11N
Projection: Transverse Mercator
Datum: North American 1983

Legend

-  Property Boundary
-  Trails



Plate 3.6-1. Recently created horse trail.



Plate 3.6-2. Old roads in the park well used by ATVs and other motorized users.



Plate 3.6-3. Old roads in the park infrequently used by ATVs.



Plate3.6-4. Trails on steep slopes used by motorbikes.



Plate 3.6-5. Erosion from motorbike use in soft, sandy soil.



Plate 3.6-6. Old road used by a variety of recreational users.



Plate 3.6-7. Erosion and invasive species on fragile soil of rock outcrops.



Plate 3.6-8. Erosion on thin soils of rock outcrops from motorbike use.

4. RECOMMENDATIONS

Overall, the new Krestova Regional Park is in relatively good condition and contains a number of regionally important habitat types and species. The following are recommended to improve the ecological integrity of the area and limit future disturbance:

- ♦ Restrict motorized activities within the park, especially on thin fragile soils of the rock outcrops, brushland and grasslands. The current use of these areas by motorized users has created numerous trails resulting in extensive erosion. Horse use on these sensitive sites likely also contributes to some soil erosion.

- ♦ Develop an introduced and invasive plant management strategy. The park has a high cover of non-native species, including several CKISS priority species. The existing populations of priority species should be addressed through control and removal, and a plan put in place to prevent additional species from becoming established.
- ♦ Create a parking location and proper signage. Signage should include an educational component so users understand that there are fragile ecosystems in the park where impacts should be minimized.
- ♦ Create a trail management plan. The current network of trails in the park is excessive, unplanned, and in some cases located in sensitive areas. The management plan should strive to find a balance between recreational use and habitat fragmentation. Numerous trails could be closed and rehabilitated, especially those on sensitive grasslands and where excessive soil erosion is occurring. The main trail system through the middle of the park that is located on old roads should be maintained for maintenance and emergency response.
- ♦ Given the high treatment priority identified in the CWPP for adjacent lands to the north (SIFCo 2020), and the results of the field survey, it is recommended to develop a fuel management strategy for the park in consultation with a professional forester. The goal of fuel treatment should be to create a more wildfire and climate resilient forest while maintaining or enhancing the ecological conditions that would historically occur under natural disturbance regimes. Fuel management strategies include understory thinning that reduces ladder fuels and retains the largest, most fire-resistant trees; pruning to raise the height to live crown and reduce the risk of a ground fire reaching the canopy, and removing existing surface fuels to reduce the rate of groundfire spread.

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APPENDIX A. LIST OF SPECIES IDENTIFIED IN THE PARK

Scientific Name	Common Name	Provincial Status	BC List	COSEWIC	SARA	Data Source
Arthropods						
<i>Aglais milberti</i>	Milbert's Tortoiseshell	S5 (2020)	Yellow			GBIF
<i>Andrena</i> sp.	Mining Bees					Field Survey
<i>Aphrophora</i> sp.	a spittlebug					Field Survey
<i>Bombus flavifrons</i>	Yellow Head Bumble Bee	S5 (2016)	Yellow			Field Survey
<i>Bombus mixtus</i>	Fuzzy-Horned Bumble Bee	S5 (2016)	Yellow			Field Survey
<i>Camnula pellucida</i>	Clear-winged Grasshopper	S5 (2015)	No Status			GBIF
<i>Camponotus herculeanus</i>	Boreal Carpenter Ant	S5 (2016)	No Status			iNaturalist
<i>Carabus nemoralis</i>	A Ground Beetle	SNA (2017)	Exotic			Field Survey
<i>Carterocephalus skada</i>	Western Arctic Skipper					Field Survey
<i>Chlaenius sericeus</i>	Ground Beetle	S3S5 (2017)	No Status			Field Survey
<i>Cicindela longilabris longilabris</i>	Boreal Long-lipped Tiger Beetle, long	SNR	No Status			Field Survey
<i>Cicindela tranquebarica vibex</i>	Oblique-lined Tiger Beetle, vibex sub	SNR	No Status			Field Survey
<i>Coenonympha tullia</i>	Common Ringlet	S5 (2020)	Yellow			GBIF
<i>Ellychnia corrusca</i>	Winter Firefly Beetle	SNR	No Status			Field Survey
<i>Erebia epipsodea</i>	Common Alpine	S5 (2020)	Yellow			GBIF
<i>Euclidia cuspidea</i>	Toothed Somberwing Moth	S5 (2017)	No Status			Field Survey
<i>Hybomitra itasca</i>	a horse fly	SU (2017)	No Status			GBIF
<i>Icaricia saepiolus</i>	Greenish Blue	S5 (2020)	Yellow			GBIF
<i>Limnephilinae</i>	a northern caddisfly					Field Survey
<i>Lycaena helloides</i>	Purplish Copper	S5 (2020)	Yellow			GBIF
<i>Noctuinae</i>	Cutworms and Dart Moths					Field Survey
<i>Nymphalis antiopa</i>	Mourning Cloak	S5 (2020)	Yellow			Field Survey
<i>Papilio rutulus</i>	Western Tiger Swallowtail	S5 (2020)	Yellow			Field Survey
<i>Phyciodes cocyta</i>	Northern Crescent	S5 (2020)	Yellow			GBIF
<i>Salticus scenicus</i>	Zebra Jumper	SNA	Exotic			iNaturalist
Birds						
<i>Archilochus alexandri</i>	Black-chinned Hummingbird	S4B (2015)	Yellow			GBIF
<i>Bonasa umbellus</i>	Ruffed Grouse	S5 (2015)	Yellow			Field Survey
<i>Cardellina pusilla</i>	Wilson's Warbler	S5B (2015)	Yellow			GBIF
<i>Cathartes aura</i>	Turkey Vulture	S4 (2015)	Yellow			GBIF
<i>Charadrius vociferus</i>	Killdeer	S4S5B (2015)	Blue			GBIF
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	S5 (2015)	Yellow	SC	SC	Field Survey
<i>Colaptes auratus</i>	Northern Flicker	S5 (2015)	Yellow			Field Survey
<i>Contopus sordidulus</i>	Western Wood-Pewee	S5B (2015)	Yellow			GBIF
<i>Corvus brachyrhynchos</i>	American Crow	S5 (2015)	Yellow			Field Survey
<i>Corvus corax</i>	Common Raven	S5 (2015)	Yellow			GBIF
<i>Cyanocitta stelleri</i>	Steller's Jay	S5 (2015)	Yellow			Field Survey
<i>Dryobates pubescens</i>	Downy Woodpecker	S5 (2015)	Yellow			Field Survey
<i>Dryocopus pileatus</i>	Pileated Woodpecker	S5 (2015)	Yellow			Field Survey
<i>Dumetella carolinensis</i>	Gray Catbird	S5B (2015)	Yellow			GBIF
<i>Empidonax hammondi</i>	Hammond's Flycatcher	S5B (2015)	Yellow			GBIF
<i>Empidonax oberholseri</i>	Dusky Flycatcher	S5B (2015)	Yellow			GBIF
<i>Empidonax</i> sp.	Empidonax Flycatchers					Field Survey
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	S5 (2015)	Yellow			GBIF
<i>Geothlypis tolmiei</i>	MacGillivray's Warbler	S5B (2015)	Yellow			GBIF
<i>Haemorhous mexicanus</i>	House Finch	S5 (2015)	Yellow			GBIF
<i>Junco hyemalis</i>	Dark-eyed Junco	S5 (2015)	Yellow			Field Survey
<i>Leiothlypis celata</i>	Orange-crowned Warbler	S5B (2015)	Yellow			GBIF
<i>Leiothlypis ruficapilla</i>	Nashville Warbler	S5B (2015)	Yellow			Field Survey
<i>Megasceryle alcyon</i>	Belted Kingfisher	S4S5 (2015)	Yellow			GBIF
<i>Melanerpes lewis</i>	Lewis's Woodpecker	S2S3B (2015)	Blue	T	T	GBIF
<i>Meleagris gallopavo</i>	Wild Turkey	SNA (2015)	Exotic			GBIF
<i>Melospiza lincolni</i>	Lincoln's Sparrow	S5B, SNRN (2015)	Yellow			GBIF
<i>Melospiza melodia</i>	Song Sparrow	S5 (2015)	Yellow			GBIF
<i>Molothrus ater</i>	Brown-headed Cowbird	S5 (2015)	Yellow			GBIF
<i>Pandion haliaetus</i>	Osprey	S5B (2015)	Yellow			GBIF
<i>Passerina amoena</i>	Lazuli Bunting	S5B (2015)	Yellow			GBIF
<i>Pipilo maculatus</i>	Spotted Towhee	S5 (2015)	Yellow			Field Survey
<i>Piranga ludoviciana</i>	Western Tanager	S5B (2015)	Yellow			GBIF
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5 (2015)	Yellow			Field Survey

Scientific Name	Common Name	Provincial Status	BC List	COSEWIC	SARA	Data Source
<i>Poecile rufescens</i>	Chestnut-backed Chickadee	S5 (2015)	Yellow			Field Survey
<i>Setophaga coronata</i>	Yellow-rumped Warbler	S5B (2015)	Yellow			GBIF
<i>Setophaga petechia</i>	Yellow Warbler	S5B (2015)	Yellow			GBIF
<i>Setophaga townsendi</i>	Townsend's Warbler	S5B (2015)	Yellow			GBIF
<i>Sialia currucoides</i>	Mountain Bluebird	S4S5B (2015)	Yellow			GBIF
<i>Sitta canadensis</i>	Red-breasted Nuthatch	S5 (2015)	Yellow			Field Survey
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker	S5B (2015)	Yellow			GBIF
<i>Spinus pinus</i>	Pine Siskin	S5B (2015)	Yellow			Field Survey
<i>Spizella passerina</i>	Chipping Sparrow	S5B (2015)	Yellow			GBIF
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	S4S5B (2015)	Yellow			GBIF
<i>Sturnella neglecta</i>	Western Meadowlark	S4B, SNRN (2015)	Yellow			GBIF
<i>Sturnus vulgaris</i>	European Starling	SNA (2015)	Exotic			GBIF
<i>Tachycineta thalassina</i>	Violet-green Swallow	S4S5B (2015)	Yellow			GBIF
<i>Turdus migratorius</i>	American Robin	S5 (2015)	Yellow			GBIF
<i>Vireo cassinii</i>	Cassin's Vireo	S5B (2015)	Yellow			Field Survey
<i>Vireo gilvus</i>	Warbling Vireo	S5B (2015)	Yellow			Field Survey
<i>Zenaidura macroura</i>	Mourning Dove	S4?B (2015)	Yellow			GBIF
Bryophytes						
<i>Aulacomnium androgynum</i>	lover's groove moss	S5 (2015)	Yellow			Field Survey
<i>Bartramia ithyphylla</i>	straight-leaved bartramia	S5? (2015)	Yellow			Field Survey
<i>Bartramia pomiformis</i>	apple moss bartramia	S4S5 (2015)	Yellow			Field Survey
<i>Bucklandiella macounii</i>						Field Survey
<i>Cephalozia</i> sp.		S4 (2021)				Field Survey
<i>Chiloscyphus</i> sp.		S4S5 (2019)				Field Survey
<i>Claopodium</i> sp.		S1S2 (2015)				Field Survey
<i>Homalothecium</i> sp.	curl-moss	S4? (2015)				Field Survey
<i>Hylocomiadelphus triquetrus</i>	rough goose neck moss					Field Survey
<i>Neckera menziesii</i>	Menzies' neckera	S4S5 (2015)	Yellow			Field Survey
<i>Plagiomnium</i> sp.	leafy moss	S4S5 (2015)				Field Survey
<i>Pleurozium schreberi</i>	red-stemmed feather moss	S5 (2015)	Yellow			Field Survey
<i>Polytrichum juniperinum</i>	juniper haircap moss	S5 (2015)	Yellow			Field Survey
<i>Ptilidium ciliare</i>	northern naugahyde liverwort	S4 (2021)	Yellow			Field Survey
<i>Ptychostomum weigelii</i>	Weigel's Bryum Moss					Field Survey
<i>Racomitrium macounii macounii</i>	rock-moss					Field Survey
<i>Racomitrium</i> sp.	rock-moss	S4S5 (2011)				Field Survey
Lichens						
<i>Letharia vulpina</i>	valley wolf lichen	S5 (2018)	Yellow			iNaturalist
<i>Nephroma</i> sp.	paw lichens	S4 (2018)				Field Survey
<i>Parmelia sulcata</i>	hammered crottle lichen	S5 (2018)	Yellow			Field Survey
<i>Peltigera canina</i>	felt pelt lichen	S5 (2018)	Yellow			Field Survey
<i>Peltigera membranacea</i>	diamond pelt lichen	S5 (2018)	Yellow			Field Survey
<i>Platismatia glauca</i>	ragbag rag lichen	S5 (2018)	Yellow			iNaturalist
<i>Usnea</i> sp.	beard lichens	S4 (2018)				iNaturalist
Macrofungi						
<i>Apiosporina morbosa</i>	black knot					Field Survey
<i>Ceriporus leptoccephalus</i>		S5?	Yellow			Field Survey
<i>Cronartium harknessii</i>	Western Gall Rust					Field Survey
<i>Cronartium ribicola</i>	white pine blister rust					Field Survey
<i>Fomes fomentarius</i>		S4S5	Yellow			Field Survey
<i>Ganoderma applanatum</i>		S3S5	Yellow			Field Survey
<i>Lycoperdon</i> sp.	puffballs					Field Survey
<i>Merulius tremellosus</i>						Field Survey
<i>Morchella brunnea</i>						Field Survey
<i>Morchella snyderi</i>		SU	Unknown			Field Survey
<i>Pleurotus populinus</i>		SU	Unknown			Field Survey
<i>Suillus lakei</i>		S4	Yellow			Field Survey
<i>Tilachlidium brachiatum</i>		SU	Unknown			Field Survey
Mammals						
<i>Cervus elaphus</i>	Elk	Yellow				Field Survey
<i>Lepus americanus</i>	Snowshoe Hare	S5 (2015)	Yellow			iNaturalist
<i>Odocoileus virginianus</i>	White-tailed Deer	Yellow				Field Survey

Scientific Name	Common Name	Provincial Status	BC List	COSEWIC	SARA	Data Source
<i>Puma concolor</i>	Cougar	S4 (2015)	Yellow			Field Survey
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5 (2015)	Yellow			Field Survey
<i>Ursus americanus</i>	American Black Bear	S5 (2015)	Yellow	NAR		Field Survey
Molluscs						
<i>Anguispira kochi</i> ssp. <i>occidentalis</i>	Banded Tigersnail	S3 (2015)	Blue	NAR		Field Survey
<i>Cryptomastix mullani</i>	Coeur d'Alene Oregonian	S3 (2015)	Blue			Field Survey
<i>Prophysaon andersoni</i>	Reticulate Taildropper	S5 (2015)	Yellow			Field Survey
Reptiles						
<i>Elgaria coerulea</i>	Northern Alligator Lizard	S4 (2018)	Yellow	NAR		iNaturalist
<i>Thamnophis elegans</i>	Terrestrial Gartersnake	S5 (2018)	Yellow			Field Survey
<i>Thamnophis sirtalis</i>	Common Gartersnake	S5 (2018)	Yellow			Field Survey
Slime Moulds						
<i>Ceratiomyxa fruticulosa</i>	Honeycomb Coral Slime Mold	S5	Yellow			Field Survey
<i>Fuligo leviderma</i>		SU	Yellow			Field Survey
<i>Fuligo septica</i>	Dog Vomit Slime Mold	S5	Yellow			Field Survey
<i>Lycogala epidendrum</i>	Wolf's Milk					Field Survey
<i>Lycogala</i> sp.		S4S5	Yellow			Field Survey
<i>Reticularia lycoperdon</i>	False Puffball	S3S4	Yellow			Field Survey
<i>Stemonitis</i> sp.						Field Survey
Vascular Plants						
<i>Abies grandis</i>	grand fir	S5 (2019)	Yellow			Field Survey
<i>Abies lasiocarpa</i>	subalpine fir	S5 (2019)	Yellow			Field Survey
<i>Acer glabrum</i>	Douglas maple	S5 (2019)				Field Survey
<i>Adenocaulon bicolor</i>	pathfinder	S5 (2019)	Yellow			Field Survey
<i>Agoseris</i> sp.	mountain dandelion	S4 (2015)				Field Survey
<i>Alnus incana</i>	mountain alder	S5 (2000)				Field Survey
<i>Amelanchier alnifolia</i>	saskatoon	SNA (2019)				Field Survey
<i>Antennaria</i> sp.	pussytoes	SNR				Field Survey
<i>Apocynum androsaemifolium</i>	spreading dogbane	S5 (2019)	Yellow			Field Survey
<i>Aralia nudicaulis</i>	wild sarsaparilla	S5 (2019)	Yellow			Field Survey
<i>Arctium minus</i>	common burdock	SNA (2019)	Exotic			Field Survey
<i>Arctostaphylos uva-ursi</i>	kinnikinnick	S5 (2019)	Yellow			Field Survey
<i>Arenaria serpyllifolia</i>	thyme-leaved sandwort	S4N,S5M (2015)				Field Survey
<i>Arnica cordifolia</i>	heart-leaved arnica	S5 (2019)	Yellow			Field Survey
<i>Asarum caudatum</i>	western wild ginger	S5 (2019)	Yellow			Field Survey
<i>Aspidotis densa</i>	dense lace fern	S5 (2019)	Yellow			Field Survey
<i>Asplenium trichomanes</i>	maidenhair spleenwort	S3 (2019)				Field Survey
<i>Athyrium filix-femina</i>	lady fern	S5 (2019)				Field Survey
<i>Balsamorhiza sagittata</i>	arrowleaf balsamroot	S5 (2019)	Yellow			Field Survey
<i>Betula papyrifera</i>	paper birch	S5 (2019)	Yellow			Field Survey
<i>Bromus tectorum</i>	cheatgrass	SNA (2019)	Exotic			Field Survey
<i>Calamagrostis rubescens</i>	pinegrass	S5 (2019)	Yellow			Field Survey
<i>Campanula rotundifolia</i>	common harebell	S5 (2019)	Yellow			Field Survey
<i>Carex aquatilis</i>	water sedge	S5 (2019)				Field Survey
<i>Carex concinna</i>	northern elegant sedge	S5 (2019)	Yellow			Field Survey
<i>Carex</i> sp.	sedge	S2 (2014)				Field Survey
<i>Castilleja hispida</i>	harsh paintbrush	S4 (2019)				Field Survey
<i>Ceanothus velutinus</i>	snowbrush	S5 (2019)				Field Survey
<i>Centaurea stoebe</i>	spotted knapweed	SNA (2019)				Field Survey
<i>Chimaphila umbellata</i>	prince's pine	S5 (2019)				Field Survey
<i>Cirsium</i> sp.	thistle	S3 (2019)				Field Survey
<i>Clintonia uniflora</i>	queen's cup	S5 (2019)	Yellow			Field Survey
<i>Collinsia parviflora</i>	small-flowered blue-eyed Mary	S5 (2019)	Yellow			Field Survey
<i>Cornus canadensis</i>	bunchberry	S5 (2019)	Yellow			Field Survey
<i>Cornus sericea</i>	red-osier dogwood	S5 (2019)				Field Survey
<i>Corylus cornuta</i>	beaked hazelnut	SNA (2019)				Field Survey
<i>Crataegus</i> sp.	hawthorn	S3S4 (2019)				Field Survey
<i>Crepis atriobarba</i>	slender hawksbeard	S5 (2019)	Yellow			Field Survey
<i>Cryptogramma acrostichoides</i>	American parsley fern	S5 (2019)	Yellow			Field Survey
<i>Cystopteris fragilis</i>	fragile brittle fern	S5 (2019)	Yellow			Field Survey
<i>Delphinium nuttallianum</i>	upland larkspur	S5 (2019)	Yellow			Field Survey
<i>Delphinium sutherlandii</i>	Sutherland's larkspur	S4 (2019)	Yellow			Field Survey

Scientific Name	Common Name	Provincial Status	BC List	COSEWIC	SARA	Data Source
<i>Dodecatheon pulchellum</i>	few-flowered shootingstar	S4S5 (2017)				Field Survey
<i>Dryopteris expansa</i>	spiny wood fern	S5 (2019)	Yellow			Field Survey
<i>Dryopteris filix-mas</i>	male wood fern	S5 (2019)	Yellow			Field Survey
<i>Equisetum arvense</i>	common horsetail	S5 (2019)	Yellow			Field Survey
<i>Erythronium grandiflorum</i>	yellow glacier lily	SU (2021)				Field Survey
<i>Fragaria vesca</i>	wood strawberry	S5 (2020)				Field Survey
<i>Fragaria virginiana</i>	wild strawberry	S5 (2020)				Field Survey
<i>Galium triflorum</i>	sweet-scented bedstraw	S5 (2019)	Yellow			Field Survey
<i>Geum macrophyllum</i>	large-leaved avens	S5 (2019)				Field Survey
<i>Geum triflorum</i>	old man's whiskers	S3 (2019)				Field Survey
<i>Goodyera oblongifolia</i>	rattlesnake-plantain	S5 (2019)	Yellow			Field Survey
<i>Hemieva ranunculifolia</i>	buttercup-leaved suksdorfia	S5 (2019)	Yellow			Field Survey
<i>Heuchera cylindrica</i>	round-leaved alumroot	S4 (2019)				Field Survey
<i>Holodiscus discolor</i>	oceanspray	SU (2017)				Field Survey
<i>Juniperus communis</i>	common juniper	SU (2021)				Field Survey
<i>Lilium columbianum</i>	tiger lily	S5 (2019)	Yellow			Field Survey
<i>Linnaea borealis</i>	twinflower	SNA (2016)				Field Survey
<i>Lithophragma parviflorum</i>	small-flowered woodland-star	S5 (2019)	Yellow			Field Survey
<i>Lomatium ambiguum</i>	swale desert-parsley	S5 (2019)	Yellow			Field Survey
<i>Lomatium geyeri</i>	Geyer's desert-parsley	S5 (2019)	Yellow			iNaturalist
<i>Lomatium macrocarpum</i>	large-fruited desert-parsley	S5 (2019)	Yellow			Field Survey
<i>Lonicera involucrata</i>	black twinberry	S5 (2019)				Field Survey
<i>Lonicera utahensis</i>	Utah honeysuckle	S5 (2019)	Yellow			Field Survey
<i>Lupinus</i> sp.	lupine	S5 (2019)				Field Survey
<i>Mahonia aquifolium</i>	tall Oregon-grape	S5 (2019)	Yellow			Field Survey
<i>Malus</i> sp.	apple	SNA (2019)				Field Survey
<i>Microseris nutans</i>	nodding microseris	S5 (2019)	Yellow			Field Survey
<i>Microsteris gracilis</i>	slender false phlox	S5 (2019)	Yellow			Field Survey
<i>Montia linearis</i>	narrow-leaved montia	S5 (2019)	Yellow			Field Survey
<i>Muscari</i> sp.		SNA (2019)				Field Survey
<i>Mycelis muralis</i>	wall lettuce	SNA (2019)	Exotic			Field Survey
<i>Myosotis stricta</i>	upright forget-me-not	SNA (2019)	Exotic			Field Survey
<i>Osmorhiza berteroi</i>	mountain sweet-cicely	S5 (2019)	Yellow			Field Survey
<i>Paxistima myrsinites</i>	falsebox	S5 (2019)	Yellow			Field Survey
<i>Penstemon confertus</i>	yellow penstemon	S5 (2019)	Yellow			Field Survey
<i>Penstemon fruticosus</i>	shrubby penstemon	S4S5 (2019)				Field Survey
<i>Philadelphus lewisii</i>	Lewis' mock-orange	S5 (2019)	Yellow			Field Survey
<i>Physocarpus malvaceus</i>	mallow ninebark	S5 (2019)	Yellow			Field Survey
<i>Picea engelmannii</i> x <i>glauca</i>	hybrid white spruce	S5 (2019)				Field Survey
<i>Pilosella caespitosa</i>	yellow king devil	SNA (2019)	Exotic			Field Survey
<i>Pinus contorta</i>	lodgepole pine	S3 (2009)				Field Survey
<i>Pinus monticola</i>	western white pine	S4 (2019)	Yellow			Field Survey
<i>Pinus ponderosa</i>	ponderosa pine	S4 (2019)				Field Survey
<i>Plantago major</i>	common plantain	SNA (2019)	Exotic			Field Survey
<i>Platanthera</i> sp.	rein orchid	S4S5 (2017)				Field Survey
<i>Poa</i> sp.	bluegrass	S1S3 (2009)				Field Survey
<i>Polypodium hesperium</i>	western polypody fern	S5 (2019)	Yellow			Field Survey
<i>Populus tremuloides</i>	trembling aspen	S5 (2019)	Yellow			Field Survey
<i>Populus trichocarpa</i>	black cottonwood	S5 (2019)	Yellow			Field Survey
<i>Potentilla argentea</i>	silvery cinquefoil	SNA (2019)	Exotic			Field Survey
<i>Potentilla gracilis</i>	graceful cinquefoil	S4S5 (2021)				Field Survey
<i>Potentilla recta</i>	sulphur cinquefoil	SNA (2019)	Exotic			Field Survey
<i>Primula pauciflora</i>	dark-throated shooting star					Field Survey
<i>Prosartes hookeri</i>	Hooker's fairybells	S5 (2019)	Yellow			Field Survey
<i>Prunella vulgaris</i>	self-heal	SNA (2015)				iNaturalist
<i>Prunus virginiana</i>	choke cherry	SNA (2019)				Field Survey
<i>Pseudotsuga menziesii</i>	Douglas-fir	SU (2021)				Field Survey
<i>Pteridium aquilinum</i>	bracken fern	SU (2019)				Field Survey
<i>Pterospora andromedea</i>	pinetrops	S5 (2019)	Yellow			Field Survey
<i>Pyrola chlorantha</i>	green wintergreen	S5 (2019)	Yellow			Field Survey
<i>Ranunculus acris</i>	meadow buttercup	SNA (2019)	Exotic			Field Survey
<i>Ranunculus glaberrimus</i>	sagebrush buttercup	S5 (2008)				Field Survey

Scientific Name	Common Name	Provincial Status	BC List	COSEWIC	SARA	Data Source
<i>Reynoutria japonica</i>	Japanese knotweed					GBIF
<i>Rosa canina</i>	dog rose	SNA (2019)	Exotic			Field Survey
<i>Rosa gymnocarpa</i>	baldhip rose	SNA (2019)				Field Survey
<i>Rosa woodsii</i>	prairie rose	SNA (2019)				Field Survey
<i>Rubus parviflorus</i>	thimbleberry	S5 (2019)	Yellow			Field Survey
<i>Rubus pubescens</i>	dwarf raspberry	S5 (2019)	Yellow			Field Survey
<i>Rumex acetosella</i>	sheep sorrel	SNA (2019)	Exotic			Field Survey
<i>Rumex sp.</i>		SNA (2019)				Field Survey
<i>Salix scouleriana</i>	Scouler's willow	S5 (2019)	Yellow			Field Survey
<i>Salix sp.</i>	willow	S2 (2004)				Field Survey
<i>Sceptridium multifidum</i>	leathery grape fern	S5 (2019)	Yellow			Field Survey
<i>Scleranthus annuus</i>	annual knawel	SNA (2020)				Field Survey
<i>Sedum lanceolatum</i>	lance-leaved stonecrop	SNA (2019)				Field Survey
<i>Sedum stenopetalum</i>	worm-leaved stonecrop	S5 (2019)	Yellow			Field Survey
<i>Selaginella wallacei</i>	Wallace's selaginella	S5 (2019)	Yellow			Field Survey
<i>Senecio integerrimus</i>	western groundsel	SH (2019)				Field Survey
<i>Shepherdia canadensis</i>	soopolallie	S5 (2019)	Yellow			Field Survey
<i>Sonchus arvensis ssp. arvensis</i>	perennial sow-thistle					Field Survey
<i>Sorbus sp.</i>	mountain ash	S5 (2000)				Field Survey
<i>Symphoricarpos albus</i>	common snowberry	SNR				Field Survey
<i>Tanacetum vulgare</i>	common tansy	SNA (2019)	Exotic			Field Survey
<i>Taraxacum sp.</i>	dandelion	SNA (2019)				Field Survey
<i>Taxus brevifolia</i>	Pacific yew	S5 (2019)	Yellow			Field Survey
<i>Thuja plicata</i>	western redcedar	S5 (2019)	Yellow			Field Survey
<i>Toxicoscordion venenosum</i>	meadow death-camas	S5 (2019)				Field Survey
<i>Tragopogon dubius</i>	yellow salsify	SNA (2019)	Exotic			Field Survey
<i>Trifolium pratense</i>	red clover	SNA (2019)	Exotic			Field Survey
<i>Tsuga heterophylla</i>	western hemlock	S5 (2019)	Yellow			iNaturalist
<i>Vaccinium caespitosum</i>	dwarf blueberry	S5 (2019)	Yellow			Field Survey
<i>Vaccinium membranaceum</i>	black huckleberry	S5 (2019)	Yellow			Field Survey
<i>Vaccinium myrtillus</i>	low bilberry	S5 (2019)	Yellow			Field Survey
<i>Veronica officinalis</i>	common speedwell	SNA (2019)	Exotic			Field Survey
<i>Vicia americana</i>	American vetch	S5 (2019)	Yellow			Field Survey
<i>Vicia cracca</i>	tufted vetch	S5 (2019)				Field Survey
<i>Vicia villosa</i>	woolly vetch	SNA (2019)				Field Survey
<i>Viola adunca</i>	early blue violet	SNA (2019)				Field Survey
<i>Viola sp.</i>	violet	S3 (2019)				Field Survey
<i>Woodsia scopulina</i>	mountain cliff fern	S5 (2019)				Field Survey

APPENDIX B. FUEL HAZARD SUMMARY TABLE

Layer ¹	Species Composition	Density (SPH)	Crown Closure	Fuel Loading	Comments
Plot K1 L1 L2 L3 L4	Fd FdPI(Sxw) MvFd Fd	100 500 100-200 50	50	low-mod	Vigorous young-maturing FdPI(SxwAtBl) stand in a draw/toe slope; low fuel loading; mod. crown fire potential, though canopy in this area has lots of gaps. Receiving slope position with some seepage in larger area, but shallow soils and vegetation suggest overall mesic site conditions. Well-developed shrub and herb understory with Douglas maple, snowberry, choke cherry, oceanspray, wild sarsaparilla, Hooker's fairybells. Sample tree: Fd, 72cm DBH, 35.4m height, 85 yrs-old.
Plot K2 L1 L2 L3 L4	PI(At) PI PI(Fd) BgPIFd(BIPw)	100-200 200-300 100-200 400	15	low	Open young PI(At) that has been logged, some patchy surface fuels from old logging. Surface fire could carry through this grassy open area but open crown and small trees would limit crown fire spread.
Plot K3 L1 L2 L3 L4	PI PI(Fd) Fd(Py) FdBgPIPy(Cw)	50-100 50 500-600 1100	10	mod	Old beetle stand, lots of dead and down, dense regen. Could be thinned from below, prune open wolfy Fd, some surface fuel clean-up.
Plot K4 L1 L2 L3 L4	Py(Fd) PyPI(Fd) Dead (PyFd) Fd(Py)	200-300 100-200 50-100 50-100	45	low-mod	Mature ponderosa pine/lodgepole pine/Douglas-fir stand, patchy with openings, some wolfy Fd, deep needle bed. Understory of snowberry, saskatoon, Oregon grape, pine grass. Could prune, remove some mature PI, surface fuel clean up.
Plot K5 L1 L2 L3 L4	Py dead Py dead PwFd FdPIPy	400-500 100-200 100-200 50-100	45	low-mod	Dense mature Py on a dry, convex slope with moderate fuel loading (patchy surface fuels). Hand treat to reduce surface and ladder fuels through pruning, piling and chipping or burning.
Plot K6 L1 L2 L3 L4	PI PI PI(Fd) FdBgPI	50 50 1000-2000 500	10	mod	Dense juvenile lodgepole pine encroaching into natural opening on dry bench with Ceanothus, saskatoon, and grasses in openings. Hand treat to thin the juvenile PI and restore more naturally open site conditions that would arise under historic fire regimes. Conduct understory burn if feasible.
Plot K7 L1 L2 L3 L4	PIPw(At) PI(Fd) Dead PIFd BgFdPI	500 200-300 50-200 300-500	45	mod	Dense maturing PI-dominated stand (structural stage 5-6) with lots of dead and down. Understory of pine grass, Douglas maple, Oregon grape, Saskatoon. Could thin the overstory to remove dead stems and hand treat to reduce ladder and surface fuels.
Plot K8 L1 L2 L3 L4	PI Dead PIFd Dead Fd Fd	400-600 500-600 200-300 patchy	35	mod	Young, dense PI forest with moderate fuel hazard. Treat by removing dead standing, reducing ladder and surface fuels. Excess CWD could be made available as firewood or chipped.
Plot K9 L1 L2 L3 L4	PI(At) PI PIBg Bg	400-800 200-300 100-200 patchy	20	mod	Open PI(At) stand with lots of dead and down PI from past beetle kill. Bg regen in dense patches, lots of mortality (drought stress?). Moderate fuel hazard. Treat by removing dead standing, reducing surface fuels and thinning understory to remove dead Bg.

¹Layer definitions: L1 = >17.5 cm DBH; L2 = 12.5-17.5 cm DBH; L3 = >1.3 cm ht, <17.5 cm dbh; L4 = regen <1.3m ht