

High Conservation Value Assessment for HCV 1-3 in Canfor's Operating Area in the East Kootenay Region, Southeastern British Columbia

January 2019



Kari Stuart-Smith, PhD, RPBio.
and
Ian Johnson, RPF.



Executive Summary

High Conservation Values (HCVs) and their associated Areas (HCVAs) are defined by the Forest Stewardship Council as areas of exceptional ecological or social value. The identification of HCVAs is expected to advance sustainable forest management by providing certainty regarding the locations of areas of exceptional conservation value, and lead to the development of management strategies to ensure that these values are maintained or enhanced.

This report summarizes the results of the formal review and update process to the original 2006 assessments for HCVs and HCVAs for Categories 1, 2 and 3 in Canfor's operating areas in the East Kootenay region of southeastern British Columbia. These Categories include species diversity, landscape-level forests, and ecosystems and habitats (including rare, threatened and endangered species and ecosystems). The assessments were consistent with both the BC-FSC Standard (2005) and the draft FSC Canada National Forest Standard (D3-0).

A technical advisory group (TAG) consisting of representatives from government, environmental non-governmental organizations, and Canfor was struck to complete the assessment, with assistance from experts in fields such as limnology and grizzly bear ecology. Collaboratively, the TAG identified 132 HCVs including:

- 6 fish species and 1 fisheries sensitive watershed
- 7 reptile and amphibian species
- 21 bird species
- 17 mammal species
- 6 invertebrate species
- 9 plant species, including 3 trees
- 1 endemic species (Alpine Larch)
- 4 types of areas with concentrations of vertebrates (extensive wetlands, Class 1 and 2 Ungulate Winter ranges, low elevation mountain passes, ungulate migration routes from summer to winter ranges)
- 3 types of refugia (intact watersheds, mountain passes, migration routes)
- 6 habitat elements (riparian, wetlands, old growth, broadleaf trees, high value snags, veteran trees)
- 1 type of large, landscape level forest (intact watersheds)
- 32 red and blue-listed plant communities
- 4 ecosystems in which old and mature forests are rare due to human activities
- 11 rare ecosystems (including karst and hot springs)
- 2 under-represented ecosystems

Based on these HCVs, 189 HCVAs were identified, including 15 new and 8 proposed HCVAs which require detailed field work to determine if they will be designated. During the assessment process 4 HCVAs were deleted and 3 were moved to HCV Category 5 and 6 (Cultural and Conservation Value Areas).

The majority of the HCVAs fall within Canfor's FSC certified area in the East Kootenay. The HCVAs outside of Canfor's operating area are not on FSC certified lands and are for information purposes only.

Canfor's approach to developing management strategies for the HCVAs is discussed, including the risk assessment methodology employed and the use of the precautionary principle. Detailed management strategies for the HCVAs are provided in a separate document. Canfor's HCVA monitoring program is briefly reviewed; results can be found in separate reports.

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1.0 INTRODUCTION

High Conservation Values and their associated areas are defined by the Forest Stewardship Council as areas of exceptional ecological or social value (FSC Standard V5.0, 2012). The identification of HCVs is expected to advance sustainable forest management by providing certainty regarding the locations of areas of exceptional conservation value, and lead to the development of management strategies to ensure that these values are maintained or enhanced.

1.1 Definitions of HCV, HCVF, and HCV Areas

High Conservation Values (HCV) refer to actual values that meet the FSC definitions in 6 categories (listed below), such as grizzly bear or medicinal plants, while High Conservation Value Areas (HCVA) refer to the physical places which possess and/or are needed for the existence and maintenance of the HCVs. HCVAs were previously called HCVFs (High Conservation Value Forests), but the name was changed in recognition of the fact that some of the values have associated areas that are not forests, like wetlands or alpine areas. In this report, where the term HCVF is used, it refers to previous assessments completed in the East Kootenay (Ferguson 2003, Stuart-Smith and Wells 2006a, b).

This HCV assessment is consistent with the current definition of HCVF for categories 1-3 in the accredited FSC standards for British Columbia (October 2005), as well as the definition of HCV in the most recent version of the FSC international standard (FSC V5-2, 2015), which Draft 3 of the upcoming FSC Canada National Standard adopts. There is little practical difference between the two definitions, other than the international standard includes rare species in HCV1, a reference to intact forest landscapes and ecosystem mosaics in HCV2, and a reference to habitats and refugia in HCV3 (Table1).

High Conservation Values (HCVs) – A biological, ecological, social, or cultural value of outstanding significance or critical importance. E.g. grizzly bears, extensive wetlands.

High Conservation Value Areas (HCVA, previously called HCVF) – physical areas that support the HCVs (e.g., high value grizzly habitat; Columbia wetlands).

Table 1: HCV and HCVF Definitions: FSC International (2015) vs FSC-BC (2005)

FSC International Standard – FSC Principles and Criteria for Forest Stewardship (FSC-STD-01-001 V5-2, 2015):	FSC-BC Standard (2005):
HCV1 - Species Diversity. Concentrations of biological diversity* including endemic species, and rare, threatened or endangered* species, that are significant at global, regional or national levels.	Category 1. Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia); and/or large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance
HCV 2 - Landscape-level ecosystems and mosaics. Intact forest landscapes and large landscape-level ecosystems* and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.	<ul style="list-style-type: none"> 1.1 Forest areas that include the critical habitats of globally, nationally, or provincially threatened species. 1.2 Forest areas that include the critical habitats of endemic species. 1.3 Forest areas that support: unusually high naturally occurring species diversity, migratory concentrations of species or individuals, or other ecological or evolutionary phenomena

FSC International Standard – FSC Principles and Criteria for Forest Stewardship (FSC-STD-01-001 V5-2, 2015):	FSC-BC Standard (2005):
	<p>1.4 Large forest areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance</p> <p>1.5 Forest areas associated with high-value fish habitat and other critical aquatic habitat</p>
<p>HCV 3 - Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats* or refugia*.</p>	<p>Category 2. Forest areas that are in or contain rare, threatened or endangered ecosystems.</p> <p>2.1 Forests designated as threatened or endangered at local, continental or national levels</p> <p>2.2 Plant communities designated as endangered or threatened (Red list) or vulnerable (Blue List) by the BC Conservation Data Centre</p> <p>2.3 Forest areas containing mature and old forest where those age classes are becoming rare to human activities</p> <p>2.4 Forest areas that are under-represented in protected areas.</p>
<p>HCV 4 - Critical ecosystem services. Basic ecosystem services* in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.</p>	<p>Category 3. Forest areas that provide basic services of nature in critical situations (i.e. watershed protection, erosion control).</p> <p>3.1 Where down slope or downstream consequences of landslides, sediment production or snow avalanches are significant (e.g., spawning habitat, transportation or communication infrastructure), forest areas associated with unstable terrain (Class IV, V), highly erodible soils or snow avalanche starting zones).</p> <p>3.2 Forest areas on the management unit that protect the water supply of the community and individual water users identified through licensing data and consultation.</p> <p>3.3 Forests required for the maintenance of flow regimes and/or flood prevention in other critical watersheds</p>
<p>HCV 5 - Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities or Indigenous Peoples* (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or Indigenous Peoples.</p> <p>HCV 6 - Cultural values. Sites, resources, habitats and landscapes* of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples.</p>	<p>Category 4. Forest areas fundamental to meeting basic needs of local communities (i.e. subsistence, health) and/or critical to local communities' traditional cultural identity (areas of cultural, ecological, economic, or religious significance identified in co-operation with such local communities).</p> <p>4.1 Forest areas that are the direct source of a significant portion of the local community's food supply identified through consultation</p> <p>4.2 Forest areas that are the direct source of a significant portion of materials used directly for community or ceremonial purposes by the local community, as identified through consultation</p> <p>4.3 Forest areas that are of culture, religious, or spiritual significant for the local community, or otherwise critical to its traditional cultural identity identified through consultation.</p>

1.2 History of HCV Assessment in the East Kootenay and Objectives of this Project

HCVFs were first identified for Tree Farm License (TFL) 14 in 2003 (Ferguson 2003, 2004), for the Invermere Timber Supply Area (TSA) in 2005 (Stuart-Smith and Wells 2006a), and for portions of the Cranbrook and Kootenay Lake TSAs in 2006 (Stuart-Smith and Wells 2006b). The HCVFs were updated on an annual basis to incorporate new information and information garnered through consultation and monitoring, such as changes to the status, distribution, and knowledge of species at risk, and changes to the company's operating area. A summary of these changes can be found in Appendix 1. Following the purchase of Tembec by Canfor in March 2012, planning for a formal review of the HCVF package in all TSAs and TFL 14 was initiated.

This report summarizes the results of all annual updates and the formal review process, and presents a complete assessment of High Conservation Values and areas for the biodiversity values (HCV 1, 2, and 3; HCVF Category 1 and 2) for the entirety of Canfor's operating area in the East Kootenay, with the exception of the newly acquired Wynwood area in the Kootenay Lake TSA (SFI certified). It compiles the results of the prior HCV 1-3 assessments and updates into one report, and updates all information on HCVs, including the status of Species-at-Risk and Plant Communities-at-Risk, to October 2018. Although the assessment was largely completed by 2015, finalization of the report was not possible until later due to delays in receiving some of the digital linework for some HCVs, workload capacity issues with the technical working group, and GIS issues.

An updated assessment for ecosystem services (HCV 4; HCVF Category 3) was completed in 2014 by a professional geomorphologist and a geotechnical engineer, including the management strategies for the associated HCVAs (Green and Halloran, 2014). This assessment covers the entirety of Canfor's operating area in the East Kootenay, and replaces the original assessments completed by Green (2005) and Green and Wallace (2005).

The assessments for HCV 5 and 6 (HCVF Category 4, also known as CCVFs, or Cultural and Conservation Value Forests) for community needs and cultural values were completed in a collaborative fashion between the company and First Nations (Lower Kootenay Band, Cathro 2008, Tobacco Plains 2012; St. Mary's and Akisq'nuk Bands 2012). A review and update process for these CCVFs has recently begun.

Detailed management strategies for the HCV Areas are located in a separate document. However, the approach taken to developing the management strategies is outlined in this report.

1.3 The assessment area and surrounding landscape

The assessment area covers Canfor's operating areas in the Rocky Mountain Forest District and the Kootenay Lake Forest District (Figure 1), with the exception of the Wynwood operating area near Kootenay Lake. Where data was available, it also covers the lands in amongst the Canfor operating area parcels, including some private land and parks.

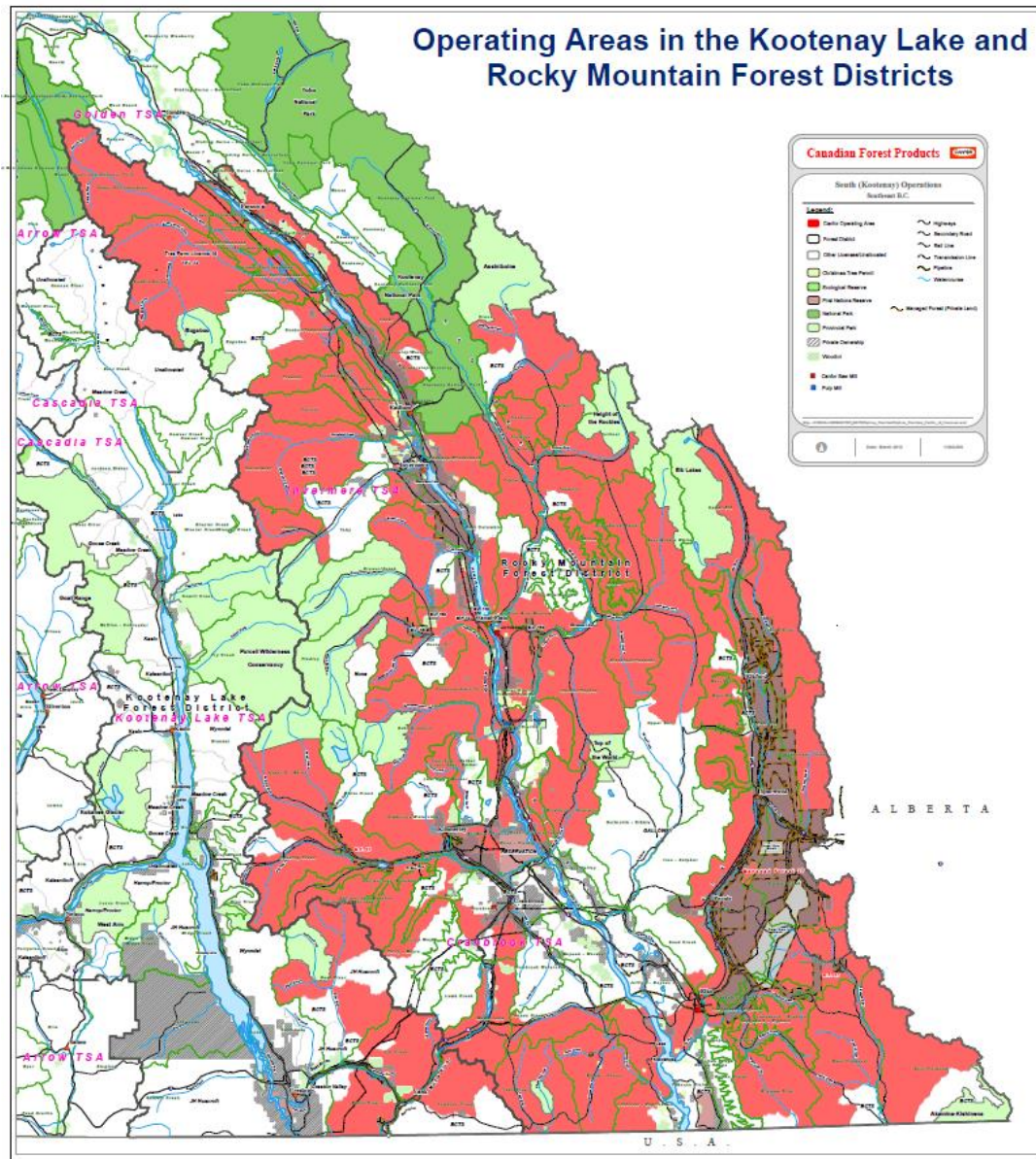


Figure 1. Canfor's operating areas in the East Kootenay Region of southeastern British Columbia

The assessment area is predominately crown (public) land, with private land mainly found in the largest valley bottoms. Numerous national and provincial parks and wilderness areas ranging from very large to very small are found within and adjacent to the area. Several large coal mines are present in the Elk Valley, near the Alberta border. Forestry, mining, ranching, and tourism form the main basis of employment and economic activity for the small communities. The area offers many and varied opportunities for backcountry and wilderness recreational experiences. Commercial heli-skiing, heli-hiking, and ski touring operations as well as guiding and trapping activities are on-going within the licence area. Fishing, hunting, hiking, snow-mobiling, camping, and touring are other activities that occur. A more detailed description and details on the socio-economics of the region can be found in Canfor's Sustainable Forest Management Plan (SFMP, 2017).

The assessment area is entirely within the Ktunaxa Nation traditional territory. Archaeological evidence suggests the Ktunaxa have inhabited the East Kootenay region since the last glaciation over 10,000 years

ago. The Ktunaxa Nation Council (KNC) represents the four Band communities of Tobacco Plains (TPIB) near Grassmere, Aq'am (SMIB) near Cranbrook, Lower Kootenay Band (LKIB) near Creston, and ?Akisq'nuk First Nation (AFN – formerly Columbia Lake Indian Band) near Windermere.

The KNC, on behalf of the Ktunaxa Nation, has entered into the BC Treaty process. They are currently at the fifth stage of that six-stage process (Agreement in Principle stage). The traditional territory includes most of the southeast corner of the province. Figure 2 shows their territory and the BC portion that was filed with the British Columbia Treaty Commission during the Statement of Intent portion of negotiations.

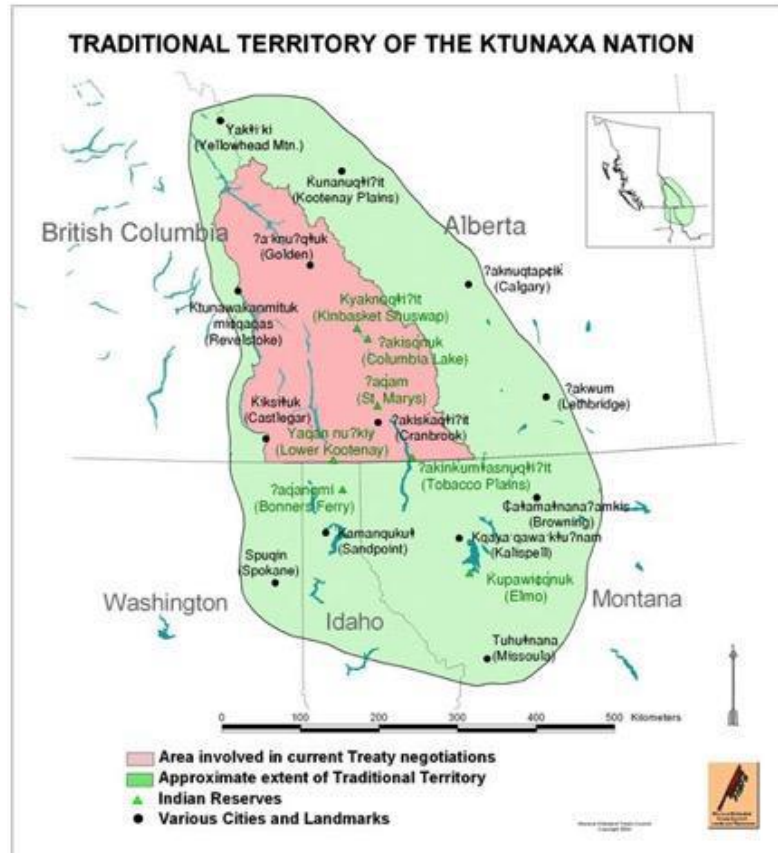


Figure 2. Traditional territory of the Ktunaxa Nation.

The East Kootenay covers a wide variety of ecosystems from low elevation grasslands in the valley bottoms to rugged mountains with rocky peaks and alpine areas. Straddling two mountain ranges, the Purcell Mountains to the west and the Rocky Mountains to the east, the region is split down the middle by the Rocky Mountain Trench, a broad, flat valley running north-south with two major rivers and numerous wetlands. The Columbia River flows north through the trench from Columbia Lake, creating a large, complex wetland ecosystem called the Columbia Wetlands. The Kootenay River enters the trench just south of Columbia Lake and flows south.

The region contains six main biogeoclimatic (BEC) zones (under BEC version 10). These zones reflect differences in terrain, climate and the species of trees that are present. Listed from high to low elevation, these are:

- Alpine Tundra (AT) / Interior Mountain-Heather Alpine (IMA)
- Engelmann Spruce-Subalpine Fir (ESSF)
- Montane Spruce (MS)
- Interior Cedar-Hemlock (ICH)
- Interior Douglas-Fir (IDF)
- Ponderosa Pine (PP)



Each of these zones is divided further into subzones, indicated with lower case letter codes, and variants, indicated with numbers. Detailed information on British Columbia's biogeoclimatic system and how it works can be found here: [BECweb](#). A description of each of the BEC zones, including photos, climate, natural disturbances, tree species, and characteristics of wildfire that occur within it can be found within Canfor's SFMP (2017) Section 4.3 Range of Natural Variability.

1.4 Canfor Operations in the East Kootenay

Canfor has one Tree Farm License (TFL14) in the northern part of the assessment area, while the remainder of the company's tenures are volume-based (Table 2, Table 3). Canfor owns and operates two dimension sawmills, one in Radium and one in Elko. Details and maps for each of the forest management units can be found in Canfor's SFMP (2017).

Table 2. The landbase associated with Canfor Woodland Operations in the East Kootenay, excluding Wynwood.

License Management Unit Name		Tenure Type	CFLB* (ha)	THLB** (ha)	Certification
TFL 14	TFL 14	Area-based	72,378	52,822	FSC
Invermere	FL A18979	Volume-based	554,650	233,873	CSA
Invermere	FL A18978	Volume-based			FSC
Cranbrook	FL A19040	Volume-based	760,590	416,196	FSC
Kootenay Lake	FL A20212	Volume-based	613,299	257,850	FSC
		Totals	1,373,889	674,046	

*CFLB – Crown Forest Land Base (productive forest land, non-private)

** TFLB – Timber Harvesting Land Base (productive forest land on which timber harvesting may occur)

Table 3. The volume associated with each management unit in Canfor's East Kootenay licenses.

License Management Unit Name		Tenure Type ²⁸	AAC m ³	Effective Date	Latest TSR
TFL 14	TFL 14	Area-based	180,000	April 7, 2008	April 7, 2008
Invermere	FL A18979	Volume-based	221,005 *	November 1, 2005	June 29, 2017
Invermere	FL A18978	Volume-based	220,668 *	November 1, 2005	June 29, 2017
Cranbrook	FL A19040	Volume-based	477,652*	November 1, 2005	August 24, 2017
Kootenay Lake	FL A20212	Volume-based	99,081	August 12, 2010	August 12, 2010

*these are the apportioned volumes associated with the 2005 TSR IIIs. The apportioned volumes for each licence associated with TSR IVs in 2017 have not been set at the time of writing. TSR IV for Cranbrook showed a 10.6% decrease from TSR III, while for Invermere it was a decrease of 17%.

2.0 METHODS

2.1 General Approach to the HCV Assessment, Review, and Update

This project began with a review of the three existing HCVF assessments and their associated supporting documents and maps for the East Kootenay. Rather than redo the assessment from first principles, the main intent of this review was to build upon the existing, comprehensive assessments, adding new information to them where this was available, and reviewing them with an experienced eye, given our collective experience implementing the HCVF management strategies and the results of the HCVF Effectiveness Monitoring. Much experience has been gained by Canfor staff by talking to stakeholders of all backgrounds about forest management in the HCVFs, and this information was very useful in reviewing the HCVFs. A related objective was to augment the HCVs, where necessary, so that they were consistent with the revised definition of HCVs from the international FSC standard.

Briefly, the process by which the original HCVF assessments were completed was as follows. A Technical Advisory Group (TAG) was formed, consisting of representatives from Tembec, Canfor, two BC Ministries (Sustainable Resource Management; Water, Land, and Air Protection), and a number of environmental groups (Wildsight, ForestEthics, The Nature Conservancy of Canada, The Nature Trust of British Columbia). Additional technical expertise was provided from the University of British Columbia, local grizzly bear experts, fish experts, and conservation experts. A group facilitator was present throughout. For individual members, see Appendix 2.

The TAG identified HCVs according to a rigorous process that addressed the intent and all the points of the HCVF definitions in the BC-FSC standard and in the guidance material in Appendix D of that standard. Once HCVs were defined and agreed upon, digital data for these values were obtained where possible, and converted to raster format for use in a Geographic Information System. Some HCVs were determined to have HCV areas associated with them on a ‘stand-alone basis’ (e.g., endangered species with well-known ranges and habitat use), while others were determined to be best managed through the strategies and standard work procedures. Still other HCVs contributed to the identification of HCVFs through the concentration of values analysis, in which raster layers of the values were overlaid with one another to identify ‘hot spots’ of biodiversity values.

Where disagreements on HCVFs occurred, alternative approaches were documented in the meeting minutes. Candidate areas identified by the TAG, including disputed ones, were brought forward to a Decision Makers Group (DMG) for consideration and designation. This group consisted of a representative from each of Tembec, Wildsight, ForestEthics, and World Wildlife Fund. These groups signed a Terms of Reference document (May 24, 2005) agreeing to work together on the identification and designation of HCVFs.

For this review and update Canfor decided to follow a similar collaborative process as the original assessments. To begin, the Technical Advisory Group was reconvened, with slightly different membership given changes in the BC Ministries and local people in the area. The TAG continued to include representation from industry, government, environmental groups, and local wildlife experts as before (Appendix 2). A Decision Makers Group was formed, consisting of representatives from Canfor and Wildsight, and the Terms of Reference from the prior process was updated.

The TAG decided at the onset to try include the entire East Kootenay region in the review, regardless of tenure, including both crown and private forested lands, where data existed. While it was recognised that management strategies and monitoring plans will be implemented by Canfor on their tenure only, similar

to the original assessments, the TAG felt that this would be best informed by considering values in the entire region.

The update of HCV areas began with the TAG defining the HCVs to be considered. These values were determined by comparing the existing assessment reports against the points under the definitions of HCV Category 1 and 2 in the BC standard, and by reviewing the questions in the FSC-BC Checklist for Assessment of HCV and Identification of HCV Forests (Appendix D, FSC-BC Standard). The HCV Monitoring Framework (2013) was also consulted. In addition, the TAG ‘brainstormed’ any additional values that had been brought to their attention through their own research and monitoring work, or through consultation with other stakeholders. Due to changes in the status of species at risk at national, provincial, and global levels, and the recent release of new recovery strategies etc., a detailed review and revision of HCV1 was necessary. Other values were updated primarily on the basis of new or improved information. Once the HCVs were defined and agreed upon, digital data for these values were obtained where possible, and converted to raster format for use in a Geographic Information System. Due to changes in the data and GIS analyst since the last assessment, much of the earlier data had to be re-worked.

As before, some HCVs were determined to have HCV Areas associated with them on a ‘stand-alone basis’ (e.g., endangered species with well-documented ranges and habitat use), while others were determined to be best managed through the strategies and standard work procedures outlined in Canfor’s SFMP (Canfor 2017). Still other HCVs contributed to the identification of HCV Areas through the concentration of values analysis, in which raster layers of the values were overlaid with one another to identify ‘hot spots’ of biodiversity values.

The review was completed through a series of collaborative participatory workshops during which the TAG compared the existing HCVFs against the updated HCV layers and concentration of values analysis. Dates of these workshops are shown in Appendix 3. HCVFs were modified to new HCV Areas as deemed necessary by the group. Where disagreements occurred, technical resolution was first sought, using the best available information or data, or if this was not available, expert opinion. Where this did not resolve the matter, alternative approaches to the HCV Areas were documented in the meeting minutes.

Once the TAG resolved all issues to the extent possible within the group, a package summarizing the proposed changes and any outstanding issues was prepared for the Decision Makers Group (DMG).

During the process, two presentations on the HCVs and preliminary HCVAs were made to Canfor’s Public Advisory Group and discussions with this group were held (Appendix 3).

The status of species and ecosystems at risk was updated to October 2018. This did not change the results of any of the HCV assessments, or HCV Area designations.

2.2 Assessment of High Conservation Values – HCV1

Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia); and/or large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

2.2.1 Species-at-Risk, Rare Species, and Species of Regional Concern **Vertebrates**

To determine the most current status of Species-at-Risk potentially occurring within the East Kootenay region, the Species and Ecosystems Explorer program within the online Conservation Data Center of British Columbia was used to generate reports on all vertebrate species considered Endangered, Threatened, or of Special Concern at global, national and provincial levels. At a national level, this list included those species that were recommended for listing by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), as well as those that were formally listed in Canada under the federal Species At Risk Act (SARA). At a provincial level, this included all species on the BC red (threatened and endangered) and blue (vulnerable) lists. At a global level, this included all species ranked G-1 (imperiled), G-2 (endangered), and G-3 (vulnerable). There were no species on the global list that were not already captured on the national or provincial lists.

This list was then refined to those species with confirmed evidence of regular breeding within the East Kootenay Region by comparing this to the list confirmed within the previous HCVF assessments and supporting documents, by comparison to the Canfor Species Database, and through review with experts on the TAG and regional experts brought in for this purpose. Species of regional concern were discussed within the TAG and regional experts, and were then added to this list. These species tended to be either those of concern to local communities for hunting or fishing (e.g., elk, moose, kokanee), or those of conservation concern to local biologists (e.g., northern goshawk).

Rare species were defined as ‘Near Threatened’ by the International Union for the Conservation of Nature. Rare vertebrate species that breed in the East Kootenay include Western Toad, Cassin’s Finch, and Olive-sided Flycatcher.

From this assessment, 51 vertebrate species were confirmed as High Conservation Values (Appendix 4):

- 6 fish (White Sturgeon, Burbot, Westslope Cutthroat Trout, Bull Trout, Rocky Mountain Sculpin, and Kokanee)
- 7 reptiles and amphibians (Coeur d’Alene Salamander, Western Toad, Rocky Mountain Tailed Frog, Northern Leopard Frog, Painted Turtle, Western Skink, and Northern Rubber Boa),
- 21 birds (Prairie Falcon, Peregrine Falcon, Broad-winged Hawk, Swainson’s Hawk, Northern Goshawk, Long-billed Curlew, Short-eared Owl, Western screech Owl, Flammulated Owl, Common Nighthawk, Lewis’s Woodpecker, Olive-sided Flycatcher, Barn Swallow, Bank Swallow, Black Swift, Williamson’s Sapsucker, American Bittern, Great Blue Heron, Sandhill Crane, Bobolink, Cassin’s Finch).
- 17 mammals (Northern Myotis, Little Brown Myotis, Townsend’s Big-eared Bat, American Badger, Mountain Caribou, Grizzly Bear, Wolverine, Fisher, Least Chipmunk (*selkirkii* and *oreocetes* subspecies), Red-tailed Chipmunk (*ruficaudus* subspecies), Southern-red-backed vole, Bighorn Sheep, Mountain Goat, Elk, Moose, White-tailed Deer, and Mule Deer.



Rocky Mountain Sculpin



Lewis’s Woodpecker (Photo Credit: Glenn Bartley, source - web)

The TAG discussed each species in depth, and classified each as to the type of habitat and range it occupied in the East Kootenay:

1. Species occupies a location generally that remains spatially stable through the time period covered by this assessment (e.g., Tailed Frog Stream, Long-Billed Curlew grassland breeding area),
2. Species occupies an area within a restricted area (e.g., Williamson Sapsuckers within the Area of Occupancy),
3. Species is wide-ranging or widespread (e.g., grizzly bear, wolverine),
4. Species habitat is not significantly impacted by forestry operations (e.g., bobolink, white sturgeon).

The threats to each species were listed, and the current condition of the population (stable, increasing, or decreasing) if known, based on a combination of local knowledge and information available on the Species and Ecosystems Explorer, BC Conservation Data Center (<http://a100.gov.bc.ca/pub/eswp/search.do>). Current mitigative measures in terms of the general strategies applied by Canfor forestry operations under the SFMP (including legal requirements) were also listed, and the risk to each HCV presented by forestry operations assessed (See Section 4.0 for details on how this was done).

The TAG also discussed the strategies and standard work procedures within Canfor's Sustainable Forest Management Plan, and whether or not the habitat needs of each species were best covered off by HCV Areas, SFMP management strategies and standard work procedures, or a combination of both. In some cases, if the species was not impacted by forestry operations, the answer was neither.

Whether or not digital data was available for each species was determined (either point locations or, preferably habitat mapping), and thus whether that species would be used in the concentration of values analysis (see below).

Any legally mapped habitat areas for species-at-risk, including Wildlife Habitat Areas (WHAs) and caribou ungulate winter ranges, were automatically considered HCV Areas.

Due to the importance of Grizzly Bear in the East Kootenay, when the first HCVF assessment was completed a special workshop was held with three local grizzly bear experts (Dr. McLellan, Dr. Apps, Dr. Proctor) to identify key grizzly habitat areas, and to discuss management guidelines within those areas. Key linkage zones (movement areas between key habitat areas) for grizzly bear were also identified at this workshop. For the HCV Areas update, a similar grizzly workshop was held with the researcher who has been doing the most work in the East Kootenay in recent years. Dr. Proctor provided updated linework in 2014 for high value grizzly habitat areas, as well as linkage zones across highways and the Rocky Mountain trench. However, this linework is currently undergoing refinement to account for huckleberry areas and road densities, and a new grizzly layer is expected to be provided sometime in 2019. When this is done, it will be incorporated into the HCV Areas.



Given the importance of spawning areas for fish, all known spawning areas for Bull Trout, Westslope Cut-throat Trout, Kokanee, and Burbot had been previously identified by Bill Westover, government fisheries expert for the Rocky Mountain Forest District and were considered HCVF. These areas were reviewed and additions made by local government fisheries biologist Herb Tepper and Montana scientist Erin Sexton (for the Flathead only, based on data collected by Montana Fish, Wildlife, and Parks). In

addition to spawning areas for fish, fisheries sensitive watersheds were included as HCV Areas. These are watersheds that contain fish and are known to be potentially sensitive to forestry impacts due to soils, topography, or both.

Species-at-Risk – Invertebrates

A similar process was followed for invertebrate species. Only species with proposed or designated WHAs, or with a higher degree of knowledge about them, were included in Appendix 4. A list of red and blue-listed butterflies, dragonflies, damselflies, slugs and snails is found in the digital Canfor Species Database. Little is known about most of these species in the East Kootenay, and no digital data is available for them, with the exception of the Gillette's Checkerspot, for which intensive surveys have been completed and for which WHAs have been designated, and a few slug species for which point locations are available.



Pygmy Slug (K. Orstovetcha)



Vivid Dancer (dirttime.ws, source: web)

Species-at-Risk – Plants

Individual plant species-at-risk were only considered for those species which have been evaluated by COSEWIC or those that were ranked as G1, G2, or G3 (Appendix 4). Of these, the most important from a forestry perspective are the listed trees; Whitebark Pine and Limber Pine (although Limber Pine is rare in the East Kootenay and limited to a few sites near the Alberta border). Western White Pine is listed as Near Threatened by the IUCN, as thus is classified as rare for this assessment.

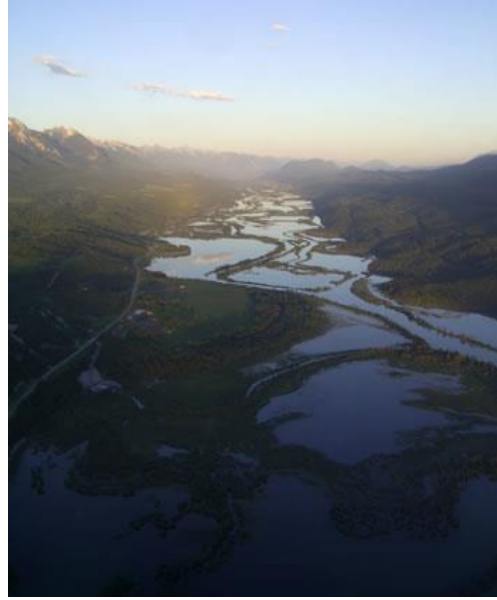
The listed plants typically occur adjacent to hot springs or alkaline lakes (Appendix 4). The numerous other red and blue listed plant species occurring in the region will be managed indirectly through plant communities-at-risk and SFMP strategies and SWPs, primarily those for ecosystem representation, ecosystem restoration, and riparian.

2.2.2 Endemism

The only endemic species to the East Kootenay identified by the TAG was Alpine Larch, although several species at risk with relatively small global ranges were noted to occur that had already been identified in the species at risk assessment (e.g., Gillette's Checkerspot, Couer d'Alene Salamander, Rocky Mountain Tailed Frog, Least Chipmunk (*selkirkii* subspecies), and Red-tailed Chipmunk (*ruficaudus* subspecies)). No global hotspots of endemism were identified in the East Kootenay.

2.2.3 Concentrations of Vertebrates

The Columbia Wetlands between Invermere and Golden were identified as a highly significant migratory area for waterbirds during spring and fall. Class 1 and 2 ungulate winter ranges (both low elevation and high elevation grasslands) were identified in the southern Rocky Mountain trench for seasonal concentrations of large vertebrates (deer, elk, bighorn sheep and their predators). Low elevation passes through high mountains, and migration routes from summer to winter range were identified as important migratory habitat and movement corridors.



Columbia Wetlands (live BC)

2.2.4 Refugia

The TAG considered this concept in terms of both glacial refugia, refugia from human activities, and climate change refugia. There are no known low elevation glacial refugia in the study area. The only likely unglaciated terrain would be mountain tops that existed as nunataks during the last major glacial period, and these are generally dominated by steep rock outcrops with little or no habitat value. Refugia from human activities, such as can be important for access-sensitive mammals, were considered to be represented by intact watersheds (see Large Landscape Level Forests below). Climate Change refugia were considered to be represented by areas free of human barriers to movement, where species could move both attitudinally and latitudinally. As such, they were represented by intact watersheds and connectivity corridors such as migration routes and low elevation mountain passes.

2.2.5 Biodiversity Hotspots

At the global level, there are no identified biodiversity hotspots (www.biodiversityhotspots.org) or high biodiversity wilderness areas identified in the East Kootenay (Conservation International: www.conservation.org).

2.2.6 Ecological or evolutionary phenomena

No unusual ecological or evolutionary phenomena were identified in the region by the TAG.

The HCVs above and the data associated with them are summarized in Appendix 4 and 5.

2.2.7 Concentrations of Biodiversity Values

All of the HCV for species at risk, species or regional concern, and other species related values were included in the concentrations of biodiversity values analysis if there was raster data associated with those values.

In addition, as in prior HCV assessments, the TAG included as input values the following six habitat elements known to be associated with high biodiversity in forested ecosystems in British Columbia (Bunnell et al. 1999). These included:

- Broadleaf Trees (Aspen, Cottonwood, Birch)

- Veteran Trees (those that have survived a disturbance such as wildfire)
- High Value Snags (large, tall standing dead trees supporting wildlife cavities, dens, etc.)
- Riparian areas (hygric and sub-hygric ecosystems)
- Wetlands
- Old and mature forest

Mapping for each of these values was obtained from Forest Cover data, TRIM data, PEM (predictive ecosystem mapping) or some combination of the above. The quality of the data for broadleaf trees, wetlands and old/mature forest was reasonably good; however the data for the other elements, even though it was the best available, was of lower quality. Detailed information on the data used for each layer, along with the maps, is available from Greg Utzig, and summarized briefly in Appendix 6. Details on the data used in the original assessments are found in Wells and Moy (2005).

2.2.8 Large Landscape-Level Forests

This was a challenging and controversial topic which the TAG dealt with as in previous assessments through the identification of intact or largely intact watersheds, particularly those with a number of HCVs within them. No minimum size threshold was set for the intact watersheds. None of the intact watersheds outside of parks were greater than 50,000 ha in size. However, the Purcell Wilderness Conservancy, Height of the Rockies, and Kootenay National Park are all greater than 50,000 ha.

Initially various methods for assessing intactness were investigated to assist in designing an approach for this assessment. Previous studies have used various indicators of development-related disturbance, including the presence of roads, forest harvesting, agriculture, buildings, mining and other features. However, after review of the other approaches, it was concluded that there was almost no significant development disturbance that occurred within the study area that was not accompanied by the presence of roads (remote backcountry lodges other helicopter-accessed activities being the only known exceptions). Since the primary objective was to identify areas with little or no development, and there was less emphasis on classifying types and degrees of development in less intact areas, it was concluded that density of roads was a sufficient indicator for a preliminary assessment.

The BC Government's Digital Road Atlas served as the primary disturbance coverage. Because this coverage was known to be incomplete, and to not include recently constructed roads, additional digital road coverages were sought to augment this coverage. Updated coverages were obtained from BC Timber Sales and Canfor, two of the major forest licensees who are presently building new roads in much of the study area. Other older road coverages were also compared. The third major licensee, Galloway Lumber was not willing to provide an updated coverage. There are also other roads that have not been updated: roads built as a result of subdivisions, roads on private land, mining roads, and roads built on smaller forest licenses such as woodlots and community forests. Further information on the input layers can be found in Appendix 6.

To link the analysis to naturally occurring units at the landscape scale, watershed units were selected as the reporting unit. The BC Ministry of Environment (through Carver and Gary 2010) has recently compiled a provincial coverage of Watershed Assessment units based on data from the 1:20,000 Freshwater Atlas (roughly equivalent to 1:50,000 third order watershed units). The individual watershed units generally range from 20-100 km² in size. These were used as the reporting units.

To initiate the analysis, all available road coverages were compared, and it was found that each contained roads not included in the others. Road segments present in the BCTS, Canfor and other coverages, but not occurring in the DRA coverage, were added to the DRA coverage to create more complete coverage.

The resultant road coverage was then overlaid by the watershed assessment units and road densities calculated for each assessment unit (km/km²). For simplicity in presentation, the densities were divided into five classes (Table 4).

The intact watershed coverage per se was not included in the concentration analysis, but overlaid on the resultant so that the watersheds could be evaluated as to the values within them.

Table 4. Road density classes used in the intact watershed assessment.

Road Density (km/km ²)	Road Density Class
0	Fully Intact
<0.1	Mostly Intact
0.1-0.5	Moderately Intact
0.5-2.0	Low Intactness
>2.0	Not Intact

2.3 HCV Category 2 - Forest areas that are in or contain rare, threatened or endangered ecosystems.

2.3.1 *Forests designated as threatened or endangered at global, continental, or national levels*

The assessment area lies entirely within the North Central Rockies Forest Ecoregion, which is classified as vulnerable by the World Wildlife Fund ([North Central Rockies Forests - na0518](#)). Although this ecoregion has a number of large, intact habitat areas, it contains large transportation corridors such as Canada's Highway 3, and US Highway 2 that fragment these areas. The major threats listed are loss of connectivity among habitat blocks due to resource extraction and development, and increased human activity within habitat blocks as more people occupy the region.

Suggested key sites for conservation actions include:

1. North Fork of the Flathead River, where excessive road access may lead to population declines for grizzlies and other large mammals.
2. In the Cabinet-Yahk ecosystem, intensive logging and associated roadbuilding is greatly reducing habitat effectiveness.
3. In the Crowsnest Pass area, where Canada Highway 3 crosses the Continental Divide, measures should be taken to preserve important linkage habitat, so as to conserve the international populations of carnivores in the area.

These three areas have been included as HCVAs, and overlap with HCVAs set for other HCVs such as grizzly bear.



North Fork of the Flathead River in BC.

2.3.2 Red and Blue-listed Plant Communities

A total of 32 red and blue-listed plant communities were designated as endangered or threatened (Red list) or vulnerable (Blue List) by the BC Conservation Data Centre within the East Kootenay region as of October 2018 (Appendix 7). These plant communities fall into 4 main groups; riparian, wetlands, low elevation grasslands and open forests, or high elevation grasslands.

The TAG discussed each community and, similar to the species at risk, decided whether each was best managed through HCV Areas, SFMP strategies and SWPs, or a combination of both. The TAG decided that any WHAs established for plant communities would automatically become HCV Areas, similar to species-at-risk, while the others were best managed through existing SFMP strategies, particularly the ecosystem restoration, ecosystem representation, and riparian strategies.

2.3.3 Old and mature forests where these are age classes are becoming rare due to human activities

This subset of old and mature forests was identified in combination through Range of Historic Variability modelling completed for the East Kootenay region in 2009 (Davis 2009), and through expert opinion. Expert opinion was necessary to refine the areas to where old and mature were rare to a scale lower than that of the TSA, which is the scale the Davis model reported at. The Davis model incorporated the best available data on the characteristics of historic fire regimes in the East Kootenay, including for each ecosystem the fire return interval, the proportion of high, moderate, and low severity fires, and the mortality curve associated with each fire severity class by tree species. A more detailed description of the model and the results is provided in Appendix 10 (Appendices 8 and 9 follow, change in order due to page layout changes).

Results of the Davis model showed that:

- For most ecosystem types (BEC groupings), the amount of early seral stands and mature stands are currently below historic amounts, and,
- The amounts of mid- and old seral stands are currently above or similar to historic amounts.

However, current forests are very different from historic forests in that the mature and old forests are dominated by closed canopy forests, and the amount of open and mid-closed canopies are well below historic amounts. This fits well with the disappearance of low severity fire from the landscape.

In terms of specific ecosystems in which old and mature are rare due to human activities, the following are those in which this was considered to occur were:

- the Open Range and Open Forest ecosystems (PPdh and drier portions of the IDFdm2), which have been heavily impacted by historic logging in combination with fire suppression,
- the wet ICH in the St Mary's valley, where historic logging was extensive but a few patches of old cedar hemlock stands remain
- The dry ICH (ICHdm) in the Purcells south of Cranbrook, where historic logging and mining exploration was extensive throughout, but a few patches of old cedar hemlock and mixed conifer forest remain.
- The ICHmk4 in the lower Elk Valley, where historic logging followed by high severity wildfire occurred between Sparwood and Elko, removing most of the old-growth Cedar-Hemlock stands that used to be present there.

In the ICH areas, OGMA's of high value were identified as HCV areas on a stand-alone basis, rather than only when contributing to the concentration of values analysis. In the Open Range and Open Forest, HCV areas were identified in locations with concentrations of HCVs (as identified from the concentration of biodiversity values analysis).

Now that a new BEC (Version 11) has been released for the East Kootenay, a new Range of Natural Variability analysis can be started, which will be compatible with planning and management processes going forward. This project is planned to begin in 2019.

2.3.4 Rare Ecosystems

The TAG considered several types of ecosystems to be rare ecosystems within the study area. Included were rare plant communities, karst, and hot springs (Appendix 8). A comprehensive and rigorous ecological representation analysis at the plant community level (Wells et al. 2004) was used to identify rare ecosystems and ecosystems under-represented in protected areas. Rare ecosystems were defined as those with < 2000 ha in the East Kootenay region (Appendix 9). These nine ecosystems tend to occur in small, isolated patches, and are protected with a 'no harvest, no road-building strategy' under Canfor's SFMP. The TAG decided to use them in the concentration of values analysis rather than as stand-alone HCV Areas.

These ecosystems were all given a risk-rating of low, given that they are not targeted for harvest and have a specific SWP designated to protect them.

2.3.5 Ecosystems Under-Represented in Protected Areas

Two lines of evidence were used to identify ecosystems under-represented in protected areas. Both came to the same conclusions. The Wells et al. (2004) report determined that the PPdh and the IDFdm2 were both under-represented (both < 20%, and were thus classified as low). The analysis completed by ForSite to satisfy FSC-BC Principle 6.4 came to a similar conclusion for the Cranbrook and Invermere TSAs (See the Canfor SFMP for a summary). Thus, these two variants were considered to be those under-represented in protected areas.

Rather than include these in the concentration of values analysis, HCV Areas were examined afterwards to determine if they contributed to an increase in the representation of these two variants. Canfor's strategy to increase representation for them is to designate HCV Areas within them and work towards ecosystem restoration within them, in partnership with MFLNRO and the prescribed burn program.

As with the Range of Natural Variability Analysis, now that a new BEC has been released for the East Kootenay, the ecosystem representation analysis needs to be re-done. This is planned to begin in 2019.

2.4 Evaluation of HCVFs and Update to HCV Areas

Once all the HCVs were agreed upon and data for them assembled in a GIS, the concentration of values map was produced. Concentrations of biological values were determined using a raster overlay process based on an approach demonstrated by Blasutti and Iacobelli (2003) and applied to the East Kootenay region in the three previous HCVF assessments. In this approach, individual raster map layers were generated for each HCV and assigned values (values were assigned '1' except where layers included rankings; see Tables within Appendices). Values for all layers were summed to generate an output map that identified high concentrations of values.

The TAG decided that it would be simplest to go through each of the existing HCVFs in light of the new data and concentration of values layer. Each HCVF was discussed and a recommendation made whether to keep it as is, delete it, or expand it. A detailed record of the discussions was kept in the meeting minutes. Following the meetings, the GIS analyst, Greg Utzig, completed changes to the linework for review.

As in the previous HCVF assessments, some HCVs were automatically considered by the TAG to be HCV Areas, regardless of whether a concentration of values appeared in that area. These values included Wildlife Habitat Areas for red-listed species and plant communities, critical fish spawning habitat, fisheries sensitive watersheds, high value grizzly habitat and linkage zones, and caribou ungulate winter ranges. For some individual HCVs with a limited distribution, such as some red-listed species, location data from telemetry and sightings were used to select HCV areas.

Areas with high concentrations of values were considered in terms of their contributions to ecosystem representation, ecosystems under-represented within protected areas, and for intactness, as well as their concentrations of values.

3.0 RESULTS

A complete list of the final HCVs, by category, is provided in Table 5. In total, 82 HCVs were identified in Category 1 (HCV1), and 51 in Category 2 (HCV2 and 3), for a total of 132 HCVs (one HCV overlapped between categories).

Table 5. Final list of High Conservation Values in the East Kootenay Assessment Area.

Category	Number	HCV
HCV1		
<i>Species at Risk, Rare Species, Species of Regional Concern</i>	<i>6 Fish</i>	White Sturgeon, Burbot, Westslope Cutthroat Trout, Bull Trout, Rocky Mountain Sculpin, Kokanee.
	<i>1 Fisheries Sensitive Watershed</i>	Upper Palliser Watershed
	<i>7 Reptiles and Amphibians</i>	Coeur d'Alene Salamander, Western Toad, Rocky Mountain Tailed Frog, Northern Leopard Frog, Painted Turtle, Western Skink, Northern Rubber Boa
	<i>21 Birds</i>	Prairie Falcon, Peregrine Falcon, Broad-winged Hawk, Swainson's Hawk, Northern Goshawk, Long-billed Curlew, Short-eared Owl, Western screech Owl, Flammulated Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Barn Swallow, Bank Swallow, Black Swift, Williamson's Sapsucker, American Bittern, Great Blue Heron, Sandhill Crane, Bobolink, Cassin's Finch
	<i>18 Mammals</i>	Northern Myotis, Little Brown Myotis, Townsend's Big-eared Bat, American Badger, Mountain Caribou, Grizzly Bear, Wolverine, Fisher, Least Chipmunk (<i>selkirki</i> and <i>oreocetes</i> subspecies), Red-tailed Chipmunk (<i>ruficaudus</i> subspecies), Southern-red-backed vole, Bighorn Sheep, Mountain Goat, Elk, Moose, White-tailed Deer, and Mule Deer.
	<i>6 Invertebrates</i>	Gillette's Checkerspot, Monarch Butterfly, Vivid Dancer, Pygmy Slug, Sheathed Slug, Magnum Mantleslug
	<i>9 Plants, including 3 trees</i>	Whitebark Pine, Limber Pine, Western White Pine, Spalding's Champion, Smoothed Goosefoot, Giant Helleborine, Alkaline wing-nerved moss, Gastony's Cliff-brake, Southern maiden-hair fern.
<i>Endemic Species</i>	<i>1 species</i>	Alpine Larch
<i>Concentrations of Vertebrates</i>	<i>4 types</i>	Columbia Wetlands Class 1 and 2 Ungulate Winter Ranges Low elevation passes through high mountains (connectivity) Migration Routes from summer to winter range for ungulates (connectivity)
<i>Refugia</i>	<i>3 types</i>	Refugia from direct human activities represented by intact watersheds.

Category	Number	HCV
HCV1		
		Refugia from climate change represented by 1) mountain passes and (2) migration routes
<i>Habitat Elements for Concentrations of Biodiversity values</i>	6	Broadleaf Trees Veteran Trees High value Snags Riparian Areas Wetlands Old and Mature Forest
HCV2		
<i>Large Landscape Level Forests</i>	1 (already listed under Refugia)	Intact Watersheds (fully and mostly intact)
HCV3		
<i>Threatened or Endangered forests</i>	1	North Central Rockies EcoRegion
<i>Red and Blue-listed Plant Communities</i>	32	Primarily riparian, wetlands, low elevation grasslands and open forests, and high elevation grasslands. Full list in Appendix 6.
<i>Old and Mature Forests where these are rare</i>	4 types	Open Range and Open Forest Wet ICH in St. Mary's valley ICHdm (BEC V10) ICHmk1 (now 4) in Elk Valley
<i>Rare Ecosystems</i>	11	Rare plant communities (9, under BEC V10) Karst Hot springs
<i>Under-represented Ecosystems</i>	2	PPdh IDFdm2

Based on these HCVs, 189 candidate HCV Areas were identified, comprising 252 separate polygons. For example, riparian HCV Areas are often comprised of several separate polygons because good riparian habitat is discontinuous along creeks and rivers. In addition, modifications were made to the linework for 54 polygons, 4 were deleted, and 23 new HCV Areas were identified, including those which have not had their designation finalized due to requirements for field work (Table 6). Three HCV Areas were moved to the CCVFs category, as they fit better there.

The updated 2019 list of HCV Areas in the East Kootenay is shown in Table 7. The area (ha) amounts are shown for each HCV Area. These are not additive over all HCV Areas however, because the grizzly bear HCV Areas overlap with some of the other HCV Areas.

Table 6. Summary of changes made to previous HCVFs through the update process.

Area	Number of HCVFs that were...						Comments
	HCVFs prior to the update	Underwent Boundary Modifications*	New HCV Areas Added*	Old HCVFs Deleted*	Moved to CCVFs	Total New HCV Areas (polygons)	
Cranbrook TSA	52	16	14	0	2	64 (91)	* 8 potential HCV Areas still to be evaluated through field work before a decision on designation is made.
Kootenay Lake TSA, Canfor Op. area	13	1	0	0	1	12 (18)	
Invermere TSA, Canal Operating Area;	28	10	6	4	0	30	Deletions do not include the 3 HCVFs that were deleted because they were covered by the Caribou UWR Order
Invermere TSA, Radium Area	51	25	2	0	0	53	Non-FSC certified tenure
TFL 14	14	1	1	0	0	15 (31)	
Wildlife Habitat Areas or UWR (counting each species/plant community as one HCV Area)	13***	0	0	0	0	13	WHAs automatically become HCV Areas when they are approved by government. There are 234 separate WHA polygons in the East Kootenay as of Oct 2018.
Caribou Ungulate Winter Range Orders	2	0	0	0	0	2	
TOTAL	173	54	23	4	3	189 (252)	

* Includes subunits of HCVAs

**deletions do not include those HCV Areas that were deleted because they were replaced by the caribou WHA or a grizzly WHA or another type of HCV Area.

***As of September 2018 WHAs are legally approved for: Flammulated Owl, Lewis's Woodpecker, Long-billed Curlew, Williamson Sapsucker, Western Screech Owl, Great Blue Heron, Grizzly Bear, American Badger, Rocky Mountain Tailed Frog, Coeur d'alane Salamander, Gillette's Checkerspot, Douglas-fir-snowberry- balsamroot plant community, Antelope brush-blue bunch wheatgrass plant community.

Table 7. Identified HCV Areas within the East Kootenay region, including candidates for which a decision has yet to be made (TBD), listed by polygon (each HCV Area may have multiple polygons). Note that CFLB and THLB areas are not additive over HCVAs, because some HCVAs overlap.

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
TFL 14 HCVAs								
110010	1101	Jubilee Mountain Southwest Aspects	HCVA	Existing	Old and Mature Forest, High Value Habitat (Class 2 Ungulate Winter Range), Broadleaf Trees	679.3	352.4	105.6
110020	1102	Forests Adjacent to the Columbia Wetlands	HCVA	Existing	Riparian, Old and Mature Forest High Value Habitat (Class 2 and 3 Ungulate Winter Range for Elk and Moose)	315.6	303.2	88.8
110031	1103a	Spillimacheen Riparian Forests Polygon 1	HCVA	Existing	Old and Mature Forests, High Value Habitat (Class 1 and 2 Ungulate Winter Range for Moose), Riparian Wetlands, Broadleaf Trees	25.6	24.8	5.2
110032	1103b	Spillimacheen Riparian Forests Polygon 2	HCVA	Existing	Old and Mature Forests, High Value Habitat (Class 1 and 2 Ungulate Winter Range for Moose), Riparian Wetlands, Broadleaf Trees	38.1	29.7	0.5
110033	1103c	Spillimacheen Riparian Forests Polygon 3	HCVA	Existing	Old and Mature Forests, High Value Habitat (Class 1 and 2 Ungulate Winter Range for Moose), Riparian Wetlands, Broadleaf Trees	61.2	53.4	4.6
110034	1103d	Spillimacheen Riparian Forests Polygon 4	HCVA	Existing	Old and Mature Forests, High Value Habitat (Class 1 and 2 Ungulate Winter Range for Moose), Riparian Wetlands, Broadleaf Trees	172.4	145.1	30.9
110035	1103e	Spillimacheen Riparian Forests Polygon 5	HCVA	Existing	Old and Mature Forests, High Value Habitat (Class 1 and 2 Ungulate Winter Range for Moose), Riparian, Wetlands, Broadleaf Trees	252.5	207.2	64.4
110041	1104a	Upper Spillimacheen Riparian Forests Polygon 1	HCVA	Existing	Old and Mature Forest, Riparian Wetlands	489.9	396.3	145.1

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
110042	1104b	Upper Spillimacheen Riparian Forests Polygon 2	HCVA	Existing	Old and Mature Forest, Riparian, Wetlands	596.0	526.2	156.3
110050	1105	Spillimacheen Range Ridgetop	HCVA	Existing	Old and Mature Forest, Whitebark Pine, Intact Watershed	1134.3	1001.1	151.7
110061	1106a	Bobbie Burns/Vowell Riparian Forests Polygon 1	HCVA	Existing	Old and Mature Forest, Riparian High Value Habitat (Class 1 and 2 Ungulate Winter Range, Wetlands Broadleaf Trees, Connectivity (to Shaws Creek and West Shaws Creek)	224.2	183.9	91.2
110062	1106b	Bobbie Burns/Vowell Riparian Forests Polygon 2	HCVA	Existing	Old and Mature Forest, Riparian High Value Habitat (Class 1 and 2 Ungulate Winter Range, Wetlands Broadleaf Trees, Connectivity (to Shaws Creek and West Shaws Creek)	65.2	47.4	21.3
110063	1106c	Bobbie Burns/Vowell Riparian Forests Polygon 3	HCVA	Existing	Old and Mature Forest, Riparian High Value Habitat (Class 1 and 2 Ungulate Winter Range, Wetlands Broadleaf Trees, Connectivity (to Shaws Creek and West Shaws Creek)	463.9	412.0	231.0
110064	1106d	Bobbie Burns/Vowell Riparian Forests Polygon 4	HCVA	Existing	Old and Mature Forest, Riparian High Value Habitat (Class 1 and 2 Ungulate Winter Range, Wetlands Broadleaf Trees, Connectivity (to Shaws Creek and West Shaws Creek)	201.0	163.7	74.2
110065	1106e	Bobbie Burns/Vowell Riparian Forests Polygon 5	HCVA	Existing	Old and Mature Forest, Riparian High Value Habitat (Class 1 and 2 Ungulate Winter Range, Wetlands Broadleaf Trees, Connectivity (to Shaws Creek and West Shaws Creek)	15.0	11.9	6.9
110071	1107a	Upper Bobbie Burns Polygon 1	HCVA	Existing	Old and Mature Forest, Avalanche Paths, wetlands, Intact watershed	4754.6	1191.6	306.0
110072	1107b	Upper Bobbie Burns Polygon 2	EF	Existing	Old and Mature Forest, Avalanche Paths, Wetlands, Intact watershed	5450.4	594.5	0.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
110080	1108	Shaws and West Shaws Creeks	EF	Existing	Old and Mature Forest, Avalanche Paths, Intact Watershed, Riparian, Wetlands	4225.1	643.9	0.2
110090	1109a	Warren Creek	HCVA	Modified	High Value Habitat (Mountain Goats), Avalanche Paths, Old and Mature Forest	163.5	105.0	20.8
110100	1109b	Upper Valley Warren Creek	EF	Modified	High Value Habitat (Mountain Goats), Avalanche Paths, Old and Mature Forest	4451.0	634.0	0.3
110110	1110	Crystalline Creek	EF	Existing	Old and Mature Forest, Riparian Wetlands, Avalanche Paths, Intact Watershed	9595.1	1587.1	0.1
110120	1111	Lower Vowell Creek/ Lower Crystalline Creek	HCVA	Existing	Old and Mature Forest, Riparian Wetlands,	545.7	471.1	362.9
110130	1112a	Upper Fool Hen Creek	EF	Existing	Old and Mature Forest, Avalanche Paths, Intact Watershed,	1318.4	178.5	0.0
110140	1112b	Lower Fool Hen Creek	HCVA	Existing	Old and Mature Forest, Avalanche Paths	114.2	112.0	7.2
110151	1113a	Headwaters of the Spillimacheen River Polygon 1	EF	Existing	Old and Mature Forest, Whitebark Pine, High Value Habitat (Mountain Caribou), Avalanche Paths, Intact Watershed, Riparian, Wetlands	5081.1	818.0	0.0
110152	1113b	Headwaters of the Spillimacheen River Polygon 2	EF	Existing	Old and Mature Forest, Whitebark Pine, High Value Habitat (Mountain Caribou), Avalanche Paths Intact Watershed, Riparian, Wetlands	1073.2	431.9	0.3
110153	1113b	Headwaters of the Spillimacheen River Polygon 3	EF	Existing	Old and Mature Forest, Whitebark Pine, High Value Habitat (Mountain Caribou), Avalanche Paths, Intact Watershed, Riparian, Wetlands	3365.3	472.8	0.2
110154	1113c	Headwaters of the Spillimacheen River Polygon 4	EF	Existing	Old and Mature Forest, Whitebark Pine, High Value Habitat (Mountain Caribou), Avalanche Paths, Intact Watershed, Riparian, Wetlands	774.7	698.5	0.0
110160	1113d	Lower Headwaters of the Spillimacheen River	HCVA	Existing	Old and Mature Forest, Whitebark Pine, High Value Habitat (Mountain Caribou), Avalanche Paths, Riparian Wetlands	709.5	673.3	429.8
110170	1114	Lakes District	HCVA	Existing	Wetlands, High Value Habitat (Class 3 Ungulate Winter Range for Moose), Broadleaf Trees	3530.3	2838.2	1551.0
110180	None - New	Malachite Creek	HCVA	New	High value grizzly habitat under MP mapping.	5276.1	980.0	142.5

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
Invermere TSA Purcells, Rockies, Canal Flats HCVAs								
120010	2101	Upper North White	EF	Modified	High Value Habitat (Grizzly Bears, Mountain Goats), Old and Mature Forest (Excellent and good Old Growth Management Areas) Intact Watershed (Large block of Class 1 and 2 intact watersheds) Whitebark Pine, Alpine Larch	13818.1	4350.6	1205.4
120020	2102	North White Riparian	HCVA	Modified	Riparian, High Value Habitat (Bull Trout Spawning), Old and Mature Forest (Good and Moderate Old Growth Management Areas)	1756.6	1452.3	622.7
120030	None - New	Schofield Creek Riparian	HCVA	Existing	Riparian, High Value Habitat (Bull Trout Spawning)	139.1	95.1	51.3
120040	2102c	Upper North White Riparian	HCVA	Existing	Riparian, High Value Habitat (Bull Trout Spawning)	100.2	87.6	29.9
120050	2103a	Blackfoot Old Growth	HCVA	Existing	Old and Mature Forests (High quality Old Growth Management Areas)	1633.2	700.9	286.7
120060	2103b	Blackfoot Riparian	HCVA	Existing	Riparian, High Value Habitat (Bull Trout Spawning)	624.4	555.5	196.2
120070	None - New	Little and Big Creeks	TBD	New	Intact Watershed, High Value Habitat (Grizzly Bears, Mountain Goats), Avalanche Paths	2141.3	1112.6	311.6
120080	2104	Mid Coyote	EF	Modified	High Value Habitat (Summer range for Bighorn Sheep, Mountain Goats) Intact watersheds (Class 2), Old and Mature Forests (Excellent, Good, and Moderate Quality Old and Mature Management Areas)	3050.7	903.6	5.6
120090	2106	Mid Lussier	HCVA	Existing	Old and Mature Forests (Old Growth Fd and Lw)	599.8	457.2	171.7
120100	2107	Upper Lussier Riparian	HCVA	Existing	Riparian, Old and Mature Forests (Excellent and Good quality Old and Mature Management Areas)	490.3	422.5	132.1
120110	2108a	Lower Coyote Riparian	HCVA	Existing	Riparian, Old and Mature Forests (Excellent and Good quality Old and Mature Management Areas)	244.0	225.1	91.9

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
120120	2108b	Mid Coyote Riparian	HCVA	Existing	Riparian, Old and Mature Forests (Excellent and Good quality Old and Mature Management Areas)	38.7	30.0	5.3
120130	2108c	Upper Coyote Riparian	HCVA	Existing	Riparian, Old and Mature Forests (Excellent and Good quality Old and Mature Management Areas)	133.9	86.9	29.7
120140	None - New	Blackfoot -Thunder-North Tower Pass	HCVA	New	Connectivity (High elevation passes between drainages), High Value Habitat (Mountain Goats)	2219.1	634.4	264.4
120150	2110	Nicol Creek	EF	Modified	Old and Mature Forests (Excellent quality Old Growth Management Areas), Whitebark Pine, Alpine Larch	1768.3	571.9	29.0
120160	2111	Diorite Creek	EF	Modified	Intact Watershed (Intact Class 1 watershed), High Value Habitat (Bighorn Sheep and Mountain Goat) Whitebark Pine, Alpine Larch	6323.3	2228.5	4.0
120170	2113a	Lower Lussier Riparian Polygon 1	HCVA	Existing	High Value Habitat (Kokanee Spawning, Class 1 and 2 Ungulate Winter Range), Broadleaf Trees – Cottonwoods in particular, Old and Mature Forest (Good quality Old and Mature Management Areas)	696.5	347.0	149.6
120180	2113b	Lower Lussier Riparian Polygon 2	HCVA	Existing	High Value Habitat (Kokanee Spawning, Class 1 and 2 Ungulate Winter Range), Broadleaf Trees – Cottonwoods in particular Old and Mature Forest (Good quality Old and Mature Management Areas)	178.4	56.9	10.2
120190	2114	Skookumchuck Prairie	HCVA	Modified	High Value Habitat (Class 1 and 2 Ungulate Winter Range, Long Billed Curlew, Badger), Wetlands Veteran Trees (Fd, Py)	2472.7	1149.2	586.1
120200	2115	Reed-Echo-Ta Ta Lakes	HCVA	Existing	Old and Mature Forests (Excellent and Good quality Old Growth Management Areas), Veteran Trees High Value Habitat (Class 1 and 2 Ungulate Winter Range), Wetlands Broadleaf Trees	2943.8	2197.8	1570.1

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
120210	None - New	Lodgepole Pass	HCVA	New	Connectivity (Major Pass between North White and Lodgepole/Palliser)	357.2	329.9	281.6
120220	None - New	Upper Rock Canyon Creek	HCVA	New	High Value Habitat (Mountain Goat, including goat lick, Grizzly Bear)	6904.1	2468.7	0.4
120230	None - New	Lower Rock Canyon Creek	HCVA	New	High Value Habitat (Mountain Goats, Grizzly Bears)	312.0	254.3	193.7
120241	2116a	Skookumchuck Riparian Polygon 1	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	17.6	11.5	1.7
120242	2116b	Skookumchuck Riparian Polygon 2	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	55.9	45.6	11.9
120243	2116c	Skookumchuck Riparian Polygon 3	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	17.3	9.5	1.6
120244	2116d	Skookumchuck Riparian Polygon 4	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	42.6	30.6	7.0
120245	2116e	Skookumchuck Riparian Polygon 5	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	78.0	66.0	27.8
120246	2116f	Skookumchuck Riparian Polygon 6	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Old and Mature Forests (Moderate quality Old Growth Management Areas)	72.8	62.5	13.0
120250	2117a	Lower Sandown	HCVA	Existing	High Value Habitat (Westslope Cutthroat Trout Spawning, Class 2 Ungulate Winter Range), Old and Mature Forests (Moderate quality Old Growth Management Areas) Wetlands, Broadleaf trees, Riparian	379.2	255.8	150.9
120260	2117b	Upper Sandown	HCVA	Modified	High Value Habitat (Westslope Cutthroat Trout Spawning, Class 2 Ungulate Winter Range), Old and Mature Forests (Moderate quality Old Growth Management Areas) Wetlands, Broadleaf trees, Riparian	206.6	153.3	114.2

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
120271	2119a	Buhl Creek Riparian Polygon 1	HCVA	Existing	Riparian, Old and Mature Forest (High quality Old Growth Management Areas)	22.2	20.3	2.7
120272	2119b	Buhl Creek Riparian Polygon 2	HCVA	Existing	Riparian, Old and Mature Forest (High quality Old Growth Management Areas)	9.3	9.2	1.7
120273	2119c	Buhl Creek Riparian Polygon 3	HCVA	Existing	Riparian, Old and Mature Forest (High quality Old Growth Management Areas)	24.4	24.3	8.5
120274	2119d	Buhl Creek Riparian Polygon 4	HCVA	Existing	Riparian, Old and Mature Forest (High quality Old Growth Management Areas)	37.7	33.4	4.5
120280	2120a	Upper Skookumchuck Grizzly Bear	TBD	Existing	Uncertain – need field visit. Only northern higher elevation portion included 2015 high value grizzly habitat from MP., High Value Habitat (Grizzly Bear), Veteran Trees (Lw), Whitebark Pine, Alpine Larch	3384.7	2023.3	394.7
120290	2120c	Upper Skookumchuck Caribou	TBD	Existing	High Value Habitat (Grizzly Bear, Caribou)	1600.3	540.6	26.9
120300	2121	North Fork Skookumchuck	EF	Modified	Intact Watershed (Class 1 intact watershed), High Value Habitat (Caribou), Veteran Trees (Lw) Whitebark Pine, Alpine Larch	5068.4	2385.9	0.0
120310	2123	Mid Findlay Creek	TBD	Existing	Old and Mature Forest (Old Growth Lw), Whitebark Pine Alpine Larch	3091.3	1524.6	187.9
120320	2124	Dutch Creek	HCVA	Existing	Old and Mature Forest (Excellent and Good Old Growth Management Areas), High Value Habitat (Mountain Goat mineral lick)	724.0	621.1	242.3
120331	2125a	Lower Findlay Polygon 1	HCVA	Modified	Old and Mature Forest (Excellent and Good Old Growth Management Areas), High Value Habitat (Ungulate Winter Range), Veteran Trees (Py, Fd, Lw), Broadleaf Trees (Black Cottonwoods), Rare Ecosystems (Rare dry ecosystems) Wetlands	3770.7	1928.9	749.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
120332	2125b	Lower Findlay Polygon 2	HCVA	Modified	Old and Mature Forest (Excellent and Good Old Growth Management Areas), High Value Habitat (Ungulate Winter Range), Veteran Trees (Py, Fd, Lw), Broadleaf Trees (Black Cottonwoods), Rare Ecosystems (Rare dry ecosystems) Wetlands	1715.3	768.2	579.1
120333	2125c	Lower Findlay Polygon 3	HCVA	Modified	Old and Mature Forest (Excellent and Good Old Growth Management Areas), High Value Habitat (Ungulate Winter Range), Veteran Trees (Py, Fd, Lw), Broadleaf Trees (Black Cottonwoods), Rare Ecosystems (Rare dry ecosystems), Wetlands	1092.2	593.5	386.1
120340	2126	East Side Columbia Lake	HCVA	Modified	High Value Habitat (Class 1 and 2 Bighorn Sheep Ungulate Winter Range)	7069.9	4312.4	0.1
120350	2128	Findlay Mouth	HCVA	Existing	High Value Habitat (Kokanee spawning, Class 2 Ungulate Winter Range), Broadleaf Trees, Riparian	106.5	86.8	10.0
120360	None - New	Findlay Corridor	EF	New	High Value Habitat (Grizzly Bears, Wolverines), Intact Watershed	2127.3	1954.7	0.0
Cranbrook TSA Purcells, Rockies, and Trench HCVAs								
130011	3101a	Elk Park North	HCVA	Existing	Old and Mature Stands (Old Growth Sx, Old Growth BI)	150.8	136.0	3.0
130012	3101b	Tobermory Old Growth	HCVA	Modified	Old and Mature Stands (Old Growth Sx, Old Growth BI)	39.9	39.9	0.0
130013	3101c	Elk Park South	HCVA	Existing	Old and Mature Stands (Old Growth Sx, Old Growth BI)	194.7	181.2	0.0
130020	None - New	Tobermory	HCVA	New	Low Elevation Pass (North-South pass into Alberta), Old and Mature Stands (Old Growth)	911.5	842.8	633.8
130031	None - New	Upper Elk West	EF	New	High Value Habitat (Grizzly Bear, Mountain Goat, Elk), Intact Watershed (valleys), Avalanche Tracks	5894.4	1572.8	3.9
130032	None - New	Upper Elk East	EF	New	High Value Habitat (Grizzly Bear, Mountain Goat, Elk), Intact Watershed (valleys), Avalanche Tracks	3500.0	887.3	0.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130040	None - New	Cadorna North	HCVA	New	High Value Habitat (Grizzly Bears, Ungulate Winter Range for Bighorn Sheep), Wetlands, Connectivity (North-South along the main Elk, up to Elk Lakes Provincial Park)	827.8	680.9	562.0
130060	3102	Upper Elk Riparian/Wetlands	HCVA	Modified	High Value Habitat (Grizzly Bears, Moose Winter Range, Bull Trout spawning), Riparian, Wetlands Old and Mature Stands (Old Growth Management Areas)	3838.0	2002.1	801.7
130070	3103a	Weary/Aldridge/Upper Fording	EF	Existing	High Elevation Grasslands (Weary Ridge), Intact Watershed (Class 1 and 2 Intact watersheds), High Value Habitat (Bighorn Sheep, Elk, and Grizzly Bear), Connectivity Low Elevation Passes (two passes into Alberta and one into Upper Fording)	8490.7	1237.9	38.0
130080	3103b	Aldridge - North slopes Mt. Veits	TBD	Existing	High Elevation Grasslands (Weary Ridge), Intact Watershed (Class 1 and 2 Intact watersheds), High Value Habitat (Bighorn Sheep, Elk, and Grizzly Bear), Connectivity Low Elevation Passes (two passes into Alberta and one into Upper Fording)	401.5	293.4	0.0
130090	3104a	West Side Upper Elk - North	EF	Modified	High Value Habitat (Grizzly Bears), High Value Habitat (Summer range for Mountain Goat, Bighorn Sheep, Mule Deer and Elk), Old and Mature Forest (Old Growth Management Areas), Intact Watershed (Class 1 and 2 intact watersheds), Whitebark Pine, Riparian, Low Elevation Pass (Crossing Creek is a key pass from the White/Bull to the Elk)	13090.0	4295.0	3.2
130100	5009b	Bingay Creek	TBD	Proposed	Intact Watershed (Level 3)	213.2	175.8	110.9

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130110	3104b	West Side Upper Elk - South	EF	Modified	High Value Habitat (Grizzly Bears), High Value Habitat (Summer range for Mountain Goat, Bighorn Sheep, Mule Deer and Elk), Old and Mature Forest (Old Growth Management Areas), Intact Watershed (Class 1 and 2 intact watersheds), Whitebark Pine, Riparian, Low Elevation Pass (Crossing Creek is a key pass from the White/Bull to the Elk)	39169.1	12770.8	622.9
130120	3104c	Upper Weigart Creek	HCVA	Modified	High Value Habitat (Grizzly Bears), High Value Habitat (Summer range for Mountain Goat, Bighorn Sheep, Mule Deer and Elk), Old and Mature Forest (Old Growth Management Areas), Intact Watershed (Class 1 and 2 intact watersheds), Whitebark Pine, Riparian, Low Elevation Pass (Crossing Creek is a key pass from the White/Bull to the Elk)	82.5	68.2	38.6
130130	3104d	Confluence Telford/ Cummings Creeks	HCVA	Modified	High Value Habitat (Grizzly Bears), High Value Habitat (Summer range for Mountain Goat, Bighorn Sheep, Mule Deer and Elk), Old and Mature Forest (Old Growth Management Areas), Intact Watershed (Class 1 and 2 intact watersheds), Whitebark Pine, Riparian, Low Elevation Pass (Crossing Creek is a key pass from the White/Bull to the Elk)	423.4	359.4	54.5
130141	3105e	Chauncey Grasslands - Henretta Creek	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	414.3	110.1	0.0
130142	3105f	Chauncey Grasslands - Kilmarnock Brownie Creeks	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	344.2	14.2	0.0
130143	3105a	Chauncey Grasslands - Chauncey Creek	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	701.0	40.6	0.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130144	3105b	Chauncey Grasslands - Todhunter Creek	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	271.4	11.8	0.4
130145	3105c	Chauncey Grasslands - Ewin Creek	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	114.8	17.9	0.5
130146	3105d	Chauncey Grasslands - Greenhills	HCVA	Modified	High Value Habitat (Bighorn Sheep and Elk high elevation winter range) High Elevation Grasslands	1094.4	59.5	0.0
130150	3154	Upper Bull Wetlands	HCVA	Modified	Wetlands	31.7	22.4	13.3
130170	3156a	Crossing Creek	HCVA	Modified	Connectivity (main pass from White and Bull to Elk)	138.6	123.0	107.2
130180	3106	Upper Elk Riparian/Fisheries	HCVA	Existing	High Value Habitat (Bull Trout spawning area, important moose winter range)	485.4	158.2	26.7
130190	3108	Grave Prairie/ Big Ranch	HCVA	Modified	High Value Habitat (Class 1 Elk and deer winter range in the Elk Valley) Hardwoods	1980.8	181.2	63.1
130270	3114	Flathead Riparian and Tributaries	HCVA	Modified	High Value Habitat (Moose winter range, Grizzly Bear spring habitat, Elk calving, western screech owl habitat, Bull Trout spawning) Connectivity (along Flathead)	6797.7	3896.0	1295.1
130280	None - New	Cate/Pollock Creeks	EF	New	High Value Habitat (Bighorn Sheep, Mountain Goats, Elk, Grizzly Bears) Intact Watershed (Set of four contiguous intact Class 1 watersheds).	8021.8	3041.4	1127.5
130290	None - New	Trachyte Upper slopes	EF	New	High Value Habitat (female Grizzly Bear area for denning and cubbing, Mountain Goat winter range), Intact Watershed	6749.0	1896.9	72.5
130300	None - New	Trachyte Lower slopes	HCVA	New	Intact Watershed (prior to logging) Huckleberries	1709.9	1610.6	1327.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130310	3116a	Celestial Creek South	EF	Existing	High Value Habitat (Grizzly Bears), Intact Watershed (Class 1 intact watershed), Riparian, Old and Mature Stands (Spruce Old Growth Management Areas), Connectivity (between the Wigwam and Flathead drainages; mainly for Grizzly Bears and Ungulates)	1062.1	876.5	12.7
130320	3116b	Celestial Creek East	HCVA	Existing	High Value Habitat (Grizzly Bears), Riparian, Old and Mature Stands (Spruce Old Growth Management Areas), Connectivity (between the Wigwam and Flathead drainages; mainly for Grizzly Bears and Ungulates)	2566.5	1178.9	48.9
130330	3122	Wigwam Riparian	HCVA	Existing	High Value Habitat (Bull Trout Spawning)	1279.1	948.5	148.6
130350	3124	Lower Wigwam	HCVA	Existing	Old and Mature Stands (Old Growth Fd and Lw), Veteran trees	907.2	772.3	3.6
130360	3125	Lower Elk Riparian/ Fisheries	HCVA	Modified	High Value Habitat (Bull Trout and Westslope Cutthroat spawning habitat, Class 1 and 2 Moose Winter Range), Broadleaf Trees, Riparian	1837.0	602.9	161.7
130370	3126	Mount Broadwood	HCVA	Existing	High Value Habitat (Class 1 and 2 Ungulate winter range, Grizzly Bear), Broadleaf Trees	3571.7	682.9	623.1
130400	3127	Fussee Lake	HCVA	Existing	High Value Habitat (Class 1 and 2 Ungulate Winter Range Mule deer and Elk), Veteran Trees (Fd, Lw, Py)	1688.2	935.5	877.3
130410	3128	Englishman Creek	HCVA	Existing	High Value Habitat (Class 1 and 2 Ungulate Winter Range for Mule deer and Elk), Veterans Trees (Fd, Py, Lw), Ecosystem Representation Old and Mature Stands (Larch Old Growth Management Areas) Riparian, Broadleaf Trees, Great Blue Heron colony, WISA nest sites, owl WHA, Lewis Woodpecker WHA, Douglas-fir Balsamroot WHA	10970.6	8514.6	7429.0
130420	3129	Bare Hill	HCVA	Existing	Mid-Elevation Grasslands, High Value Habitat (Class 1 and 2 UWR) Old and Mature Stands (Old growth Fd and Lw stands), Veteran Trees (Lw, Fd, Py), Intact Watershed (relatively high for this area)	1436.2	1145.5	872.7

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130430	3130	Upper Fitzpatrick	EF	Existing	Intact Watershed (Class 2 intact watershed), Whitebark Pine Old and Mature Stands (High quality Old Growth Management Areas)	916.7	605.5	69.3
130441	3131a	Bloom Ridge Grasslands North	HCVA	Existing	Mid-Elevation Grasslands, Intact Watershed (Class 2 intact watershed)	467.2	265.3	31.6
130442	3131b	Bloom Ridge Grasslands South	HCVA	Existing	Mid-Elevation Grasslands, Intact Watershed (Class 2 intact watershed)	129.7	28.4	0.8
130450	3132	Blacktail	HCVA	Existing	Old and Mature Stands (High quality Old Growth Management Areas)	163.2	155.7	144.3
130460	3133	Ward Canyon	HCVA	Existing	Old and Mature Stands (Old Growth Lw)	1645.6	1503.1	1176.5
130470	3136	Irishman Creek Yellow Pine	HCVA	Existing	Veteran Trees (Py), Old and Mature Stands	411.6	308.1	3.2
130480	3137a	Lamb Creek Fisheries	HCVA	Existing	High Value Habitat (Kokanee spawning), Riparian	152.5	120.3	6.5
130490	3137b	Etna Creek	HCVA	Existing	High Value Habitat (Kokanee spawning), Riparian Old and Mature Stands (High quality Old Growth Management Area)	832.8	736.4	535.2
130500	3138	Glencairn/ Barshanty Creeks	HCVA	Existing	Old and Mature Stands (Old growth riparian stands)	702.3	570.5	390.8
130510	3139	Kiahko Lake	HCVA	Modified	High Value Habitat (pure strain westslope cutthroat trout), Old and Mature Stands (High quality Old Growth Management Areas), Veteran Trees (Fd, Lw, Py), Wetlands (extensive)	1561.7	1409.7	607.9
130520	3141	Upper Meachen	EF	Existing	High Value Habitat (Grizzly Bears, Caribou), Old Growth Stands (High quality Old Growth Management Areas), Avalanche Paths	2077.7	461.4	0.0
130541	None - New	Baribeau Creek South	HCVA	New	High Value Habitat (Grizzly Bears) Intact Watershed (Class 1 Intact watershed), Avalanche Paths	366.3	347.3	0.0
130542	None - New	Baribeau Creek Central	HCVA	New	High Value Habitat (Grizzly Bears) Intact Watershed (Class 1 Intact watershed), Avalanche Paths	921.5	689.4	2.1
130543	None - New	Baribeau Creek North	HCVA	New	High Value Habitat (Grizzly Bears) Intact Watershed (Class 1 Intact watershed), Avalanche Paths	1613.8	628.3	0.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130550	None - New	Baribeau Creek	HCVA	New	High Value Habitat (Grizzly Bears), Avalanche Paths	272.1	260.1	220.0
130560	3143	Tower Creek	EF	Existing	Intact Watershed (Intact watershed), Old and Mature Stands (Old growth Sx and Cw), Whitebark Pine	3948.7	1657.8	10.8
130570	3144	Upper Redding Creek Fisheries	HCVA	Existing	High Value Habitat (Bull Trout Spawning), Western White Pine	62.8	59.1	31.2
130580	3145	Baker Creek	EF	Existing	Old and Mature Stands (Old Growth Cw and Hw)	207.8	190.8	27.4
130590	3146	Sawyer Face	EF	Existing	Old and Mature Stands (Old Growth Cw and Hw)	660.3	583.4	126.9
130600	3147	Lapointe Face	HCVA	Existing	Old and Mature Stands (Old Growth Cw and Hw)	167.9	152.7	53.1
130610	None - New	North Lapointe Grizzly Bear Pass	EF	New	High Value Habitat (Grizzly Bears) Connectivity (pass to West Kootenay)	235.2	117.0	0.0
130620	3148a	Calamity/ Coppery Creek	EF	Modified	High Value Habitat (Grizzly Bears) Intact Watershed (Intact Watersheds), Old and Mature Stands (Old Growth Cw and Hw) Whitebark Pine, Alpine Larch	8632.1	2912.9	119.9
140160	3148b	Upper West Fork	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	25742.8	11725.1	828.8
130640	3148c	Vulcan Creek	EF	Existing	High Value Habitat (Grizzly Bear, Mountain Goats), Old and Mature Stands (Old Growth Cw and Hw) Whitebark Pine, Alpine Larch, Intact Watershed (Intact watersheds)	2260.6	632.8	33.9
130650	3149	Pyramid Creek	EF	Existing	High Value Habitat (Grizzly Bear, Mountain Goats), Old and Mature Stands (Old Growth Cw and Hw) Whitebark Pine, Alpine Larch Intact Watershed (Intact watersheds)	2465.0	877.1	0.7
130661	3150a	Upper St. Mary/ Redding Creek	HCVA	Existing	Old and Mature Stands (Old Growth Riparian Stands), High Value Habitat (fish, mountain goat licks, Class 2 Ungulate Winter Range for Moose)	2644.5	1245.5	455.5
130662	3150b	Lower St. Mary/ Matthew Creek	HCVA	Existing	Old and Mature Stands (Old Growth Riparian Stands), High Value Habitat (fish, mountain goat licks, Class 2 Ungulate Winter Range for Moose)	1189.3	844.8	310.3

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130663	3150c	Lower St. Mary	HCVA	Existing	Old and Mature Stands (Old Growth Riparian Stands), High Value Habitat (fish, mountain goat licks, Class 2 Ungulate Winter Range for Moose)	88.7	82.2	41.8
130664	3150d	Perry Creek North	HCVA	Existing	Old and Mature Stands (Old Growth Riparian Stands), High Value Habitat (fish, mountain goat licks, Class 2 Ungulate Winter Range for Moose)	257.7	188.9	51.2
130665	3150d	Perry Creek South	HCVA	Existing	Old and Mature Stands (Old Growth Riparian Stands), High Value Habitat (fish, mountain goat licks, Class 2 Ungulate Winter Range for Moose)	2.7	0.0	0.0
130670	3151	Kimberley Nature Park	HCVA	Existing	Old and Mature Stands (High quality Old Growth Management Areas) High Value Habitat (Class 1 and 2 Ungulate Winter Range), WISA habitat	1134.7	997.0	656.0
130680	3152	Saugum Lake	HCVA	Existing	High Value Habitat (Class 1 and 2 Ungulate Winter Range), Old and Mature stands (Old Growth Fd and Lw), Great Blue Heron	6302.5	4334.8	3618.2
130690	None - New Polygon	Sunken Creek Pass	EF	New	Intact Watershed (Intact valley) Connectivity (Important pass into the Rockies for wildlife)	1708.2	669.2	0.0
130701	3157a	Upper Mather Wetlands Central	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose) Connectivity (wildlife travel corridors along wetlands)	206.6	152.4	92.7
130702	3157b	Upper Mather Wetlands South	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose), Connectivity (wildlife travel corridors along wetlands)	100.2	38.8	16.0
130703	3157c	Upper Mather Wetlands West	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose), Connectivity (wildlife travel corridors along wetlands)	55.7	22.5	5.1
130704	3157d	Upper Mather Wetlands East 1	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose) Connectivity (wildlife travel corridors along wetlands)	44.0	28.0	0.9

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
130705	3157d	Upper Mather Wetlands East Polygon 2	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose), Connectivity (wildlife travel corridors along wetlands)	1.9	1.9	0.0
130706	3157d	Upper Mather Wetlands East Polygon 3	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose), Connectivity (wildlife travel corridors along wetlands)	4.9	2.9	1.9
130707	3157e	Houle Creek Wetlands	HCVA	Modified	Wetlands, High Value Habitat (Ungulate Winter Range for Moose), Connectivity (wildlife travel corridors along wetlands)	308.9	195.0	112.9
130231-130240	3110	Alexander	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	5432.7	428.3	347.1
130221-130228	3109c	Deadman Pass	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	1176.7	376.9	241.4
130340	3123	Fenn Creek	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	7056.7	4127.0	397.8
130241-130251	3112	Hosmer	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	7952.3	3413.4	1376.4
130390	None – new	Mid Quinn	HCVA-GB	New	High Value Habitat (Grizzly Bears)	4453.1	2091.7	952.8
130261-130269	3113	Morrisey	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	5556.4	1213.1	352.3
130201-130206	3109a	North Fork Pass	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	896.9	529.7	333.6
130211-130215	3109b	Race Horse Pass	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	818.1	429.2	241.7
130710	3148d	St. Mary's	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	22604.6	6896.0	1395.3
130160	3155	Upper Bull	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	14403.9	4002.3	963.9
130630	None - new	Upper Dewar	HCVA-GB	New	High Value Habitat (Grizzly Bears)	177.7	152.8	114.7
130051-130058	3104	Upper Elk	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	435.2	365.5	283.0
130380	None - new	Upper Goat Creek/ North Galbraith	HCVA-GB	New	High Value Habitat (Grizzly Bears)	1528.4	447.2	31.7

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
Kootenay Lake TSA FL A20212 HCVAs								
140011	4101a	Cold Creek OGMA Polygon 1	HCVA	Existing	Old and Mature Forest	270.1	259.1	40.6
140012	4101b	Cold Creek OGMA Polygon 2	HCVA	Existing	Old and Mature Forest	183.3	178.8	29.8
140013	4101c	Cold Creek OGMA Polygon 3	HCVA	Existing	Old and Mature Forest	495.4	456.3	52.1
140020	4102	Little Moyie Grasslands	HCVA	Existing	Mid Elevation Grasslands, Western White Pine	718.1	596.9	88.1
140030	4103	Smuggler's Wetland	HCVA	Existing	Wetlands	17.1	15.5	14.0
140040	4104	Mission Creek Old Growth Cedar Hemlock	HCVA	Existing	Old and Mature Forest	103.4	98.1	74.2
140050	4105	Mission Creek West	HCVA	Existing	Old and Mature Forest	176.9	174.0	70.0
140060	4106	Little Moyie Old Growth Cw/Hw	HCVA	Existing	Old and Mature Forest	253.2	241.2	36.3
140070	4107	Little Moyie Wetlands	HCVA	Modified	Wetlands	147.9	135.7	34.0
140080	4108	Upper Russell Creek	HCVA	Existing	Old and Mature Forest	1377.7	128.5	82.0
140151	4112a	Upper Kidd Cw 1	HCVA	Existing	Old and Mature Forest	615.0	533.3	149.7
140152	4112b	Upper Kidd Cw 2	HCVA	Existing	Old and Mature Forest	245.5	239.7	20.3
140110	4109c	Border	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	2821.7	2344.2	1449.2
140091-140098	4109a	Kitchener	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	9740.1	6264.3	5693.0
140140	4110c	Meachen/Redding	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	98486.8	60055.4	7318.6
140130	4110b	Skelly	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	17148.8	9936.2	3279.6
140120	4110a	South Purcell	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	58224.4	46081.2	11240.8
140101-140107	4109b	Yahk	HCVA-GB	Existing	High Value Habitat (Grizzly Bears)	21187.6	22185.3	18698.3

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
Invermere TSA Radium HCVAs								
150010	2501	Upper Mitchell Tributary	HCVA-R	Modified	Intact watershed (subwatershed) High Value Habitat (Grizzly Bears)	885.9	180.8	0.0
150020	2502	Assiniboine Creek	HCVA-R	Modified	Intact watershed (subwatershed) High Value Habitat (Grizzly Bears) Wetlands	1517.2	328.9	2.8
150030	2503	Mitchell River/Magnesite Creek	HCVA	Existing	Old and Mature Forest (Good and Moderate Old Growth Management Areas), Broadleaf Trees, Avalanche Tracks, High Value Habitat (Grizzly Habitat), Connectivity (pass to Cross River)	13209.1	4607.9	766.3
150040	2504	Magnesite Creek Upper Tributary	HCVA	Modified	Old and Mature Forest (ESSF Old Growth Management Areas), Intact Watersheds (unroaded areaz), Connectivity (two passes),	1415.6	437.3	0.0
150050	2505	Lower Mitchell and Mid-Lower Cross	HCVA	Existing	Old and Mature Forest (Excellent and Good Old Growth Management Areas), Riparian, Connectivity, High Value Habitat (Fish)	827.2	517.9	235.5
150060	2506	White Man Pass	HCVA	Modified	Old and Mature Forest (Excellent and Good Old Growth Management Areas), Intact Watershed (Intact portion of upper sub-basin), Connectivity (regional- continental connectivity), Riparian, High Value Habitat (Grizzly Bear Movement)	356.9	301.4	133.8
150070	2507	Leman Lake Pass	HCVA	Modified	Old and Mature Forest (Excellent and Good Old Growth Management Areas), Alpine Larch, Connectivity (Regional Continental), Riparian, High Value Habitat (Grizzly Bear)	395.1	296.9	177.7
150080	2508	Miller Pass	HCVA	Modified	Connectivity (North-South regional connectivity within the central Rocky Mountains)	510.0	454.9	342.9
150091	2509a	Albert River Cedars Polygon 1	HCVA	Modified	Old and Mature Forest (ICHmk1 Excellent/Good/Moderate Old Growth Management Areas), Riparian	400.9	342.3	207.5
150092	2509b	Albert River Cedars Polygon 2	HCVA	Existing	Old and Mature Forest (ICHmk1 Excellent/Good/Moderate Old Growth Management Areas), Riparian	14.9	13.6	10.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
150093	2509c	Albert River Cedars Polygon 3	HCVA	Existing	Old and Mature Forest (ICHmk1 Excellent/Good/Moderate Old Growth Management Areas), Riparian	27.9	26.6	8.1
150094	2509d	Albert River Cedars Polygon 4	HCVA	Existing	Old and Mature Forest (ICHmk1 Excellent/Good/Moderate Old Growth Management Areas), Riparian	202.8	176.9	61.3
150095	2509e	Albert River Cedars Polygon 5	HCVA	Existing	Old and Mature Forest (ICHmk1 Excellent/Good/Moderate Old Growth Management Areas), Riparian	25.4	25.3	5.7
150100	2510	Shag Creek Albert Ridge Old Growth	HCVA	Modified	Old and Mature Forest (Excellent/Good Old Growth Management Areas)	317.0	266.8	113.1
150110	2511	Shag Creek	TBD	Existing	Old forest (ESSF/ ICH; E/G/ Old Growth Management Area); intact watershed; support area for Height of the Rockies PA, high value grizzly habitat.	1875.9	1032.4	309.6
150120	2512	Northwest Miller Grizzly Bear	HCVA	Existing	High Value Habitat (Grizzly Bears) Old and Mature Forests (Excellent and Good Old Growth Management Area), Veteran Trees (Lw), Alpine Larch, Whitebark Pine, Intact Watersheds	14968.6	6658.6	1373.6
150130	2513	Palliser Grizzly Bear	HCVA	Modified	High Value Habitat (Grizzly Bear), Alpine Larch, Whitebark Pine, Old and Mature Forest (Excellent and Moderate Old Growth Management Area), Intact Watersheds (Intact upper watersheds), Fisheries Sensitive Watershed	2969.5	1297.8	64.5
150140	2514	Mid Kootenay River Valley bottom	HCVA	Modified	Mature and Old Forest, Wetlands Riparian, High Quality Habitat (moose)	4633.1	4019.3	3318.4
150150	2515	Ridge and Basins north of Bear Creek	HCVA	Existing	High Value Habitat (Grizzly Bear), Old and Mature Forest, Veteran Trees (Lw), Whitebark Pine Alpine Larch, Intact Watersheds	5884.8	3917.7	376.0
150160	2516	Bear Creek	HCVA-R	Existing	Old and Mature Forest, Wetlands, High Elevation Grasslands, High Value Habitat (Grizzly Bears), Intact Watershed (relatively intact valley)	2965.3	1773.7	135.9

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
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150170	2517	Ridge North of Mary Anne Creek	HCVA	Existing	High Value Habitat (Grizzly Bears), Whitebark Pine, Broadleaf Trees Intact Watersheds, Old and Mature Forests	11104.3	5460.3	167.4
150180	2518	Mary Anne Creek	HCVA	Existing	Old and Mature Forests (Cedar Hemlock), Intact Watersheds (sub watershed)	2203.3	1167.1	444.1
150190	2519	White River	HCVA	Existing	Old and Mature Forest, Riparian Connectivity (regional)	559.5	494.4	461.4
150200	2520	Lower Jack Creeks	HCVA	Existing	Old and Mature Forest, Riparian	774.2	717.6	539.5
150210	2521	Upper Jack Creeks	HCVA-R	Modified	Old and Mature Forest, Intact Watersheds, High Value Habitat (Mountain Goat)Old forest (MS and ESSF; E/G/M/L Old Growth Management Area); relatively intact watersheds; riparian types; mountain goat.	3740.0	2661.2	209.4
150220	2522	Middle White River Riparian	HCVA	Modified	Old and Mature Forest, Riparian High Value Habitat (Bull Trout Spawning)	727.1	496.5	216.3
150230	2523	Kotsats Creek	HCVA-R	Modified	Old and Mature Forest, Intact Watersheds, High Value Habitat (Mountain Goat)	3127.0	1304.6	7.2
150240	2525	Premier Ridge	HCVA	Existing	High Value Habitat (Class 1 and 2 Ungulate Winter Range, fish), Veteran Trees, Riparian	3273.0	2288.0	1189.0
150250	2530	Lower Findlay Polygon 4	HCVA	Modified	High Value Habitat (Ungulate Winter Range Class 1 and 2),	862.5	300.8	149.2
150260	2531	Thorald Creek East	TBD	Existing	Rare old forest PI leading (ESSF and MS; G/M Old Growth Management Areas); The Pa and La leading stands are now covered in the caribou GAR which reduced this in size.	1044.3	720.4	232.5
150270	2532	Lower Brewer Creek	HCVA	Existing	Old and Mature Forest, Veteran Trees, Riparian	1075.3	1004.8	665.8
150280	2533	Upper Brewer Creek	HCVA-R	Existing	Old and Mature Forest, Wetlands Intact Watersheds (subwatersheds, e.g. Laundry), High Value Habitat (Grizzly Bear, Moose and Mountain Goat), Avalanche Paths	5380.4	1850.5	76.3
150290	2534	Mineral Creek	HCVA-R	Modified	Old and Mature Forest, Intact Watershed, High Value Habitat (Grizzly Bear), Connectivity (extends Purcell Wilderness Conservancy)	4891.6	1180.5	3.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
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150300	2535	Coppercrown Creek	HCVA-R	Modified	Old and Mature Forest, Intact Watershed, High Value Habitat (Grizzly Bear), Connectivity (extends Purcell Wilderness Conservancy)	2465.5	627.6	2.5
150310	2536	Stark Creek	HCVA	Modified	Old and Mature Forest, Intact Watershed, High Value Habitat (Grizzly Bear), Connectivity (extends Purcell Wilderness Conservancy)	182.8	172.5	82.3
150320	2536a	Upper Stark Creek	HCVA-R	Modified	Old and Mature Forest, Intact Watershed, High Value Habitat (Grizzly Bear), Connectivity (extends Purcell Wilderness Conservancy)	1061.4	309.4	7.3
150330	2537	Jumbo Creek Riparian	HCVA	Modified	High Value Habitat (Grizzly Bear) Riparian	543.2	343.1	165.1
150341	2538a	Jumbo Creek Grizzly Bear & Old Growth Polygon 1	HCVA-R	Existing	High Value Habitat (Grizzly Bear Mountain, Goat), Avalanche Paths Intact Watershed, Old and Mature Forest	671.1	131.2	0.0
150342	2538b	Jumbo Creek Grizzly Bear & Old Growth Polygon 2	HCVA-R	Modified	High Value Habitat (Grizzly Bear Mountain, Goat), Avalanche Paths Intact Watershed, Old and Mature Forest	1334.2	224.2	0.0
150343	2538c	Jumbo Creek Grizzly Bear & Old Growth Polygon 3	HCVA-R	Modified	High Value Habitat (Grizzly Bear Mountain, Goat), Avalanche Paths Intact Watershed, Old and Mature Forest	1789.5	406.1	5.8
150344	2538d	Jumbo Creek Grizzly Bear & Old Growth Polygon 4	HCVA-R	Existing	High Value Habitat (Grizzly Bear Mountain, Goat), Avalanche Paths Intact Watershed, Old and Mature Forest	2240.3	208.5	39.7
150350	2539	Upper Farnham Creek	HCVA-R	Modified	Old and Mature Forest Intact Watershed (relatively intact)	3439.4	337.4	16.6
150360	2540	Farnham Creek Riparian	HCVA	Modified	Old and Mature Forest	179.2	98.9	17.7
150370	2541	Lake of the Hanging Glacier	HCVA-R	Existing	Old and Mature Forest, Intact Watersheds (small intact subwatersheds), Wetlands	9414.8	841.8	16.0
150380	2542	Upper Horsethief Polygon 1	HCVA	Existing	High Value Habitat (Grizzly Bear, Wolverine, Mountain Goat), Veteran Trees, Broadleaf Trees, Connectivity (with Stockdale Creek)	2012.2	999.2	459.9
150390	2542a	Upper Horsethief Polygon 2	HCVA-R	Existing	High Value Habitat (Grizzly Bear, Wolverine, Mountain Goat), Veteran Trees, Broadleaf Trees, Connectivity (with Stockdale Creek)	758.7	130.7	0.0

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
150400	2543	Stockdale Creek	HCVA-R	Existing	Old and Mature Forest, Intact watershed (subwatershed), High Value Habitat (Grizzly Bear), Connectivity (Low Elevation pass to the West Kootenays)	11514.9	1516.9	233.6
150411	2544a	Horsethief Wetlands Polygon 1	HCVA	Existing	Wetlands, Riparian, High Value Habitat (Moose and Grizzly Bear, Westslope Cutthroat Trout spawning, Class 2 Ungulate Winter Range), Broadleaf Trees	336.5	269.7	144.3
150412	2544b	Horsethief Wetlands Polygon 2	HCVA	Existing	Wetlands, Riparian, High Value Habitat (Moose and Grizzly Bear, Westslope Cutthroat Trout spawning, Class 2 Ungulate Winter Range), Broadleaf Trees	816.7	347.9	64.4
150420	2546	Windermere Creek	HCVA	Existing	High Value Habitat (Kokanee spawning, Ungulate Winter Range)	105.8	2.5	0.0
150430	2547	Irish Creek	HCVA-R	Existing	Old and Mature Forest Intact Watershed (subwatershed)	1340.4	127.8	0.1
150440	2548	Forster Wetlands	HCVA	Existing	Wetlands, Riparian, High Value Habitat (Moose, Grizzly Bear, Fisheries downstream), Old and Mature Forest, Veteran Trees	249.6	203.5	2.8
150451	2549a	Frances Creek Riparian Polygon 1	HCVA	Existing	Riparian	44.6	24.5	6.4
150452	2549b	Frances Creek Riparian Polygon 2	HCVA	Existing	Riparian	79.8	69.9	32.2
150453	2549c	Frances Creek Riparian Polygon 3	HCVA	Existing	Riparian	63.4	39.8	0.0
150460	2550	Cartwright Lakes	HCVA	Existing	Old and Mature Forest, Veteran Trees, Broadleaf Trees, Wetlands Intact Watersheds (subdrainages)	8517.6	7219.7	5996.4
150470	2551	Upper Septet Creek	HCVA-R	Existing	High Value Habitat (Grizzly Bear) Intact Watersheds	3109.9	630.6	163.5
150480	2552	Chalice Creek	HCVA-R	Existing	High Value Habitat (Grizzly Bear) Intact Watersheds	1021.0	163.5	0.0
150490	2553	Rocky Point Creek	HCVA-R	Existing	High Value Habitat (Grizzly Bear) Intact Watersheds	1915.3	320.3	26.9

HCVA ID	Previous ID	HCVA Name	HCVA Category	Status	HCVs	Area (ha, not additive)		
						Total	CFLB	THLB
150500	2554	Upper Kane Creek	HCVA-R	Existing	High Value Habitat (Grizzly Bear) Intact Watersheds	2430.1	329.6	41.7
150510	2555	Upper Bugaboo Creek	HCVA	Modified	High Value Habitat (Grizzly Bear), Veteran Trees, Broadleaf Trees, Old and Mature Forest, Wetland Riparian, Intact Watersheds (Intact subdrainages)	10603.3	4462.1	1786.3
150520	2556	Lower Bugaboo Creek Riparian	HCVA	Modified	Broadleaf Trees, Wetlands Riparian, Intact Watersheds (intact subdrainages)	603.8	510.6	242.7
150531	2557a	Columbia Wetlands Polygon 1	HCVA	Modified	Wetlands, Broadleaf Trees Riparian, High Value Habitat (Ungulate Winter Range)	13552.1	793.6	12.9
150532	2557b	Columbia Wetlands Polygon 2	HCVA	Existing	Wetlands, Broadleaf Trees Riparian, High Value Habitat (Ungulate Winter Range)	1557.9	51.2	20.3
150540	None - New	Fraling Creek	HCVA-R	New	Connectivity (Pass into the Rockies from the Columbia Valley), Intact Watershed, High Value Habitat (Mountain Goat and Bighorn Sheep)	3254.1	1561.9	414.4
150550	None - New	Diana Lake Pinnacle Creek	HCVA-R	New	Connectivity (Pass into Rockies),	1178.6	220.3	3.6

4.0 MANAGEMENT STRATEGY DEVELOPMENT

4.1 Risk Assessment Methodology and the Precautionary Principle

Management strategies for HCV Areas are intended to maintain or restore identified HCVs and associated HCV Areas. The FSC Standard requires that these strategies use a precautionary approach. This means that, *when available information indicates management activities pose a threat of severe or irreversible damage to the environment or a threat to human welfare, the organization will take explicit and effective measures to prevent damage and avoid risks to welfare, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of environmental values are uncertain* (draft FSC Canada National Forest Standard, (D3-0) April 2018).

To assist in the development of management strategies, a risk assessment methodology was developed and applied to each HCV or associated conservation attribute (an element, structure, or process associated with an HCV that can be monitored and managed to ensure its persistence over time, BC-FSC Standard). In the context of the FSC-BC Regional standards, Environmental Risk Assessment (ERA) is a process for estimating the likelihood of an adverse outcome or event due to changes in environmental conditions resulting from management activities (FSC-BC 2005). A risk assessment does not presume to provide all environmental, social and economic information relevant to making decisions, nor is the approach intended to supplant other planning and management processes (FSC-BC 2005).

One approach to assessing risk is to define a baseline from which to evaluate deviations from. The 'Range of Natural Variability' is a commonly used baseline in western North America, based on the assumption that, the closer anthropogenic-created ecosystem patterns and processes resemble those historically created through natural disturbances, such as wildfire, the lower the risk to species and ecosystem functions. Conversely, the greater ecosystem patterns and processes deviate from natural ones, the higher the risk to species and ecosystems (Landres et al. 1999 and many others).

Although the Range of Natural Variability approach is useful in assessing the overall level of risk due to cumulative effects of anthropogenic change since European settlement, it does not isolate or identify the impact of current forestry management activities on HCVs. Further, it is difficult to establish quantitative range of natural variability baselines for many HCVs, because the data on pre-historic conditions simply does not exist for many species or ecosystems.

Thus, for the purpose of this exercise, which was to help inform management strategies, the risk assessment was based on a qualitative assessment of the likelihood of an adverse effect occurring to the HCV (and associated conservation attributes) as a result of current Canfor forestry management practices (both strategic and operational), and the consequence of that effect.

To assess the likelihood of forestry resulting in an adverse outcome, 3 main components were examined and an overall rating of low, moderate, or high was assigned as a result of all three combined:

- 1) Threats to the HCV – the main threats were documented, including the threats that forestry management practices pose, if any.
- 2) How widespread the HCV is relative to forestry practices – e.g., to determine how often the HCV comes in contact with forestry.
- 3) The current mitigation practices applied to the HCV and associated conservation attributes by Canfor, as a result of legislation and voluntary practice, if any.

It is important to note that both direct and indirect effects of forestry practices were assessed. For example, for mountain goat, which inhabits high, rocky terrain not directly affected by forestry, the impact of forestry roads and cutblocks on the goat population was considered, e.g. roads increase hunter access to goat habitat, thereby potentially increasing mortality rates; and cutblocks surrounding goat habitat can increase alternative prey such as deer and elk, which can in turn result in an increased level of predators such as wolves and cougars, resulting in increased predation on goats.

To assess the consequences of an adverse outcome of forestry practices on the HCV, 2 components were examined:

- 1) Current Condition of the HCV – Current condition was expressed as both short-term population trend (if known) and current population size relative to historic size (if known).
- 2) Sensitivity of the HCV – i.e., does the species have very low reproductive rates or suffer high natural mortality, or is an ecosystem highly resilient or highly sensitive to disturbance.

A similar rating of low, moderate, or high was assigned for the consequences. The impact of forestry practices were evaluated in the context of cumulative effects, e.g. given that the HCV may already be impacted by many other factors, and not forestry alone.

When determining ratings, the risk for both likelihood and consequence was considered at the scale of the HCV over the entire Canfor operating area in the East Kootenay, and not the scale of the individual breeding territory or stream reach. For example, when rating Bull Trout, the likelihood of an impact from Canfor forestry practices was considered in context of how widespread the species is, how often Canfor encounters streams in blocks and roads, and the current mitigation practices employed by Canfor. Similarly, the current condition of the trout population and its sensitivity were also considered over range of the population within the Canfor's operating area in the East Kootenay.

To obtain the final risk rating, the table below was used, which employed a precautionary approach in determining the rating. That is, if information was felt to be lacking about any of the components of the risk rating in terms of a potential forestry impact, the rating was increased one numerical step.

Consequence	Likelihood		
	Low (1)	Moderate (2)	High (3)
Low (1)	Very Low (1)	Low (2)	Moderate (3)
Moderate (2)	Low (2)	Moderate (4)	High (6)
High (3)	Moderate (3)	High (6)	Very High (9)

Results of the risk analysis are presented in the Tables with the HCV assessments (Appendices 4-10) and summarized in Table 8.

The risk rating was incorporated into the management strategies by:

- 1) applying more precautionary management strategies to HCVs that had a higher risk rating than to those with a lower risk rating, and,
- 2) by assigning SFMP management strategies to HCVs with a 'very low' risk rating, rather than designating HCV Areas and management strategies for them.

The original management strategies (developed by K. Stuart-Smith, together with relevant experts) have undergone review and revision so that they are consistent with this new HCVA assessment and to incorporate new information gained since they were originally developed, including that from the HCVF Effectiveness Monitoring.

Table 8. Results of the Risk Assessment of HCVs due to forestry activities.

High		
<ul style="list-style-type: none"> • Bull Trout • Westslope cutthroat trout • Rocky Mountain Tailed Frog • South Purcell Herd, Southern Mountain Caribou 	<ul style="list-style-type: none"> • Grizzly Bear • Wolverine • Northern Goshawk 	<ul style="list-style-type: none"> • High Value Snags • Old and Mature Forest • Low elevation passes between high elevation mountain ranges
Moderate		
<ul style="list-style-type: none"> • Rocky Mountain Sculpin • Kokanee • Fisheries Sensitive Watersheds • Flammulated Owl • Olive-sided Flycatcher 	<ul style="list-style-type: none"> • Williamson's Sapsucker • Northern Myotis • Little Brown Myotis • Mountain Goats • Western White Pine • Riparian • Ungulate migration routes from summer to winter range 	<ul style="list-style-type: none"> • Wetlands • Mid-elevation grasslands • Low elevation open range and open forest plant communities (PPdh/01, IDfdm2/04/Ff02)) • Rare ecosystems • Under-represented Ecosystems
Low		
<ul style="list-style-type: none"> • Coeur d'Alene Salamander • Western Toad • Broad-winged Hawk • Western Screech Owl • Great Blue Heron • Black Swift • Townsend's Big-eared Bat • Fisher • Whitebark Pine 	<ul style="list-style-type: none"> • Southern red-backed vole • Bighorn Sheep • Elk, White-tailed Deer, Mule Deer, Moose • Gillette's Checkerspot • Pygmy Slug and Sheathed Slug • Magnum Mantleslug • Other red and blue listed butterflies, dragonflies, damselflies, slugs and snails 	<ul style="list-style-type: none"> • Broadleaf Trees • Veteran Trees • High elevation Grasslands • Mid-elevation Grasslands • Riparian red and blue-listed plant communities • Low elevation grassland plant communities (02 and 03 site series) • Riparian red and blue listed plant communities in IDF/MS/ICH
Very Low		
<ul style="list-style-type: none"> • White Sturgeon • Burbot • Northern Leopard Frog • Painted Turtle • Western Skink • Northern Rubber Boa • Prairie Falcon • Peregrine Falcon • Swainson's Hawk • Long billed Curlew • Short-eared Owl • Common Nighthawk • Lewis's Woodpecker 	<ul style="list-style-type: none"> • Barn Swallow • Bank Swallow • American Bittern • Bobolink • Cassin's Finch • American Badger • Least Chipmunk, <i>oreocetes</i> subspecies • Red-tailed Chipmunk, <i>ruficaudus</i> subspecies • Sandhill Crane • Monarch • Vivid Dancer • Limber Pine • Spalding's Campion 	<ul style="list-style-type: none"> • Smooth Goosefoot • Giant Helleborine • Alkaline wing-nerved moss • Gastony's Cliff-brake • Southern maiden-hair fern • Alpine Larch • High elevation Grasslands • Migratory Concentrations of species • Elk Valley high elevation grassland plant communities • Alkaline and Marsh wetland red and blue-listed plant communities • Karst • Hot Springs

5.0 MONITORING

Since the initial HCVA assessment and designation, Canfor has monitored HCVAs and reported on the results annually. This monitoring has included:

- 1) Assessing the area of harvesting and length of road built within each HCVA, together with any other activities such as forest health flights, fall-and-burn treatments, or wildlife monitoring specific to individual HCVAs that Canfor was aware of (in HCVA Annual Reports),
- 2) Summarizing ecological/wildlife monitoring or research projects occurring in the East Kootenay and their results applicable to multiple HCVAs or HCVs, for example grizzly bear, caribou, and Williamson Sapsucker population surveys, or grassland Ecosystem Restoration monitoring data analyses (in HCVA Strategic Reports),
- 3) Developing and implementing a Canfor-specific field monitoring program to determine if the HCVA management strategies were being implemented in cutblocks within HCVAs, and if these strategies were effective in maintaining any HCVs present in those cutblocks (in HCVA Effectiveness Monitoring Reports).

The field program was implemented in collaboration with Wildsight for the first 2 years, and then with the Ktunaxa Nation for the last several years.

Results of the field monitoring were incorporated into the 2017 SFMP and associated strategies and Standard Work Procedures. In addition, they were presented to Canfor staff and consultants through annual spring training sessions, with particular focus placed on areas where improvements were required (e.g., erosion and sediment control).

With the change from the BC-FSC standard to the Canada-wide FSC standard expected in 2019, Canfor is re-assessing its monitoring program. Changes will be implemented concurrent with the implementation of the program to meet the new standard.



5.0 REFERENCES AND RELEVANT DOCUMENTS

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- Stuart-Smith, K. 2010. HCVF Assessment for the Upper Bull River, Mather Creek and Oke Creek areas.
- Tobacco Plains Cultural and Conservation Value Forests and their Management Strategies in Tembec's Operating Area in the East Kootenay, British Columbia. Final Report, January 2012.

Appendix 1. Summary of changes to the HCVFs between 2006 and 2017

Updates made to the HCVFs between 2006 and 2015, and the rationale for them, are summarized in Table 1. Most of these changes were largely considered ‘automatic’, since they involved new information on species-at-risk and the designation of new, legal, Wildlife Habitat Areas or ungulate winter ranges that the TAG automatically considered would become HCVFs. Minor linework changes to the HCVFs are not included in the table, because the TAG agreed that these did not constitute ‘changes’ unless they compromised the values for which the HCVF was originally designated. The HCVFs were originally drawn at a fairly large scale, and the boundaries were intended to be refined with field work through time.

Table 1. Summary of changes to the HCVFs between 2006 and 2017.

Year(s)	High Conservation Value(s)	Addition/Deletion/Replacement/Expansion	General Location	Comments
2008	Cultural and Conservation Value Forests (HCV 5 and 6) completed for the Lower Kootenay Band	Additions and Extensions, Overlap with existing HCVF	Kootenay Lake TSA and southern portion of Cranbrook TSA	From collaborative, consultative process.
2009	Mountain Caribou habitat for South Purcell and Central Selkirk sub-populations	Replacement and Addition – replaced some EFs and HCVFs, new additions in other areas.	Large area over Kootenay Lake, Cranbrook and Invermere TSA and TFL 14	Legalized under the Government Action Regulation for Ungulate Winter Ranges
2009	Grizzly Bear High Value Habitat and Linkage (Connectivity) Habitat	Replacement - Replaced interim HCVF linework with final linework, both sets from Dr. Proctor.	South Purcells, north of Highway 3/95	Based on final data analysis
2010	High Value Grizzly, Connectivity, low elevation pass, wetlands, riparian, HCV3	Additions	Upper Bull, Mather, and Oke Creeks	Assessments of new areas done as a result of new operating area added to the company’s tenure
2010	Bull Trout	Expansion – based on new data on Bull Trout spawning locations	Barnes Ranch HCVF in the Flathead River	New data from consultation with Montana Fish, Wildlife and Parks
2011	Grizzly Bear	Additions (13 separate polygons)	South Purcells, between Koocanusa and Highway 3/95	Legal GAR Order to protect threatened sub-population
2011	Williamson Sapsucker, Gillette’s Checkerspot, Western Screech Owl, Antelope-Brush/ Blue-bunch Wheatgrass and Douglas-fir/ Snowberry/Balsamroot plant communities	Additions – 40 new Wildlife Habitat Areas legally approved for these species or plant communities at risk.	Various	WHAs. Based on monitoring data and new data on these species.
2012	Cultural and Conservation Value Forests (HCV 5 and 6)	Additions and Extensions, Overlap with existing HCVF	Cranbrook TSA and southern portion of Invermere TSA	From collaborative, consultative process.

Year(s)	High Conservation Value(s)	Addition/Deletion/Replacement/Expansion	General Location	Comments
	completed for the Tobacco Plains and St. Mary's-Akisk'nuuk bands			
2012	Williamson Sapsucker Critical Habitat	Addition. Overlaps many existing WHAs	WISA Area of Occupancy	From Federal Recovery Plan
2014	Williamson Sapsucker, Gillette's Checkerspot, Western Screech Owl	Additions. 81 new WHAs representing habitat for species at risk.	Various locations.	Based on monitoring data and new data on these species.
2015-17	Tailed Frog Proposed Critical Habitat (finalized in 2017)	Additions as interim HCVFs, from proposed Federal Recovery Plan (finalized in 2017)	Flathead and Yahk drainages	Covers streams meeting habitat requirements within area of occupancy, in addition to already designated WHAs.

Appendix 2. HCVA Technical Advisory Group (TAG) Participants

Canfor

Kari Stuart-Smith, Senior Forest Scientist, PhD, RPBio, PBIOL.
Ian Johnson, Planning Forester, BSc., RPF

Wildsight

John Bergenske, Executive and Conservation Director
Dave Quinn, BSc.

Nature Trust British Columbia

Robert Neil

Nature Conservancy of Canada

Nancy Newhouse, MSc.

Ministry of Forests, Lands, and Natural Resource Operations

Peter Holmes, BSc. – retired 2017
Doug Martin – retired 2017
Mike Black, RPF (replaced by Steven Knowles partly through the process)

BC Timber Sales (Observer)

Sean Slimmon, RPF and Carolyn Beurskens, RPF (alternates)

Expert Specialists

Ted Antipheau (Species at Risk, MFLNRO) – retired 2014
Michael Proctor, PhD (Grizzly Bear Expert)
Erin Sexton, MSc., PhD Candidate (Research Associate, University of Montana)
Irene Teske, RPBio. (Mountain goat and bighorn sheep biologist, MFLNRO)
Herb Tepper, RPBio. (Fish biologist, MFLNRO)
Greg Utzig, P.Ag. (Kutenai Nature Investigations Ltd.)

Original TAG Members (2002-2006)

Tembec

Dr. Kari Stuart-Smith, PhD, RPBio.
Brian Dureski
Ken Streloff
Steven Temple, RPF
Joe Gnucci, RPF

Canfor

Vivian Jablanczy, RPF
Darren Tamelin, RPF

University of British Columbia

Ralph Wells, MRM (Master of Resource Management)

Wildsight/ForestEthics

Greg Utzig, P.Ag.

Dave Quinn

Nature Trust British Columbia

Robert Neil

Nature Conservancy of Canada

Robert Forbes

Ministry of the Environment

Peter Holmes

Expert Specialists

Dr. Clayton Apps, PhD (Grizzly Bear Expert)

Albert Chirico (Fisheries Expert, BC Ministry of Environment)

Dr. Bruce McLellan, PhD (Grizzly Bear Expert, Ministry of Forests Research Branch)

Dr. Michael Proctor, PhD (Grizzly Bear Expert)

Bill Westover (Fisheries Expert, BC Ministry of Environment, retired)

Appendix 3. Dates of TAG meetings

June 7, 2013

July 16, 2013

September 17, 2013

October 8, 2013

December 19 and 20, 2013

February 27 and 28, 2014

Meeting minutes available upon request

A presentation on the HCVA work was also given to the Canfor Public Advisory Group in January 2013 and on November 28, 2016. The presentations included information on basic management strategies, and feedback on the HCV Areas was received. These presentations are available upon request.

A field trip to HCV Area Findlay Larch was held in September 2018. Field trips are planned to the other outstanding HCV Areas not yet designated, once background field work has been completed.

Appendix 4. Endangered, threatened, rare and regional species of concern in the East Kootenay and the results of their HCV assessment by the TAG.

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
Fish												
White Sturgeon – Upper Kootenay River Population	Endangered under SARA (2006); Red-listed in BC	Inhabit deep lakes and large rivers; occur in the Kootenay River above Kootenay Lake. Individuals spawn in Kootenai River near Bonner’s Ferry, Idaho; do not spawn in Canada.	No short-term population trend given. Lower than historic.	Decline in BC seems to be linked to changes in the Kootenay River flow pattern due to construction of the Libby Dam, and pollution from industrial and mining developments. Poaching and past-overfishing also factors. Forestry a very minor factor if at all in population changes.	Riparian buffers, ECA calculations and practices to mitigate changes in water flow.	4	Low	Low	Very Low	n/a	No	No
Burbot (Ling Cod)	SARA n/a; Lower Kootenay pop’n red-listed; Upper Kootenay yellow-listed (secure)	Previously common in deep, cold waters of lakes, reservoirs, and large rivers. Lower Kootenai River population occurs in Kootenay Lake, with only the Goat River known to support spawning (in the dead of winter). The Upper Kootenay population is found in low numbers in Columbia, Windermere St. Mary’s, Moyie, and other smaller Lakes and the Columbia, Kootenay, and St. Mary’s Rivers. Spawns in winter under ice in main or side channels over fine gravel, silt, or cobbles.	The population has collapsed over the past 20 years, most likely due to over-fishing and introduction of non-native fish species (H.Tepper, Regional Habitat Fish Bio FLNRO, pers.comm.).	Over-fishing the current key threat, reason why the fishery was closed. Highly susceptible to over-fishing during spawning season in winter. Population unlikely to be significantly impacted by forestry, given species proclivity for large lakes and rivers which are not significantly impacted by forestry activities in mountainous terrain.	Riparian buffers, ECA calculations and mitigation practices.	4	Low	Low	Very Low	n/a	No	No
Westslope Cutthroat Trout, <i>lewisii</i> subspecies	Special Concern (2010); Blue-listed in BC	Widespread. Present in cool, clean, oxygenated water. In rivers, adults generally prefer large pools and low velocity areas. Adfluvial populations live in lakes and spawn in lake tributaries; fluvial populations live and grow in rivers and spawn in tributaries. Resident populations complete the entire life history in tributaries. All three life-history forms may occur in a single watershed. Migrants may spawn in the lower reaches of the same streams used by residents. Maturing adfluvial fishes move into the vicinity of tributaries in fall and winter and remain there until they begin to migrate upstream in spring and spawn in late spring/early summer. Of migratory spawners, some remain in tributaries during summer months but most return to the main river or lake soon after spawning.	No trends given on BC-CDC site. In the Elk Valley, the trend from the early 1980’s to present is increasing, as is average size, producing a world-class fishery (H.Tepper, pers.comm).	Genetic purity is a major concern; prioritize systems without hybridization with Rainbow trout (often above waterfalls). Particularly sensitive to over-fishing because they are easily caught. Forestry not thought to be a major factor in population changes, but has the potential to influence habitat through increased road densities which may increase fishing pressure and erosion into streams, and riparian buffers which can influence stream temperature in some lower elevation drainages.	Riparian buffers, ECA calculations and mitigation practices; erosion and sedimentation controls on crossings.	3	Moderate	High	High	HCVA for spawning and rearing locations; M for over-wintering, foraging	Spawning locations identified by Westover 2005; Weaver Report (2013) data, Detection and spawning sites in the Flathead from MT FWP.	Yes. Buffer spawning channels and points by 100 m on either side. Rate spawning areas and pure strain streams = 2, foraging and over-wintering =1.
Bull Trout	Not at Risk (Pacific population); Blue-listed	Widespread. Key spawning locations include Wigwam/Ram/Bighorn, Flathead, White, Skookumchuck, and Kootenay Rivers. More areas likely but not as well known. Requires cold water, particularly from upwelling zones.	Unknown. Overall the population, at least of large fish, is likely much lower than historic.	1) Over-fishing, historical years especially 2) Road density causing increased fishing pressure and increased erosion/ sedimentation. 3) Climate change, causing increases in water temperature and decreases in summer flow (lower snow pack). 4) Forestry not thought to be a major factor in population changes, but can influence habitat via increased road	Riparian buffers, ECA calculations and mitigation practices, erosion and sedimentation controls on crossings.	3	Moderate	High	High	HCVA for spawning and rearing locations; M for over-wintering, foraging	Spawning locations from Westover and in Flathead from Montana FWP	Yes. Buffer spawning channels by 100 m on either side Spawning areas = 2, foraging and over-wintering = 1.

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
				densities which may increase fishing pressure and erosion into streams, and riparian buffers which can influence stream temperature in some lower elevation drainages.								
Rocky Mountain Sculpin, <i>Cottus</i> species	Special Concern (2017); Blue-listed.	Flathead drainage only, lower 28 km.	Unknown.	Taxonomy not confirmed. Eastslope populations currently considered to be present only in Alberta.	Riparian buffers, ECA calculations and mitigation practices; erosion and sedimentation controls.	1	Moderate	Moderate	Moderate	M (riparian strategy)	Detection sites from Montana FWP	Not used in concentration analysis due to few points. These areas covered by BT and WSCT above.
Kokanee	Not listed or assessed. Species of regional importance.	Confirmed, widespread, particularly Kootenai reservoir and tribs, St., Mary’s River and tribs, and other local rivers. Key spawning streams largely known. These have important grizzly bear food and fisheries values.	Increasing. Not-native to the East Kootenay.	None significant.	Riparian buffers, ECA calculations and mitigation practices.	3	Low	Moderate	Moderate	HCVA for key spawning creeks	Spawning locations from Bill Westover (fishbuff.s hp);	Yes. Buffer spawning channels by 100 m on either side. Spawning = 2
Fisheries Sensitive Watersheds	Various fish species	One only currently designated is the Palliser watershed, above the confluence of the Pallier and the Albert, due to terrain instability. More watersheds are currently under consideration for designation. Unknown when government will release this information.	n/a	Erosion and sedimentation from road crossings; potential changes in timing and amount of flow due to harvesting/wildfire in the drainage.	Fisheries Sensitive Watershed requirements Riparian buffers, ECA calculations and mitigation practices	3	Low	High	Moderate	HCVA	Shape file from Approved Fisheries Sensitive Watershed website	F-4-001 Rating for main stem within the watershed = 2.
		<i>Amphibians and Reptiles</i>										
Coeur d’Alene Salamander	Special Concern; Yellow-listed	Confirmed at 3 locations in the EK. Restricted to cool, damp environments; springs or seeps, waterfalls, and edges of streams. Longest distance moved by a salamander in one fall season was 53m away from a waterfall.	Unknown, extent of species in Canada not known.	Run-of-the River projects that can alter hydrology, rock scaling, blasting, and spoil dumping, wood harvesting. Logging has the potential to negatively impact Coeur d’Alene Salamanders by removing overstory vegetation (thus increasing solar penetration to forest floor, affecting moisture regimes), altering ephemeral streams, rock seepages, and subsurface water (leading to desiccation of downslope habitats), and compaction of salamanders through equipment and/or slumping.	WHAs have been placed around all known breeding locations. Training for identification of suitable habitat and procedures for when this is encountered.	1	Low	Moderate	Low	HCVA for WHAs	Shape file of approved WHAs, MOE website	Yes, use WHAs. Rating = 2 for all WHAs.
Western Toad	Special Concern (2018); Yellow-listed	Thought to be widespread, occurs in a wide variety of habitat types, but highest densities occur near wetlands and moist riparian areas.	Thought to be decreasing in the East Kootenay (CDC website)	Habitat loss, fragmentation, and road mortality as the result of transportation and service corridors, invasive and other problematic species and genes (e.g. disease), logging, pollution, and climate change.	Riparian buffers, Road rehab to prevent creation of short term-standing water.	3	Moderate	Low	Low	M for wetlands and small ponds (riparian strategy)	Only 11 breeding locations available, no systematic survey data.	No

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
				Western toads are considered to be relatively tolerant of logging. The major impact from forest harvesting is considered to be the potential for the creation of breeding ponds in clearcuts that act as population sinks due to short hydroperiods.								
Rocky Mountain Tailed Frog	Threatened (SARA), Threatened (COSEWIC); Blue-listed (BC)	Confirmed in two main watersheds in EK (Yahk, Flathead). Breeding and habitat areas well-known, WHA around all known breeding streams; recent field work revealed new locations in Elder and Elmer Cr., and upper Teepee; WHA proposed.	Unknown, total population size in both populations is unknown.	Logging related impacts include loss of riparian forest cover (leading to hotter, drier conditions, and removal of dispersal sites and refugia), changes in peak flow regimes. Pollution from agricultural and forestry effluents that cause increased sedimentation of streams, fire and fire suppression.	All known or potential habitat is either WHA or Critical Habitat. All being managed with riparian buffers, sedimentation controls.	1	Moderate	High	High	HCVA for WHAs and Federal Critical Habitat	Proposed and Approved WHAs, Critical Habitat from ECCC	Yes, WHAs = 2. Other detections = 1.
Northern Leopard Frog	Endangered; Red-listed	Was extirpated; reintroduced to Bummers Flats and the Columbia Wetlands (also Duck Lake, out of study area). Currently managed by Ducks Unlimited, and the Nature Trust of Canada.	Decreasing in Creston (Duck Lake), unknown in Bummer’s Flats and Columbia Wetlands.	Threats include invasive and other problematic species and genes, and modifications to natural systems. Forestry is not considered to be a main threat (according to the Federal Recovery Strategy).	Mgmt strategies for Critical Habitat	4	Low	Low	Very Low	HCVA for Critical Habitat	Critical Habitat available from ECCC.	No
Painted Turtle Intermountain Rocky Mountain Population	Special Concern; Blue-listed	Confirmed in many small lakes in the trench. Locally abundant and confined to low elevation lakes and wetlands.	Unknown, thought to be declining.	Transportation and service corridors, residential development, agriculture and aquaculture, biological resource use, human intrusions, disturbance, and natural systems modifications. Forestry is not considered to be a main threat (according to the Provincial Management Plan), as habitat is generally not targeted for harvest.	Riparian buffers, protect connectivity between nearby known breeding sites.	1	Low	Low	Very Low	M for wetlands (riparian strategy)	Yes, sighting locations available from the CDC	No
Western Skink	Special Concern; Blue-listed	Only confirmed sighting near Moyie Prov. Park, some sightings in KLFD. Habitat includes chaparral, grasslands, pinyon-juniper woodlands, open pine or pine-oak woodlands, and rocky areas near streams.	Unknown, no studies to estimate population trends, habitat quality continues to decline in areas with human development.	Significant threats include habitat loss due to residential, commercial, and agricultural development. Forestry is not considered to be a main threat (according to Federal Management Plan).	Report sightings to CDC.	4	Low	Low	Very Low	M – consult FLNRO for mgmt around confirmed sightings.	Yes, sighting locations available from the CDC	No
Northern Rubber Boa	Special Concern; Yellow-listed	Confirmed, known sites include Radium Hot Springs, Lazy Lake, Kimberley Nature Park, Eager Hills, and the grasslands near Wycliffe. Thought to occur primarily in open woodlands, forest clearings, grassy savannas, and generally not far from water.	Short term trend is unknown. Long term decline (1800s to present) appears to be 30-70% due to corresponding habitat loss.	Threats include habitat loss and fragmentation due to housing developments, roads, and transport corridors. Forestry is not considered to be a main threat (according to the Provincial Management Plan).	Report sightings to CDC.	4	Low	Low	Very Low	M – consult FLNRO for mgmt around confirmed sightings.	Yes, sighting locations available from the CDC	No
		Birds										
Prairie Falcon	Not at Risk; Red-listed	Confirmed sightings during breeding season, however only one active nest in BC in 2016 and 2017 (near William’s Lake).	Short term (2000-2015) trend indicates a decline of 70-90% in BC. Long term (1900-2015)	Main threats include habitat loss, fragmentation and degradation due to agricultural practices, urban sprawl,	Report sightings to CDC, manage	4	Low	Low	Very Low	M – consult FLNRO for	Yes, Breeding locations	No

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
		No known breeding sites in the East Kootenay (cliffs).	trend indicates a decline of >80% in BC. No EK specific data. Has always been rare in the province.	rural development, as well as limited number of suitable nesting sites (and corresponding interspecific competition for those sites). Repeated, low flying helicopters also thought to contribute to nest abandonment. Forestry not considered to be a threat.	on a case by case basis.					mgmt around confirmed sightings.	available from the CDC	
Peregrine Falcon, <i>anatum</i> ssp.	Special Concern; Red-listed	Confirmed breeding sites in East Kootenay. Nest on rock cliffs above lakes or river valleys where abundant prey is nearby.	Short term trend indicates that there has been a relatively stable increase (<25%) in BC. Long term trend (since 1900s) indicates a decline of 70-90%.	Main threats are related to development of areas below nesting sites or recreational use of cliffs. DDT is still in use within Peregrine Falcon winter range. Forestry not considered to be a main threat.	Report sightings to CDC, manage on a case by case basis.	4	Low	Low	Very Low	M – consult FLNRO for mgmt around confirmed sightings.	Yes, Breeding locations available from the CDC	No
Broad-winged Hawk	Not assessed; Blue-listed	Three confirmed breeding locations mapped in BC, one of which was near Spillimacheen (2002, TFL 14). Prefers broadleaf and dense mixedwood forests. Very rare in the Canfor DFA.	Short term trend increase >10% in BC. Long term trend increase >25% in BC.	Threats suspected to be low based on natural resource management information. Extensive land clearing may threaten habitat integrity at a local scale.	Reserve known nests sites and deciduous stands, protect mixedwood. Stick Nest Guide.	1	Low	Moderate	Low	M	Yes, Breeding locations available from the CDC	No
Swainson’s Hawk	Not assessed; Red-listed	One possible breeding location in the Rocky Mountain Trench. Prefers Savanna, pine-oak woodland and cultivated lands with scattered trees.	Unknown, thought to be declining.	Main threats include shooting and pesticide use in winter range, loss of grassland habitat to urban sprawl and agriculture, pesticide use leading to reduction in prey abundance, forest encroachment into grasslands. Forestry not considered to be a main threat as habitat is not generally targeted for harvest.	Report sightings to CDC, manage on a case by case basis.	1	Low	Low	Very Low	M if encountered	Yes, Breeding locations available from the CDC (shows no overlap with EK).	No
Long billed Curlew	Special Concern; Blue-listed	Confirmed breeding from several locations in the Rocky Mountain Trench. Breeds in prairies and grassy meadows, generally near water. Known breeding areas are protected in WHAs.	Short term trend (2005-2015) indicates that populations are relatively stable, and increasing (change of <10%) Long term trend (1966-2015) also indicates populations are stable.	Main threats includes habitat loss due to urban, rural, and agricultural development of grasslands, and forest encroachment due to fire suppression. Forestry is not considered to be a main threat as habitat is not generally targeted for harvest.	Follow GWMs for WHAs. Logging will enhance habitat, mostly not targeted.	1	Low	Low	Very Low	HCVA for WHAs	Approved WHAs, MOE website	Yes, WHAs. Rating = 2.
Short-eared Owl	Special Concern; Blue-listed	Sightings at Bummers Flats, lower Premier Ridge area. Could not be confirmed during systematic surveys in 2003. No confirmed breeding areas in the East Kootenay. Requires broad expanses of open land with low vegetation for foraging and nesting. In BC, usually breeds below 1000 m.	Decreasing since the 1970s in BC.	Main threats include habitat loss and fragmentation due to urbanization and intensive agriculture. Forestry not considered to be a main threat as habitat is not generally targeted for harvest.	Ecosystem Restoration BMPs. Report sightings to CDC, manage on a case by case basis.	4	Low	Low	Very Low	M- if encountered, Ecosystem restoration should enhance habitat	Yes, Breeding locations available from the CDC (no overlap with EK).	No
Western Screech Owl, <i>macfarlani</i> subspecies	Endangered (recommended threatened in 2012); Red-listed	Confirmed – systematic surveys. Breeds in riparian areas of Gold Creek, lower Kootenay River and Flathead River, and one in the Lodgepole Creek area. WHAs established around all known and suspected breeding locations.	Stable (according to 2012 COSEWIC Assessment)	Main threats from habitat loss, degradation, and fragmentation, as well as predation from Barred Owls, and road kill. Logging has the potential to impact WSOW habitat by removing suitable	Follow GWMs for WHAs, protect Legislated WHFs. Most breeding habitat lies within riparian reserves.	2	Low	Moderate	Low	HCVA for WHAs and M for Ac (riparian strategy)	Approved WHAs, MOE website	Yes, WHAs. Rating = 2.

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				nest trees (large, mature trees with cavities, near riparian areas) and foraging area near riparian.								
Flammulated Owl	Special Concern; Blue-listed	Confirmed – systematic surveys. Some breeding areas known (WHAs established) but surveys are old. Breed in open montane conifer forests, where Ponderosa pine is present, and dense foliage is present for roosting.	Unknown, total population estimates in BC continue to increase as more areas are surveyed.	Main threats include timber harvest in older Douglas-fir/Ponderosa Pine stands (which has the potential to remove available nest trees), firewood cutting, danger tree removal, wildfire suppression, predation by Barred owls.	Follow GWMs for WHAs, protect Legislated WHFs., High Value Snag SWP	2	Moderate	Moderate	Moderate	HCVA for WHAs and M (Trench Restoration strategy, Legislated WHF guidance)	Approved WHAs, MOE website	Yes, WHAs. Rating = 2.
Common Nighthawk	Threatened; Yellow-listed	Confirmed from public sightings – no systematic surveys. Few known nesting locations in the study area, mostly in the trench between Windermere and Radium. Combination of dry open uplands near wetlands or riparian appears to provide good habitat	Short term trend (1997 – 2007) indicates an overall decline of 65% in BC. Long term trend (1968-2007) indicates a decline of up to 84%.	Main threats include the reduced availability of insect prey, fire suppression, loss of breeding habitat. Logging has the potential for short term impacts on nesting nighthawks by disrupting breeding activities, but in general will benefit the species by creating more open habitat.	Open Range and Open Forest BMPs, Migratory Bird SWP	3	Low	Low	Very Low	M (Trench Restoration BMPs, migratory bird SWP)	No. Known nesting locations could be available through CBFWCP	No
Lewis’s Woodpecker	Threatened; blue-listed	Confirmed - systematic surveys. Most current breeding areas in EK are known and are established WHAs. Breeds in open forest and woodland areas and in riparian areas.	Short term trend (1970-2012) in BC indicates a 28% decline. Long term trend not available. Trends based on BBS routes which may not be representative of the entire population.	Main threats are loss or alteration of habitat, including the removal of dead and dying trees for firewood, human safety, aesthetic, or other reasons. Future western pine beetle outbreaks may destroy or limit the number of available nest trees. Logging generally improves habitat for the species as long as high value snags are retained	GWMs for WHAs, Legislated WHFs, High Value Snag SWP	1	Low	Low	Very Low	HCVA for WHAs and M (Trench Restoration BMPs, Legislated WHF guidance)	WHAs, MOE website	Yes - Approved WHAs, rating = 2; Buffer nest locations by 100 m – rating = 1
Olive-sided Flycatcher	Threatened (Recommended Special Concern by COSEWIC in 2018); Blue-listed, rare (IUCN)	Confirmed; widespread and fairly common in suitable habitat. Most nesting sites contain snags, which are used for singing and nesting. Usually nests near water.	Short term trend (1997-2007) in BC shows a slight decline (0.5% annually). Long term trend (1868-2007) indicates declines between 50-90% in BC.	Main threats include reduced availability of insect prey, fire suppression, deforestation and land conversion in nonbreeding habitat, forest harvesting and silviculture, energy and mining exploration and extraction, and residential and commercial development. Logging has the potential to impact Olive-sided flycatchers by removing suitable habitat and by disturbing nests during the breeding season, but may be beneficial if snags or residual trees are retained to provide habitat for nesting and perching, especially in cutblocks near wetlands or streams. Unsure if nests in cutblocks act as ecological traps due to increased predation.	Species of Management concern SWP, migratory bird SWP. Riparian SWP, high value snag SWP.	3	Moderate	Moderate	Moderate	M	No	No
Barn Swallow	Threatened (2017); Blue-listed	Confirmed; occurs in low elevation grasslands with appropriate structures for breeding, and agricultural areas near water.	Short term trend (1986-2006) indicates a decline of 59% in Canada. Long term trends not assessed, though aerial insectivores are	Threats are: loss of nesting and foraging habitat as the result of agriculture, large scale declines in insect populations, direct and indirect mortality from climate perturbations	(Information to mill managers re nests on mill buildings)	4	Low	Low	Very Low	n/a	No	No

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			declining as a group, likely due to climate change.	on breeding grounds (i.e. cold snaps). Other threats include interspecific competition for nesting sites, parasitism, loss of foraging habitat along migration routes, and pesticides. Forestry is not considered to be a threat as habitat is not generally targeted for harvest. Bridge removals or replacements could impact specific nesting areas if not completed outside the breeding season.								
Bank Swallow	Threatened (2017); Yellow-listed	Confirmed; nests in natural stream banks, hoodoos, some steep road cuts, quarries with sand or silty substrates.	Short term trend in BC (1968-1993) has not indicated a net change in numbers. Long term trends not available.	The main threat is considered to be cumulative effects from several sources. Threats include loss of foraging and breeding habitat (in particular through erosion control measures), climate change, and large-scale declines in insect populations due to climate change.	Migratory Bird Strategy (info to road-and bridge builders re nests)	4	Low	Low	Very Low	n/a	No; but some key nesting areas locally known by naturalists . Not areas targeted by forestry.	No
Williamson’s Sapsucker	Endangered; red-listed	Confirmed; roughly 50 nest sites found in the East Kootenay. Inventory in EK has defined area of occupancy and breeding sites. WHAs located around all known nest sites and critical habitat also defined around each known or probable breeding site. BMPs for area of occupancy developed by FLNRO.	Unknown, Long-term monitoring surveys only established in 2012. Population thought to be lower than historical.	Wildfire (severe), commercial logging (leading to loss of breeding and foraging habitat), danger tree removal (loss of potential nest trees), salvage logging, firewood collection, nestling mortality due to removal of nest trees during the breeding season, urbanization, mining and petroleum exploration, climate change, road construction, recreational activities, and pesticide use.	WHAs around known and probable nest sites with associated legal measures; BMPs applied within WISA Area of Occupancy and Critical Habitat.	2	Moderate	Moderate	Moderate	HCVA for WHAs and Critical Habitat. M for the Area of Occupancy, and Legislated WHFs	Approved WHAs from FLNRO, nest locations and Critical Habitat from ECCC	Yes. Approved and proposed WHAs. Rating = 2. Nest locations rating = 1.
American Bittern	Not assessed; Blue-listed	Confirmed. All areas with > 1-2 pairs are within Wildlife Management Areas (e.g., Bummers Flats, Columbia wetlands). Breeds in large freshwater and brackish marshes (>10 ha), including lake and pond edges with abundant emergent vegetation. Also occurs in areas with dense herbaceous cover, such as shrubby marshes, bogs, wet meadows, and rarely hayfields.	Short term trend (1966-2007) indicates a 1.9% decline per annum in BC. Long term trends not available.	Main threats include loss of habitat (as the results of draining wetlands), and pesticides. Forestry is not considered to be a main threat as habitat is not targeted for harvest.	Riparian buffers, Riparian SWP	4	Low	Low	Very Low	Riparian Strategy for cover around wetlands	No	No
Great Blue Heron, <i>herodius</i> subspecies	Not assessed; Blue-listed	Confirmed. Constructs stick nets in colonies (rookeries) in stands with large trees near water. Many rookery locations known, most protected as WHAs (except those on private land). Herons appear to be moving away from water as Bald Eagle predation becomes significant.	Short term trends in BC (2002-2012) indicate population trends are variable, with overall numbers in interior BC apparently stable. Long term trends (since the 1900s) indicate modest increases (>25%).	Main threats include predation by Bald Eagles, human disturbance, and habitat declines due to rural development. Forestry is not considered to be a main threLowat as their habitat is not generally targeted for harvest.	WHAs around all known and suspected nests,	1	Low	Moderate	Low	HCVA for rookeries. M for Legislated WHFs	Approved WHAs from MOE website; known rookery sites from	WHAs rating = 2; buffer rookery locations by 200 m (due to multiple nests). Rating = 2 (due to rarity)

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											Machmer report	
Black Swift	Recommended for Endangered (COSEWIC 2015); Blue-listed	Known from various valley bottom areas (eBird) and areas with canyons (Kootenay National Park). Breeds on moist canyon and cliff faces, usually in proximity to waterfalls.	Short term trends (1970-2012) in BC indicate a decline of >50%. Long term trends not available.	Largely unknown but believed to be airborne pollutants (that reduce aerial insect food availability) and climate change, which changes the timing of insect food availability for chicks.	Riparian SWP	4	Low	Low	Very Low	n/a	No	No
Bobolink	Threatened (2017); Blue-listed	A few known breeding locations, probable breeding locations (according to Breeding Bird Atlas) near Cranbrook in the Rocky Mountain Trench in agricultural fields. Breeds in tall grass, flooded meadows, and prairies. No overlap with forestry.	Short term trends in BC unknown, but considered to be decreasing Long term trends also unknown.	Main threats considered to be habitat loss due to urbanization, and conversion from grass species to alfalfa in fields. Pesticides are also considered a threat (as they reduce available prey). Forestry is not considered to be a main threat as habitat is not targeted for harvest.	n/a. Forestry does not occur within its habitat in EK.	4	Low	Low	Very Low	n/a	Yes, some breeding locations available from the CDC	No
Cassin’s Finch	Not assessed; Yellow-listed;	Confirmed breeding sites in the EK (near Kimberley and Elko). Prefers dry, relatively open areas (ponderosa Pine, Douglas-fir forests, or riparian woodlands), at low to moderately high elevations in interior valleys. Habitat is often human-influenced (56%).	Breeding Bird Atlas survey data suggests the population increased at 2% from 1968 to 1993 in interior BC.	Threats have not been formally assessed. Selective logging and small clearcuts may improve breeding habitat for this species. Logging during the breeding season could be considered a minor threat.	Migratory Bird SWP, Ecosystem Restoration BMPs	4	Low	Low	Very Low	n/a	No	No
		Mammals										
Northern Myotis	Endangered; Blue-listed	Distribution uncertain; could be widespread or just a few locations. Species associated with old-growth (>100 yrs old); relies on intact interior forest habitat, with a high percentage of old trees, uneven forest structure, single and multiple tree fall gaps, snags, and woody debris. Roosts in mature trees or snags with cracks in bark, hibernates in caves, mines, and tunnels.	Unknown, considered to be decreasing in BC.	The greatest threat for this species is considered to be White-nose Syndrome (COSEWIC Report). Other threats include wind turbines, colony eradication due to public health concerns, and other disturbances. Logging has the potential to impact this species through the removal of foraging and roosting sites. This is considered a minor threat.	Legislated WHFs (bat hibernacula and nursery roosts). Report sick or dead bats. OGMA strategy, High Value Snag Strategy, Riparian buffers, WTPs	3 or 4?	Moderate	Moderate	Moderate	M – Legislated WHFs (hibernacula and nursery roosts)	No. No sightings in EK from CDC. No Habitat suitability mapping	No
Little Brown Myotis	Endangered; Yellow-listed	Confirmed, thought to occur in all Regions in BC, though sighting locations not available in CDC website. Relies on riparian areas for foraging, roosts in man-made structures, caves, and hollow trees.	Considered to be decreasing in BC.	The greatest threat considered to be White-nose Syndrome (COSEWIC Report). Other threats include wind turbines, colony eradication due to public health concerns, and other disturbances.	Protect Legislated WHFs (bat hibernacula and nursery roosts). Report sick or dead bats. High Value Snag Strategy, Riparian buffers, WTPs	3	Moderate	Moderate	Moderate	M - Legislated WHFs (hibernacula and nursery roosts)	No	No
Townsend’s Big-eared Bat	Not assessed, Blue-listed	Thought to occur in most MOE regions in BC, except for the Peace, Skeena, and Omineca. One known roost in EK is buildings on private land. Occurs in mesic habitat characterized by coniferous and deciduous forests. Maternity and hibernation colonies typically are in caves and mine tunnels, occasionally in	Unknown, inadequate sampling hampers ability to establish trends for BC.	The greatest threat to this species is human disturbance of maternity roosts and hibernacula. Other threats include pesticide use, which reduces prey (moth) availability. Forestry is not considered to be a main threat as habitat is not generally targeted for harvest.	Legislated WHFs (bat hibernacula and nursery roosts). Report sick or dead bats.	4	Low	Moderate	Low	No	No. No sightings in EK from CDC. No Habitat suitability mapping	No

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		buildings. Has not been found to roost in trees in BC.										
American Badger	Endangered; Red-listed	Confirmed, nearly 1400 sightings in the Rocky Mountain Trench to date, and nearly 200 sightings in the Elk Valley. Radio telemetry data also available. In BC prefers grasslands and fields or open canopied forests.	Short term trends (previous ten years) indicate a decline, with the exception of the EK, which indicates a stable or increasing population. Long term trends indicate a provincial decline >70%.	Majority of mortality due to road-kill on highways, persecution by humans, forest-ingrowth causing loss of habitat for prey (ground squirrels). Logging considered beneficial since it creates habitat for prey.	Areas of concentrated dens in WHAs; dens protected by legislated WHFs and Canfor SWP for dens.	3	Low	Low	Very Low	HCVA for WHAs, M for Legislated WHFs (dens)	Approved WHAs from FLNRO, High value habitat from Kinley et al (2013) model.	Yes. Approved WHAs (rating = 2) and high/very high value habitat. Rate very high = 2, high = 1. Buffer burrows by 50 m and rating =1
Woodland Caribou Southern Mountain Population, Southern Group (S. Purcells, C. Selkirks sub-populations)	Threatened (recommended Endangered by COSEWIC 2014; Red-listed).	Confirmed. High value and connectivity habitat mapped as UWR order (BC), Critical Habitat mapped for High/Low elevation habitat, and Matrix habitat (wolf density management zone; ECCC).	Short and Long term trends show significant population declines (>40%, COSEWIC Report). Current (2018) South Purcell herd numbers 4 individuals.	Main threats include: altered predator/prey dynamics due to habitat change resulting from forest harvest in adjacent low elevation valley bottoms, climate change leading to increased populations of deer and elk, increased predator populations (decreased wolf and bear persecution by humans) and increased predator efficiency from using trails created by snowmobiling and heli-skiing allowing access into caribou habitat.	Caribou UWR Order, Canfor Caribou SWP for Critical habitat areas, OGMAs.	2	Moderate	High	High	HCVA (EF) M – Critical Habitat	FLNRO website. Critical Habitat available through ECCC. Radio collar data.	Yes. Rating = 2 for entire area.
Grizzly Bear	Special Concern (2018); Blue-listed	Confirmed, broad distribution. Grizzly bears are habitat generalists, and habitat associations vary seasonally (reflecting local food availability). In the EK, high value habitat and connectivity corridors have been identified as HCVFs by expert bear biologists.	Short term trend (since 1990) for BC indicate a stable population, with possible declines in southern BC (and Alberta and parts of the Yukon). Long term trends not available.	Main threats include human caused mortality, habitat conversion, human activity (leading to a loss of habitat effectiveness), and habitat fragmentation. High road density is considered a major threat.	GWMs for GAR Order in South Purcells, Riparian buffers, seasonal restrictions on timing of harvest, OGMAs, Avalanche Path SWP	3	Moderate	High	High	HCVA for high value habitat (including WHA #4-180) and connectivity polygons; M for avalanche tracks and riparian areas with key grizzly foods	Yes. Existing HCVF high value grizzly and grizzly connectivity; avalanche track rating; B. McLellan’s bear points for Flathead.	Due to broad coverage of grizzly habitat, use only the avalanche tracks in the concentration analysis. Rating = 2 for high value or high/moderate value tracks, 1 for moderate value.
Wolverine	Special Concern (2018); Blue-listed	Confirmed, harvest records throughout the East Kootenay. Wolverines use a wide variety of forested and tundra vegetation associations. Prey on snowshoe hare and scavenge carcasses of ungulates. Reproduce where snow cover persists until at least April.	Population trends rely on harvest records, and are therefore unreliable (expected high proportion of unreported harvests). Concern that populations in BC and parts of Alberta are declining due to declines in Mountain Caribou.	Main threats considered to be overharvest by trapping, habitat loss and fragmentation due to forestry, agriculture, oil and gas development, hydroelectric reservoirs, and roads. Functional habitat loss dues to recreational activities, climate change, and decreases in prey are also considered to be threats.	Maintain intact watersheds.	3	Moderate	High	High	An objective in appropriate HCVA/EFs	Intact drainages Weaver capability and connectivity mapping in a portion of	No

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											the study area.	
Fisher	Not assessed; Blue-listed	Extirpated then re-introduced in EK. Occasional sightings and trapping, mainly along Gold Creek. Fisher inhabit upland and lowland forests, primarily in dense coniferous or mixedwood forests. Riparian areas likely important habitat. Den in tree hollows (cottonwoods or large snags), under logs or in a rocky crevice.	Short term trends indicate declines between 10-50% over their range in BC. Long term declines estimated to be 25-50% due to habitat loss.	Main threats are considered to be trapping, habitat loss as a result of hydro-electric development and forestry.	OGMA SWP, High Value Snag SWP, Riparian SWP, WTPs	2	Low	Moderate	Low	M (riparian and snag strategies)	No	No
Least Chipmunk, <i>Oreocetes</i> subspecies	Not assessed; Blue	Confirmed. Sightings reported throughout the Eastern portion of the EK operating area.	Unknown.	Threats not formally assessed. Forestry not considered to be a main threat as habitat (alpine tundra, alpine talus) is not targeted for harvest.	n/a	4	Low	Low	Very Low	n/a	No	No
Least Chipmunk, <i>Selkirki</i> subspecies	Not assessed; Red-listed	Confirmed – Paradise Mine. Restricted to alpine and sub-alpine habitats in the Central Purcell mountains	Unknown, likely stable.	Possible threats include future mining activity. Forestry is not considered to be a main threat as habitat (alpine tundra, alpine talus) is not generally targeted for harvest.	n/a	4	Low	Low	Very Low	n/a	No	n/a
Red-tailed Chipmunk, <i>ruficaudus</i> subspecies	Not assessed; Red-listed; endemic to BC	Confirmed on east side of Flathead valley from US border north to Middle Pass. Inhabits open areas and early successional stages in Sub-alpine habitat, between 1750 and 1900 m.	Unknown.	Threats not formally assessed. Forestry is not considered to be a main threat as habitat (alpine tundra, alpine talus) is not generally targeted for harvest.	n/a	4	Low	Low	Very Low	n/a	No	n/a
Southern red-backed vole, <i>galei</i> subspecies	Not assessed, Blue;	Confirmed, unknown locations, based on unknown studies. Subspecies designation not confirmed. Inhabits moist and riparian conifer forests.	Unknown.	Moist and Riparian conifer forests. Understory retention assists in species habitat use in cutblocks.	Riparian buffers, CWD SWP, OGMA's, OGMA SWP.	3	Low	Moderate	Low	M	No	No
Mountain Goats	Not assessed; Blue-listed. BC has high responsibility for this species globally.	Confirmed. Inhabits alpine and subalpine areas throughout the East Kootenay.	Surveys from 2013-2015 indicate populations in the Rockies, Purcells and Selkirks have changed since 2004-2008 with 24% of the units having higher adult numbers, 12% stable, and 64% lower adult numbers (Poole 2015). Many declines were >30%. Long term trends are unknown, though thought to be decreasing due to overharvest in the 1960s and early 1970s.	Cumulative effects are considered significant for this species. Threats include human intrusions and disturbance, mining, helicopters, timber harvest within winter range, increased predator and hunter access. Increased predator numbers are thought to play a role in recent declines.	UWR Order; Legislated WHFs (Licks and Wallows), access management controls in key areas.	3	Moderate	Moderate	Moderate	HCVA for significant licks, M for winter range (UWR strategy)	Canfor/M OE ungulate lick database from Kari and Irene Teske	Yes. Goat licks = 2; buffer points by 100 m.
Bighorn Sheep	Not assessed; Blue-listed	Confirmed. Inhabit mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, and river canyons. Suitable escape terrain very important for this species. Winter range mapped for sheep through UWR order for the Cranbrook and Invermere TSAs.	Short term trends (over the past 18 years) indicate a province wide decline of 10-30%. Long term trends estimate a decline of 30-70% throughout their range since 1900. This species is prone to periodic severe die-offs (every 20-25 yrs), due partly due to pneumonia from contact with domestic sheep.	Primary threats are habitat loss, degradation and fragmentation, livestock ranching, and harassment by the public. Key amongst these is pneumonia from contact with domestic sheep.	WHFs (significant Licks and Wallows) protected, access management controls in key areas.	2	Low	Moderate	Low	HCVA for high priority winter ranges, M for remainder of winter range (UWR strategy)	winter range mapping FLNRO;; GPS location data from Elk Valley Sheep Project (Teske)	Yes. Winter ranges rating = 2

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		<i>Vertebrate Species of Regional Concern</i>										
elk, moose, white-tailed deer, mule deer	Not assessed; yellow	Confirmed; widespread for all species.	Elk: Decreased by nearly 50% in the EK since their high in the 1980’s, due to targeted reduction by FLNRO. Moose – decreasing in some areas, stable in others. White-tail: declining, but much higher than historic. Mule deer, increasing since large decline due to severe winter 1996/97.	Populations largely impacted by hunting and severe winters. Decreasing winter forage due to forest ingrowth and invasive plants. Forestry can remove forage for mule deer (old trees with lichen) and cover for all species; soil disturbance associated with forestry practices can lead to invasive plant establishment.	UWR order, Ecosystem Restoration BMPs, OGMAs, riparian buffers	3	Low	Moderate	Low	HCVA for high priority winter ranges, M for remainder of winter range	FLNRO UWR mapping	Yes. In the RM District, Class 1 for any species = 2, Class 2 for any species= 1. In KLD, forage areas = 2.
Northern Goshawk (<i>atricapillus supspecies</i>)	Not assessed; Blue-listed	Confirmed. Over 65 breeding areas known in the EK as of 2018. For breeding prefers larger areas of mature forests with closed canopy, and large trees for building nests.	Short term and long term trends not known.	The main threat to Northern goshawks in the EK is thought to be habitat loss. Commercial logging often targets suitable breeding habitat for Northern Goshawks. Climate change also a threat in some regions (changes in black fly distribution); West Nile virus may also be a threat.	Buffer known nest sites as per BMPs, seasonal restrictions, OGMAs	2	High	Moderate	High	M for breeding areas	Canfor wildlife features database	Yes. Buffer nest locations by 400 m
Sandhill Crane	Not assessed; yellow	Confirmed. Few breeding locations in the EK, Columbia wetlands, wetlands near Wasa (private land), Cherry Cr. Wetlands (Bummers Flats). Breeding habitat includes open grasslands, marshes, marshy edges of lakes and ponds, and river banks. Recent sightings suggest population is increasing.	Short term trends (1980-2007) and local sightings suggest populations are increasing. Long term trend (since the 1800s) indicate a decline of 30-70% in BC.	Threats to Sandhill cranes include predation, disease, climate conditions, and habitat loss. Logging typically does not occur near breeding areas in the EK.	Riparian buffers around large wetlands in lowlands	1	Low	Low	Very Low	M – Avoid activities near known nest sites during the breeding season.	None	N/a
		<i>Invertebrates</i>										
Gillette’s Checkerspot	Not assessed; Red-listed	Limited distribution. Known from 10 sites; all WHAs.	Short-term relatively stable. Long-term <30%.	Restricted distributions; heavy livestock grazing, ingestion of eggs by cattle, trampling and compaction. Logging creates temporary open habitat, but can remove roosting trees	WHAs with associated GWMs.	2	Low	Moderate	Low	HCVA for WHAs	WHAs	Yes. WHAs = 2.
Monarch	Recommended for Endangered by COSEWIC (2016); Blue	Confirmed but very rare. Closely associated with Milkweed. Monarchs have been observed throughout southern BC, with the earliest records from 1914. Both current and historic element occurrences include Cranbrook. Monarchs migrate north into low elevation areas of southern BC. Many hobbyists are able to rear Monarchs in captivity on garden milkweed plants, and release these adults into the wild in areas not usually within the range of the species thus making it difficult to determine a legitimate element occurrence for the species.	Unknown.	Not listed.	Ecosystem Representation SWP, Ecosystem Restoration BMPs	3	Low	Low	Very Low	M (ecosystem representation, ecosystem restoration)	No	No
Vivid Dancer	Recommended for Special Concern; Blue-listed	Confirmed. Associated with cool or hot springs (Fairmont, Dewar, Ram); which are all in ecological reserves	Unknown.	Not listed.	Ecosystem Representation SWP,	1	Low	Low	Very Low	n/a	No	No (no specific digital data of hotsprings)

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
Pygmy Slug and Sheathed Slug	Recommended as SC by COSEWIC (2016); Both red listed.	Both confirmed. Pygmy slug endemic to Idaho panhandle, central Kootenay. One detection of pygmy slug in riparian area of Hawkins Creek (cottonwood riparian). BC represents the northern distribution. Sheathed slug inhabits riparian areas.	Unknown. No trend data for either, but declines are suspected for Sheathed.	Not listed for Pygmy. For Sheathed, include logging, drought, and flood events (climate change).	Ecosystem Representation SWP, Riparian SWP	1	Low	Low	Low (rated this rather than very low due to uncertainty)Very Low	M	From MOE slug report (Ostevitch)	No.
Magnum Mantleslug	Recommended for Special Concern; Blue	Confirmed. Known sites made available to Canfor. Only one known site on crown land. Spotty occurrences and low densities within a relatively small range. Prefers cool, very moist, coniferous forests in SE BC.	Unknown	Logging, mining, recreation, mountain pine beetle, rural and urban development, wildfire, and climate change.	Ecosystem Representation SWP, Riparian SWP	1	Low	Low	Low (rated this rather than very low due to uncertainty)Low	HCVA at known sites if in THLB	From MOE slug report (Ostevitch)	No.
Other red and blue listed butterflies, dragonflies damselflies, slugs and snails (see Canfor species database)	Not assessed; Red or Blue	Listing usually based on one or very few sightings at restricted locations (e.g., Bummer’s Flats, alpine, hot springs). Very little information about these species, no digital data for sightings or habitat. Many butterfly species/subspecies that are found on the prairies with occasional rarities near the Alberta border	Unknown	Sites not typically impacted by forestry.	Ecosystem Representation SWP, Riparian SWP, WTP SWP	1	Low	Low	Low (rated this rather than very low due to uncertainty)	M (ecosystem representation, riparian and other strategies in combination)	No	No
		<i>Plants</i>										
Whitebark Pine	Endangered; Blue-listed	Confirmed. Widespread at high elevations. Important food source for grizzly; often associated with good caribou habitat. Incidence and severity of blister rust decreases from south to north, and from east to west. Thus, TFL14 has some low rates of infection compared to the Flathead.			Whitebark Pine SWP	3	Low	Moderate	Low	HCVA/EF for significant sites in THLB; M for other sites	VRI data, Pa extraction s from Ralph. Proposed Critical Habitat available from ECCC	Yes. For TFL 14, if Pa > 60 % rating = 2, if Pa < 60 % rating = 1 (Greg’s calculation). For rest of the area, if Pa> 30 % rating= 1 (from Ralph).
Limber Pine	Recommended as Endangered (COSEWIC 2012); Red-listed	Confirmed. Occurs near AB border on dry, windswept sites.			Whitebark Pine SWP	2	Low	Low	Very Low	HCVA for any significant sites in THLB; M for other sites	No Limber pine occurs in the VRI. No known mapping.	No
Western White Pine	Near Threatened (Rare, IUCN)	Confirmed. Occurs in St. Mary’s valley, Kootenay Lake TSA, Fernie area				3	Moderate	Moderate	Moderate	HCVA for any significant sites, M otherwise	VRI data	VRI extraction.
Spalding’s Champion	Endangered; Red	Confirmed. Highly localized. Roosville (private) and Tobacco Plains Reserve.				1	Low	Low	Very Low	n/a – Not in Canfor operating area	No	No

HCV 1 – Endangered, Threatened, and Rare Species												
Species	Conservation Status ^a (SARA; BC)	Presence and Location in East Kootenay ^b	Current Condition of the Population (Stable, increasing, or decreasing)	Threats ^b	Canfor Applicable Mitigation Practices	Habitat Class ^c	Likelihood of Adverse impact from Forestry ^d	Consequence of adverse impact from Forestry ^d	Overall Risk from Forestry Practices ^d	HCVA and/or SFMP Mgmt (M)	Digital Data Avail-able?	Use in Concentrations of Biodiversity Values Analysis? ^e
Smooth Goosefoot	Threatened, Red	Confirmed. Only mapped location in EK at Wasa Lake, northeast shore (in the park)				4	Low	Low	Very Low	n/a	No	No
Giant Helleborine	Special Concern, Blue	Confirmed. Radium and Fairmont Hot Springs				1	Low	Low	Very Low	Within the Parks or on private land	No	No
Alkaline wing-nerved moss	Threatened; Red	Confirmed. Three locations near Canal Flats		Alkaline lakes, main threat trampling by cattle		1	Low	Low	Very Low	n/a	No	No
Gastony’s Cliff-brake	Not assessed, Blue, G2G3	Confirmed. Locations on east side of Columbia Lake					Low	Low	Very Low	Within Wildlife Management Area (HCVA)	No	No
Southern maiden-hair fern	Endangered, Red	Confirmed. Only present at Fairmont Hot Springs			n/a	1	Low	Low	Very Low	n/a	No	No
Other red and blue-listed plants in EK	Have not been assessed by COSEWIC or SARA.	Confirmed. Usually based on one or very few sightings, and restricted to specific habitats like hot springs, or dry open slopes. Very often they are prairie species that occasionally occur close to the continental divide.		These plants are either not impacted by forestry, or will be addressed through red-listed plants communities and/or SFMP strategies and SWPs.	Ecosystem Representation SWP, Riparian buffers and SWP, Ecosystem Restoration SWP, etc.	1	Unknown	Unknown	Unknown	M	No	No

^a Conservation Status as of October 22, 2018. SARA = Canada’s federal Species at Risk Act. BC CDC = BC Conservation Data Center, using the Species and Ecosystem Explorer website.

^b Presence and Location in East Kootenay, and Threats – Taken from Conservation Status report on the species from the Species and Ecosystem Explorer website, augmented by local knowledge from the TAG.

^c Habitat Class: 1 – Point or line location that remains spatially stable (e.g., Tailed Frog stream), 2 – point that moves around within a restricted area (e.g., WISA nest), 3 – wide-ranging or widespread (e.g., grizzly habitat), 4 – Not significantly impacted by forestry (e.g., Bobolink). HCVF and Management Strategies were only considered for species rated 1 through 3.

^d See the Management Strategy Development section for an explanation of the risk rating system used

^e The Concentration of Values analysis required numerical values be assigned to different data types. A rating= ’1’ was assigned to species detection sites or nest sites. A rating = ‘2’ was assigned to high or very high value habitat, WHAs, and spawning or pure-strain streams.

Appendix 5. High Conservation Values in BC Category 1, excluding Species-At-Risk, including habitat elements, endemism, concentrations of vertebrates, and old and mature forest.

HCV	Rationale	HCV # (BC)	Threats in EK	Current Condition	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequenc e of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Areas and/or Management Strategies (M)	Where data is derived from	Use in Concentration Analysis?
Broadleaf Trees	Support high species diversity	1.3	Drought, severe wildfire, silviculture brushing, climate change (increasing drought and severe wildfire)	Unknown relative to historic. Deciduous trees are relatively uncommon in the EK, except in riparian zones.	Mature trees generally left as retention, not targeted for timber harvest in EK. Brushing does not target deciduous except when over-topping the crop tree.	Low	Moderate	Low	HCV Area where contributes to high concentrations of biodiversity values; M otherwise	Either from the VRI or from the Columbia basin hardwood project (Jamieson).	Yes. Rating = 3 if Ac > 60%; Rating = 2 if Ep or At is > 60 %, or if Ac> 30 %, or if there is more than 1 species of hardwood present, Rating = 1 if hardwoods are > 30 % and < 60 %
Veteran Trees	Support high species diversity, nest and denning sites, future high value snags	1.3	Logging, Firewood cutting, mining, road-building, climate change (drought), severe wildfire	Unknown. Very likely lower densities than historic.	Veteran trees typically left as retention within blocks; WTP SWP.	Low	Moderate	Low	HCV Area where contributes to high concentrations of biodiversity values; M otherwise	VRI - Ralph’s extraction vets (layer "V", Fd, Lw, Py and AC _≥ 7 - 121 years) for Cran; old stands with Vets outside OGMA’s for Inv. Need to derive from VRI for TFL if we want this variable.	Yes. Stands with vets have rating = 1.
High Value Snags	Support high species diversity, nest and denning sites	1.3	Logging, Firewood cutting, mining, road-building,	Unknown. Very Likely lower densities than historic.	High Value Snag SWP	Moderate	High	High	Mgmt strategies; lack of precision in data does not permit otherwise.	No good digital data. Use OGMA’s and Vets as substitute.	No. No data except in areas being laid out.
Riparian	Supports high species diversity, importance may increase with climate change	1.3	Logging, Clearing for rural and urban development and agriculture, severe flooding, changing flow regimes due to climate change.	Unknown. Likely has been impacted by threats.	Riparian SWP, Riparian buffers in FSP	Moderate	Moderate	Moderate	HCV Area where contributes to high concentrations of biodiversity values; M otherwise	Use data from Wells 2004,. Uncommon hygric and uncommon sub-Hygric plus the riparian and wetland areas from TEM.	Yes. Uncommon sub-hygric and hygric both get a rating = 1.
Wetlands	Supports high species diversity, importance may increase with climate change	1.3	Ranching (cattle), motorized recreation, climate change, urban and rural development, lack of wildfire (growing in)	Declining for wetlands in trench (highly impacted); others unknown.	Riparian SWP, Riparian legal buffers in FSP	Moderate	Moderate	Moderate	HCV Area where contributes to high concentrations of biodiversity values; M otherwise	Use both the 1:50,000 watershed atlas and the 1:20,000 watershed atlas (TRIM), since each has slightly different areas mapped.	Yes. Rating = 2 for all wetlands.
Old and Mature forest	Supports high species diversity,	1.3, 2.3	Logging, urban and rural development, severe and more frequent	Declining in some BEC variants,	Old and Mature legal targets, Old and Mature SWP,	Moderate	High	High	HCV Area where contributes to high concentrations of	Use the FSP OGMA/MMA layer that Canfor is currently using, as modified	Yes. OGMA = 2, excellent OGMA = 2, good OGMA = 1

HCV	Rationale	HCV # (BC)	Threats in EK	Current Condition	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Areas and/or Management Strategies (M)	Where data is derived from	Use in Concentration Analysis?
	becoming rare in some BEC variants		wildfire and droughts associated with climate change	Increasing in others, depending on location in the EK and scale of analysis.					biodiversity values and where are rare due to human activities; M otherwise	by OGMA deletions and recruitments, plus the excellent and good OGMA's from the ranked files in Invermere and the TFL and Sx leading stands Age class 9 and Height Class 4.	
Alpine Larch	Endemic species	1.2, 1.3,	Severe and more frequent wildfire and droughts associated with climate change	Stable?	n/a. Not targeted by logging operations.	Low	Low	Very Low	HCV Area for significant stands where it contributes to concentrations of values; M otherwise	From VRI – Ralph's extraction. Files have La > 30 %	Yes. Stands with La > 30 % = 1
High elevation Grasslands	Critical winter habitat for sheep and elk, rare plant species	1.1, 2.4	Forest ingrowth, mining, possibly climate change	Decreasing	UWR orders	Low	Moderate	Low	HCV Areas for largest most significant grasslands (already designated), M for others	Use the Sheep layer to represent this. The high elevation layer that was done for Tembec is not very accurate.	Yes, Sheep habitat = 1.
Mid-elevation grasslands	Spring and early winter ungulate habitat	2.4	Forest ingrowth, logging which increases road access to these areas and invasive plants	Unknown. Decreasing?	None, other than HCV A strategies.	Low	Moderate	Low	HCV Areas – for largest most significant grasslands (already designated); useful to identify areas where access mgmt. is needed.	Check sensitive sites mapping, otherwise use local knowledge	Yes if they can be digitized.
Connectivity; Low elevation passes; migration routes summer to winter range; connectivity across highways	Important migration/connectivity habitat for ungulates and bears across highways or major valleys	1.3	Roads; motorized and non-motorized recreation, mining.	Declining	None, other than HCV A strategies.	High	Moderate	High	HCV Areas	Grizzly Connectivity mapping – use existing HCVF mapping across highways, add new Proctor mapping across trench. Also inspect Weaver report for other passes and migration routes.	No. Important passes/connectivity corridors will become HCV Areas.
Migratory Concentrations of species	Important migration habitat (wetlands, lakes)	1.3	Human disturbance (motorized recreation), pollution	Declining?	Riparian Buffers, Riparian SWP	Low	Low	Very Low	HCV Area	Columbia wetlands. Use existing HCVF mapping or Mapping from Greg, done manually from satellite photo of Columbia wetlands	Yes. Columbia wetland area = 3 due to high importance.

^a See the Management Strategy Development section for an explanation of the risk rating system used

Appendix 6. Data used to identify large, landscape levels forests (HCV Category 1.4, and HCV Category 1.1, critical habitat for access sensitive species).

Element	Rationale	Where data is derived from	Use in Concentration of Values Analysis?
Roads	Negative impact on many wildlife species, with impact generally increasing with size and traffic volume	Roads layers from BC Gov. Digital Road Atlas, manually updated with Canfor and BCTS roads (could not obtain Galloway roads).	No. Intact or Highly intact valleys to be HCV Areas or EF. Evaluate intact or nearly intact watersheds individually and examine values within each to pick the most important.
Utility Corridors	Human use along them; noxious weeds	BC and Federal Gov. sources	No. Use layer to assess if intact watershed really is intact.
Railways	High use, cause of mortality to wildlife	BC and Federal Gov. sources	As above
Cutblocks	Use road data to first identify intact watersheds – then overlay cutblocks to assess.	From FC/VRI, Canfor/BCTS updates, and digital imagery	As above
Rec Sites	High human use	Provincial data	As above
AMAs	Areas where motorized vehicles are prohibited.	Provincial data	As above
Mining Areas	Impacts on wildlife, and pollution sources for aquatic habitat.	Provincial data	As above
Settlement Areas	Impacts on wildlife and aquatic habitat	Provincial and Federal Data	As above

Appendix 7. Red and blue-listed plant communities.

Ecosystem Name and Site Series Association found in East Kootenay (red=red-listed, blue=blue-listed)	Description (from CDC website)	Threats (from CDC website)	Current Condition (from CDC website)	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Area and/or SFMP Management Strategy (M)
Riparian Ecosystems								
Black Cottonwood-snowberry-roses (ICHmk4/Fm01)	Active floodplain ecosystem, occurs in small linear patches	Significant past land use pressures associated with agricultural activity, water licensing and modifications such as bank stabilization and extensive channelization along some rivers, have further reduced suitable sites for this ecosystem. Existing water licensing, irrigation, agriculture, and urban and commercial development continue to threaten the remaining occurrences. More recent threats include independent power plants that impact stream channels and water balance, and drought conditions brought about by increasing temperatures and decreasing available precipitation, which affects the hydrological regime of these active floodplain ecosystems.	Unknown trend. In some parts of the range, degradation of this ecosystem is occurring as a result of water use. The effects on the flooding cycle and the mean annual discharge is affecting downstream ecological integrity.	Riparian Buffers, Riparian SWP, Ecosystem Rep. SWP	Low	Moderate	Low	M – Riparian SWP, Ecosystem Representation SWP
Alkali salt-grass herbaceous vegetation (IDFdm2/Gs01)	Occurs on moist sites including potholes, depressions and areas surrounding alkaline ponds. These sites are usually closed or linked basins that are briefly flooded in the spring and then subject to drying and salt accumulation later in the growing season.	Severely impacted by mud-bogging and cattle grazing. Climate change may alter precipitation and hydrology patterns. Recovery after disturbance, even where human and domestic animal use is excluded, is slow.	Short-term trend: Decline of 10-30% provincially. Long-term 30-50%.	Riparian Buffers, Riparian SWP	Low	Low	Very Low	
Hybrid white spruce-trembling aspen-wild sarsaparilla (IDFdm2/05)	This riparian community occurs on fluvial materials adjacent to streams or lacustrine terraces.	None listed.	Not assessed.	Riparian Buffers, Riparian SWP	Low	Moderate	Low	
Black cottonwood-red-osier dogwood-nootka rose (PPdh/04)	Floodplain community, linear small patches	None listed.	Not assessed.	Riparian Buffers, Riparian SWP	Low	Moderate	Low	
Low Elevation Grassland and Open Forest Ecosystems								
Antelope brush-blue bunch wheatgrass (IDFdm2/02 and PPdh2/00)	This ecological community occurs on dry crests and upper slopes with shallow soils.	Threats that directly and indirectly affect this ecological community include forest encroachment, domestic and wildlife grazing, ongoing urban and commercial development, invasive alien plants, and climate change impacts.	Short-term Decline of 10-30%; Long-term 50-70%.Very little area of grasslands is in good to excellent condition. It is difficult to find examples of late seral vegetation when field sampling grassland ecosystems	WHAs and measures, UWR Order, Ecosystem Restoration BMPs	Low	Moderate	Low	HCV Areas and M Ecosystem Restoration Strategy, UWR Order
Douglas-fir/snowberry/balsamroot (IDFdm2/03)	These open grown stands of Douglas-fir and Ponderosa pine occur on upper to mid slopes with warm aspects.	None listed	Not assessed.	WHAs, UWR Order, Ecosystem Restoration BMPs	Low	Moderate	Low	
Douglas fir/tall Oregon grape/parsley fern (ICHdw1/02)	This ecological community occurs usually on steep, warm, moisture-shedding slopes, where	No threats given.	Not assessed.	UWR Order; WTP SWP	Low	Moderate	Low	

Ecosystem Name and Site Series Association found in East Kootenay (red=red-listed, blue=blue-listed)	Description (from CDC website)	Threats (from CDC website)	Current Condition (from CDC website)	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Area and/or SFMP Management Strategy (M)
	soil moisture is limited during the growing season.							
Antelope-brush/prairie sandgrass – needle and thead grass / sidewalk screw-moss (PPdh2/Gs13)	This ecological community occurs on small pockets of pure-sand deposits in areas of glaciofluvial deposits. Fragile sandy soils are vulnerable to disturbances that affect the soil profile.	Trends indicate that this community has been seriously impacted by forest encroachment associated with fire exclusion, overgrazing, and invasion of alien plant species. Its soils are readily damaged by livestock and off-road vehicles.	Short-term Decline of 10-30%; Long-term 50-70%. Very little area of grasslands is in good to excellent condition. It is difficult to find examples of late seral vegetation when field sampling grassland ecosystems	Ecosystem Restoration BMPs	Low	Low	Very Low	
Rough fescue – (Idaho fescue) – yarrow – clad lichens (PPdh2/Gg15)	Upland sites within the PPdh. Due to the dry soils and subsequent slow recovery time from overgrazing, this ecological community is vulnerable to disturbance impacts that affect the soil profile and vegetation community.	These ecosystems were red- listed due to impacts of forest ingrowth and encroachment resulting from fire suppression, over-grazing, and/or urban and rural development, and invasive species/noxious weeds. Off-road and all-terrain vehicle use and projected climate change impacts are minor threats. Logging at the turn of the century reduced veteran trees and snags significantly, also impacting this community. High road density creates fragmentation and contributes to the spread and establishment of noxious weeds.	Short-term Decline of 30-70%; Long-term 50-70%.	UWR Order, Ecosystem Restoration BMPs;	Low	Moderate	Low	
Rough fescue-blue bunch wheatgrass – yarrow – clad lichens (PPdh2/Gg15; IDFdm2/Gg10)			Short-term Decline of 30-70%; Long-term 50-70%.		Low	Moderate	Low	
Ponderosa Pine-trembling aspen-prairie rose (PPdh/03)			Not assessed.		Low	Moderate	Low	
Ponderosa Pine-bluebunch wheatgrass-silky lupine (PPdh/01)			Short-term Decline of 10-50%; Long-term 50-70%.		Moderate	Moderate	Moderate	
Douglas fir-western larch /pinegrass (IDFdm2/04)			Not assessed.		Moderate	Moderate	Moderate	
Bluebunch wheatgrass-junegrass (IDFun/00, PPdh/02; IDFdm2/Gg01)			Short-term Decline of 10-30%; Long-term 30-50%.		Low	Moderate	Low	
Common snowberry – prairie rose (IDFdm2/Ff02)	This ecological community occurs on depressions that collect snow, snow melt and seepage sites in grassland-dominated areas.	This shrubby small patch community is rare within a small range. Losses in area to conifer encroachment, relatively high road density, and permanent land conversion contribute to declining long and short term trends. Ongoing conifer encroachment due to fire suppression practices, conversion to agricultural, urban, and rural land cover, recreational vehicles, and climate change impacts threaten this ecological community. This community is also threatened by invasive alien plants when livestock grazing reduces shrub cover.	Short-term Decline of 10-30%; Long-term 30-50%. Very little area of grasslands is in good to excellent condition. It is difficult to find examples of late seral vegetation when field sampling grassland ecosystems	UWR Order, Ecosystem Restoration BMPs; WTP SWP	Moderate	Moderate	Moderate	
Elk Valley/Flathead High Elevation Grassland Ecosystems								
Rough fescue-Sulphur buckwheat – thread-leaved sandwort (ESSFdk1/Gg16; ESSFdk2/Gg16; ESSFdkp/Gg16; ESSFdkw/Gg16; ESSFwmw/Gg16)	This grassland has a limited distribution in the province. It is relatively abundant in the Elk Valley where it typically occurs at high elevations on moderately steep to steep warm aspects on rich, non-calcareous soils with high coarse fragments, often associated with coal deposits.	Coal mining, roads, and other mine-related infrastructure are concentrated in areas where this ecological community occurs. Approximately 65% of the community is located within areas of mineral claims, coal licenses, coal leases, and coal license applications, or within mineral and coal	Short-term and long-term trends: estimated decline of 30-50%.	UWR Orders; WTP SWP	Low	Low	Very Low	M – UWR Orders; typically out of the THLB.

Ecosystem Name and Site Series Association found in East Kootenay (red=red-listed, blue=blue-listed)	Description (from CDC website)	Threats (from CDC website)	Current Condition (from CDC website)	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Area and/or SFMP Management Strategy (M)
		reserves. The remaining 35% is located within 2 km of the coal license, leases, and license application areas. Grazing elk and bighorn sheep are likely to continue affecting the condition of this ecological community as grazing pressures are concentrated in remaining grassland areas.						
Idaho fescue-Sulphur buckwheat – thread-leaved sandwort (ESSFdk1/Gg14; ESSFdkp/Gg14;	This ecological community commonly occurs on dry, mid to high elevation sites. These windswept sites are usually on warm aspects (S to W) of moderately steep middle slopes and experience high insolation. Loamy soils have medium to rich soil nutrient regimes.	As above, with 48% rather than 65%.	Short-term and long-term trends: estimated decline of 10-50%.	UWR Order; WTP SWP	Low	Low	Very Low	
Idaho fescue- Bluebunch Wheatgrass - Sulphur buckwheat – thread-leaved sandwort (ESSFdk1/Gg17; ESSFdkw/Gg17; MSdk1/Gg17)	This grassland has a limited distribution. It is relatively abundant in the Flathead Valley and to a lesser extent in the Elk Valley, B.C. This ecological community tends to occur at mid to high elevation moderate to steep sites with warm aspects. Loamy soils often have a thin eolian capping and are susceptible to surface erosion.	As above, although no percentages given.	Short-term and long-term trends: estimated decline of 10-50%.	UWR Order; WTP SWP	Low	Low	Very Low	
Wetland Ecosystems								
Tufted hairgrass Community (IDFdm2/Gs04, MSdk/Gs04, MSdm1/Gs04, MSdm2/Gs04, MSdm2/Gs04)	Rare within its range occupies moist, frost-prone and slightly alkaline sites. It is vulnerable to disturbances that impact soils and vegetation; cold conditions limit recovery.	Climate change impacts present high to medium threats to this ecological community due to changes in the hydrological regime. Medium threats include ongoing impacts associated with grazing. Depending on intensity, livestock grazing can result in slight to moderate degradation of this community and recovery from disturbance is slow. Overgrazing and disturbance by livestock can drive a shift in vegetation dominance to Kentucky bluegrass. Extensive logging (e.g., MPB salvage central interior) can also alter the hydrological regime, potentially impacting this community.	Short-term trend – estimated decline 30-50% provincially; long-term 10-50% provincially.	Riparian Buffers, Riparian SWP	Low	Low	Very Low	M – Riparian buffers and SWP. Out of the THLB.
Nuttall’s alkali grass-foxtail barley (IDFdm2/Gs02)	This ecological community is limited to alkali potholes and shallow lakes that are briefly inundated in the spring. Salts accumulate through evaporation of water.	This small patch wetland is rare within a limited range. It is vulnerable to disturbances that alter hydrology patterns, soil profiles, and the vegetation community. Recovery can be prolonged. Significant threats include climate change impacts, disturbance from cattle grazing and recreational vehicle use. Declines in ecological community condition are largely attributed to disturbances by livestock.	Short and Long-term declines of 30-50%		Low	Low	Very Low	
Baltic rush - field sedge (IDFdm2/Gs03, IDFdw/Gs03, PP/Gs03)	This small patch community is rare across its range. It is limited to saline or alkaline sites in	Short and long-term declines are largely driven by overgrazing and invasion of alien plant species. Vegetation and soils	Short-term Decline 10-50%; Long term 30-70%.		Low	Low	Very Low	

Ecosystem Name and Site Series Association found in East Kootenay (red=red-listed, blue=blue-listed)	Description (from CDC website)	Threats (from CDC website)	Current Condition (from CDC website)	Canfor Mitigative Strategies	Likelihood of Adverse impacts from forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Area and/or SFMP Management Strategy (M)
	grassland areas of the south-central interior of British Columbia.	are easily damaged by grazing livestock and use of recreational vehicles. Many sites are now dominated by invasive alien plant species, particularly Kentucky bluegrass. Recovery after disturbance can be prolonged. Very high threats include a combination of ongoing impacts from alien invasive plant species, overgrazing, and climate change impacts that influence its hydrological regime. Ongoing land conversion, use of recreational vehicles, and road development present low threats to this community.						
Drummond's willow / bluejoint reedgrass (MSdk/FI05, MSdm1/FI05)	Wide-ranging wetland ecosystem,	None listed	Not assessed		Low	Low	Very Low	
scrub birch /water sedge (IDFdm2/Wf02, MSdk/Wf02, MSdm1/Wf02)	Wide-ranging wetland ecosystem, occurs primarily on permanently saturated organic soils.	Land use activities that affect the hydrological regime (transportation and utility lines), and pollutants from industrial activities in some parts of the range. Climate change could lead to drying or flooding in different portions of the range.	Not assessed		Low	Low	Very Low	
Scrub birch / horsetails (IDFdm2/06)	Riparian community in the IDF	None listed.	Not assessed.		Low	Moderate	Low	
Slender sedge / common hook-moss (IDFdm2/Wf05, MSdk/Wf05, MSdm1/Wf05, MSdm2/Wf05)	Relatively common wetland type with a wide range, but occupies a very limited area in linear formation around small lakes and ponds. High water table levels maintain the community.	Changes to the hydrological regime resulting from land use practices such as road building or harvesting, or drought stress arising from increasing summer temperatures projected for drier parts of its range, threaten the ecological integrity of this community.	Not assessed.		Low	Moderate	Low	
Swamp horsetail – beaked sedge (ESSFmw/Wm02, ICHmw3/Wm02, ICHwk4/Wm02, IDFdm2/Wm02)	This swamp community is restricted to freshwater sites, which are uncommon but wide-ranging. Site requirements include fairly consistent high water levels adjacent to lakeshores, back-levee depressions along low-gradient streams, other marshes and fens, or along large coastal rivers above saltwater influence.	None given, but assumed to be similar to those for other riparian ecosystems on saturated soils.	Not assessed.		Low	Moderate	Low	
Hard-stemmed Bulrush-Deep Marsh (IDFxx/Wm06, MSdk/Wm06, MSdm2/Wm06, IDFdm2/Wm06)	Widely distributed marsh	None given	Not assessed.		Low	Low	Very Low	
Common Cattail Marsh (IDFdm1/Wm05, IDFdm2/Wm05, PPdh2/Wm05)	Widely distributed marsh	None given	Not assessed.		Low	Low	Very Low	

Note: None of these communities were included in the Concentrations of values analysis, except for those which have WHAs for them (given a value of 2).

Appendix 8. Rare and under-represented ecosystems for HCV Category 2.

HCV	Rationale	HCV # (BC)	Threats in EK	Current Condition	Canfor Mitigative Strategies	Likelihood of Adverse impacts from Forestry ^a	Consequence of Impact from Forestry ^a	Overall Risk in EK from Forestry Activities ^a	HCV Area and/or SFMP Mgmt Strategy (M)	Where data is derived from	Use in Concentration of Values Analysis?
Rare ecosystems (see list in Appendix 9)	Support rare species	2	Various. Rare tend to be very dry or very wet, so main threats are grazing, mining, rural development, riparian	Various. Good to very poor, depending on extent of human impact.	Ecosystem Representation SWP, riparian SWP, UWR Order.	Low. Generally not harvested.	High	Moderate	M	Ecosystem Representation Analysis.	Yes. Rating = 1 for all rare ecosystems.
Under-represented ecosystems	Required to support full complement of species, particularly unknown ones	2.4	These ecosystems are largely in the IDF and PP (subxeric-submesic IDF/PP; circum-mesic IDF/ICH/MS, circum-mesic ICHdw/dm). These ecosystems have <25% pf their area in the non-harvestable landbase and have been impacted by forest ingrowth and encroachment resulting from fire suppression, over-grazing, and/or urban and rural development, and invasive species/noxious weeds. Off-road and all-terrain vehicle use and projected climate change impacts are minor threats. Logging at the turn of the century reduced veteran trees and snags significantly, also impacting this community. High road density creates fragmentation and contributes to the spread and establishment of noxious weeds. There are few parks in these ecosystems, and extensive human settlement and development.	Generally Poor.	Ecosystem Representation SWP, Ecosystem Restoration BMP, UWR Order, OGMA's, WTP SWP.	Moderate	Moderate	Moderate	HCVA and M	Representation Analysis. Results agree generally with results from Canfor FSC Protected Area analysis at the variant level.	No. Use to assess final results to see if representation of under-represented ecosystems was improved.
Mature and Old forest in ecosystems where these age classes are rare due to human activities	Support high species diversity; rarity	2.3	Logging, urban and rural development, mining, wildfire and insect pests (and thus climate change), invasive plants	Various. Good to very poor, depending on extent of human impact. Lower in low elevation ecosystem than in high.	KBHLPO – Old and Mature requirements; OGMA replacements SWP	Moderate	High	High	HCVF and M (3 Old Growth strategies and SWP in the SFMP)	BEC variants where they are significantly less than historic amounts, from Stand Structure modeling results augmented with expert opinion.	Yes.
Karst	Rare type	2.1	Unknown	Unknown.	Karst BMPs issued by FLNRO.	Low	Low	Very Low	M	No data currently, unless local knowledge.	No.
Hot Springs	Rare type, supports rare plant species	2.2, 1.1	Recreational use, roads, historic logging	Unknown.	WF legislation, SoMC SWP	Low	Low	Very Low	HCVF where not in reserves	Local knowledge; most are in ecological reserves or parks	No.

Appendix 9. Rare ecosystems within the East Kootenay. Note: to be re-defined based on the new BEC V11 and associated PEM when complete.

Ecosystem Group #	Ecosystem Group Name	Site Series within the Ecosystem Group (BEC V6)	Climax Community Description
2	Submesic-mesic IDFun	IDFun-DP	Cool mossy aspects dominated by Fd
5	Mesic IDFun2	IDFun2-FH	Mid-slope Fd & At with rich herb understory.
9	Subhygric IDFun2	IDFun2-SD	Level to Lower slope. Sx & Fd with red-osier dogwood.
14	Hygric PPdh2 (fluvial mid-bench riparian)	PPdh2 04	Open Ac & Sx (Fd) with snowberry, bluegrasses and common silverweed.
15	Hygric IDF (fluvial mid-bench riparian)	IDF dm2 07 IDF dm2 XB	Open Sx with water birch, horsetails, sarsaparilla, sedges, red-osier dogwood and trailing raspberry.
16	Hygric IDFun (fluvial mid-bench riparian)	IDFun-CD	Open Ac & Sx with red-osier dogwood
19	Subhydric MS	MSdk 07 IDFdm2A-SB	Level slope position with organic soils. Open Sx with sedges, sitka alder, scrub birch and sphagnum
24	Subhydric ESSFdm2	ESSFdm2/FS	Warm aspects and upper slope positions. Dominated by very open Englemann spruce stands with willow, scrub birch, and sphagnum. Similar to the ESSFdk 07.
30	Hygric ESSFdm1 (fluvial riparian)	ESSFdm1-FH	Se & BI with false azalea, horsetail, Canby’s lovage and arrow-leaved groundsel.

Note: Taken directly from Wells et al. 2005. Requires updating now that a new BEC has been released for the East Kootenay (V11, August 2018).

Appendix 10. Mature and Old Forests

In order to determine the range of natural variability in old and mature forests, an extensive modelling project was carried out (Davis 2009). The model incorporated the best available data at the time on the characteristics of historic fire regimes in the East Kootenay, including for each ecosystem the fire return interval, the proportion of high, moderate, and low severity fires, and the mortality curve associated with each fire severity class by tree species.

The model was run for the entire Cranbrook and Invermere TSAs, including the Radium license (A18979). The model did not include TFL 14 or the portions of the DFA within the Kootenay Lake TSA, due to the high cost of bringing data from these areas into the model. However, since the model is operating at such a large scale, and results were similar between the Cranbrook and Invermere TSAs for the same BEC zone groupings, the results are also expected to be similar for similar BEC groupings in the TFL 14 and Canfor's portion of the Kootenay Lake TSA.

Results of the model are presented in terms of the area burned by age class (seral stage) and ecosystem group across each TSA. Four age classes were chosen (early, mid, mature, and old, as defined in the Biodiversity Guidebook) and eight ecosystem groups were defined: grassland, IDF, MS, dry ICH, wet ICH, dry ESSF, wet ESSF, and parkland forest. The model was also run using structural stages, because these capture ecological information rather than age class alone. Six structural classes were defined; shrub/sapling, small tree, medium tree open or moderate crown closure, medium tree closed crown closure, large tree open or moderate crown closure, and large tree closed crown closure. The definition of these classes is explained in the reports (Davis 2009), and is based on work from the Columbia Basin in the United States.

Results of the model showed that:

- For most ecosystem types (BEC groupings), the amount of early seral stands and mature stands are currently below historic amounts, and,
- The amounts of mid- and old seral stands are currently above or similar to historic amounts.

However, current forests are very different from historic forests in that the mature and old forests are dominated by closed canopy forests, and the amount of open and mid-closed canopies are well below historic amounts. This fits well with the disappearance of low severity fire from the landscape.

Table 1 summarizes the results for the Cranbrook TSA for each BEC grouping; results for the Invermere TSA were very similar and can be found in Davis (2009). The key follows on the next page.

Table 1: Relative area of age groups found in historic vs. current forests in the Cranbrook TSA.

BEC Group	Early	Mid	Mature	Old
Grassland	--	+		
IDF	--	+		
MS	--	+	--	+
Dry ICH	--	+	--	+
Wet ICH	--	+	--	
Dry ESSF	--	+	--	+
Wet ESSF	--	+	--	
Parkland	--	+	--	+

Key	Description
--	Less area found in forests of today than found in historic forests
	Present forests have approximately the same area as historic forests.
+	More area found in forests of today than found in historic forests.

There is a need in the near future for the model to be revisited and updated, given that a new TSR has just been completed (2017) with somewhat different harvesting assumptions from those used in the model, there is new BEC mapping available as of August 2018, and there is new information available on fire return intervals and severities in the East Kootenay from the studies Dr. Lori Daniels and her students have been recently conducting. The fire return intervals used in the model are considered aggressive by some ecologists (they were developed by a team of expert fire ecologists in 2006). Further, over 10 years of harvesting has occurred since the original data was used to input into the model, and there are better methods of running the random simulations than were used in this particular model.

Perhaps more importantly, is the question of the changing fire regimes we are experiencing as a result of climate change. The model needs to be revisited to examine the parameters input for these regimes, and it could be used to game various scenarios around different fire regimes. All indicators point to increasing frequency and severity of fire, along with more insect attack, both of which will significantly impact the amount of mature and old forest on the East Kootenay landscape. Forest harvesting decisions need to be made in light of these realities.