Basic Impact Analysis
(BIA)

Trans-Canada Highway
Rock Slope Reprofiling
2015 Works

Trans-Canada Highway: Sherbrooke Creek, Lower Sherbrooke Creek, Little Topple and Phyllite Rock Slopes
Yoho National Park, BC

May 2015

Parks Canada Parcs Canada

Canada

1. PROJECT TITLE

Rock Slope Reprofiling 2015 Works
Trans-Canada Highway (TCH): Sherbrooke, Lower Sherbrooke, Little Topple and Phyllite Rock Slopes.

2. PROJECT LOCATION

Yoho National Park, BC. (YNP)

3. PROJECT SITE(S)

The overall Project will occur along the TCH, between km 88 to 91 and between km 114 to 128. The 2015 Project works are occurring at four sites. Table 1 below identifies all locations in the overall Project to provide large-scale context, and highlights the areas where work will occur this year (2015). To identify slopes along the highway, the start and end points of existing and proposed slope cuts are provided relative to the eastern park boundary. This station system, provided by McElhanney Consulting (MCE), is measured in kilometres along the road centreline and uses the east gate of Banff National Park as Sta. 0+000.

Table 1: Slope Reference Table

Project (km)	Colloquial Name	Station Start (km)	Station End (km)	Included in 2015 Works?	Approximate Volume (m^3)[1]
88 to 91	Sherbrooke Soil Slope	88+200	88+500		
	Sherbrooke Creek Rock Slope	88+500	89+090	✓	161,800
	Lower Sherbrooke Creek Rock Slope	89+090	89+420	✓	18,740
	Upper Dustin's	89+540	89+900		
	Dustin's Slide	89+900	90+150		
	Spiral Tunnels Hill	90+150	90+900		
114 to 128	Through Cut (Left)	114+800	115+120		
	Through Cut (Right)	114+900	115+050		
	Big Topple	115+380	115+580	*	
	Little Topple	115+650	115+860	✓	27,600
	Mount Vaux	116+150	116+470		
	Lower Mount Vaux	116+910	117+200		
	Mount Vaux	116+470	116+900		
	Leanchoil East	123+100	123+400		
	Phyllite Slope	124+280	124+580	✓	100,780
	Western Boundary	125+820	125+940		
*As of April 30, 2015 Big Topple was flagged and logged but no other resloping works will occur at this site in 2015.					
[1]Exact volumes are subject to change as the Rock Cut designs are finalized. Approximate volumes current as of April 20, 2015.					

Additionally, two locations were identified near the project areas to be used for material storage during the 2015 Project.

Table 2: Storage Site Locations, Volumes and Areas

Project (km)	Storage Site Name	Station (km)	Location (UTM, zone 11U)	Approximate Storage Capacity Volume (m^3) based on 2H:1V*	Approximate Footprint (m^2)*
88 to 91	AB/BC Border	82+000	5700586.07 N 549850.58 E	65,000	9,500
114 to 128	Mount Vaux	119+500	5675948.29 N 529622.31 E	Up to 986,000	Up to 80,000
* Numbers based on information available in Tetra Tech EBA's Design Report, *Yoho National Park Trans-Canada Highway – Slope Reprofiling Km 88 To Km 91 And Km 114 To Km 128* as of April 1, 2015. Exact numbers subject to change with design finalization.					

4. PROPONENT

Parks Canada Agency (PCA): Ryan Syme, P.Eng. Engineer II – Highway Service Centre

BIA Author: Tetra Tech EBA Inc.

5. PROPONENT CONTACT INFORMATION

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6. PROJECT DATES

Work for the Project is expected to occur over the summer and fall of 2015 and will be limited by snowfall.

Planned commencement for 2015 work: 2015-06-15
Planned completion for 2015 work: 2015-10-31

Tetra Tech EBA notes that these works are part of a larger project anticipated to occur over the next three years (ending in 2017).

7. INTERNAL PROJECT FILE #

8. PROJECT DESCRIPTION

Project Justification:

The project area slopes in YNP were constructed in the 1950s before controlled blasting was developed. The slopes have performed relatively well over the years; however, in the last 5 to 10 years, the slopes are showing increased distress in the form of rock falls, causing sections of the TCH to be closed during cleanup operations. The intent of reprofiling these slopes is to reduce both PCA's maintenance burden and the risk of failures affecting traffic on the highway.

Project Details:

This BIA considers only the work to be conducted in 2015. However, these works are part of a larger multi-phase project. The overall project occurs within the same area (between km 88 to 91 and between km 114 to 128 of the TCH) but includes different slopes and storage sites. These works are expected to be conducted in 2016 and 2017 and the activities will be similar to the 2015 works described below.

Work conducted in 2015 is expected to include slope excavation at Sherbrooke Creek Rock Slope, Lower Sherbrooke Creek Rock Slope, Little Topple Slope and Phyllite Slope. Estimated volumes for each slope are provided in Section 3, Table 1. Rock will be stored at these locations and/or removed from site to the storage locations via hauling along TCH. Catchment ditches and access roads will also be constructed to these areas. Project activities are generally comprised of the following:

- General limited clearing of vegetation, including tree felling[1], will be required at each 2015 reprofiling slope, as well as at one additional slope;
    - Sherbrooke/Lower Sherbrooke Slopes at 88+500 to 89+420 (right side).
    - Little Topple Slope at 115+650 to 115+860 (left side).
    - Phyllite Slope at 124+270 to 124+570 (right side).
    - (additional slope) Big Topple Slope at 115+380 to 115+580.
- Mobilization and Demobilization of all manpower, equipment, materials, and other resources necessary to execute the Work;
- Provision of traffic signage and traffic control;
- Slope Excavation;
    - Cut angles will be as steep as possible and uniform (not benched).
    - Controlled blasting (either trim blasting or production blasting) will be used on all final faces to limit damage to the rock behind the face and enhance long-term stability of the rock cuts. Large areas of blasting remnants will be removed.
    - Catchment ditches will be excavated between the toe of the rock cuts and shoulder to provide a catchment area for rock falls. Following slope remediation, removal of accumulated construction debris (rock fall) will be required for all locations. Rock and other debris which falls into the catchment area will be loaded into a truck with an excavator and transported to an appropriate disposal location.
    - Localized mitigation measures to enhance stability of the rock cuts will be performed where required. This may consist of rock reinforcement (dowels), scaling (by hand or excavator), rock removal (scaling, trim blasting or other excavation with light explosives, hydraulic splitters, chemical expanders or pneumatic hammers), dentition (shotcrete or masonry walls) and/or drainage (installing drain holes).Where required, rock support will be installed as the excavation proceeds. Detailed geotechnical mapping should be conducted as the excavation proceeds to identify areas that require rock support and to provide the basis for the final design of localized rock support.
- Storage Site preparation;
    - Vegetation clearing, including tree removal, will be required (see footnote 1).
        - AB/BC Border Storage Site at 82+000 (none expected).
        - Mount Vaux Storage Site at 119+550 (under storage footprint only).
    - Top soil will be stripped from Storage Sites where necessary and stockpiled or removed from site.
    - Materials excavated from slopes will be transferred to storage areas.
    - Volumes and area presented above in Section 3, Table 2.
- Repair of damaged road surface, if required.

9. VALUED COMPONENTS LIKELY TO BE AFFECTED

Following the background review of environmental information, potential Valued Components (VCs) were identified for the project, including biological resources (vegetation and wildlife), visitor experiences and visual and aesthetic

[1] Tree felling activities are being considered under a separate BIA (file # 2015-017Y) and are discussed only in general terms as it relates to other activities in this report. As of April 30, 2015 felling activities have been completed.

values. The potential VCs were assessed to determine if they are present near the rock slope remediation locations and if they are subject to stakeholder or regulatory concern. Based on these criteria and the professional judgment of the study team, Tetra Tech EBA professionals used this information to determine the final VC selection for the purposes of the environmental impact analysis.

Project activities that may interact with VCs are identified by investigating the various components of the works that have potential effect pathways to the receiving environment. The potential effects pathway for these projects involves rock slope remediation. The project pathway was compared to the list of identified VCs and the interactions were documented for further consideration in the BIA process. The documented interactions between the project's pathways and the VCs are used to identify potential impacts. Knowledge of both the projects and VCs are used to identify potential adverse effects of the projects on the environment and to ensure appropriate mitigations are established and industry best management practices are followed.

Background Information:

Yoho National Park, along with Jasper, Kootenay and Banff National Parks and three British Columbia provincial parks—Hamber Provincial Park, Mount Assiniboine Provincial Park, and Mount Robson Provincial Park—form the Canadian Rocky Mountain Parks UNESCO World Heritage Site. It was established in 1886 and occupies approximately 1,310 km^2 (Parks Canada, 2014).

Vegetation:

The Biogeoclimatic Ecosystem Classification (BEC) is a land classification system that groups similar ecosystems based on climate, soils and vegetation. This classification system was developed in British Columbia and is widely used as a framework for resource management as well as for scientific research. Vegetation of mature ecosystems is emphasized in BEC as it is considered the best indicator of the combined influence of the environmental factors affecting a site.

According to BEC mapping (BC Ministry of Forest and Range, 2011), the majority of the project area lies within the Montane Spruce dry cool (MSdk2) subzone. The Montane Spruce zone predominantly occupies the middle elevations of the Rocky Mountains and Rocky Mountain Trench above the elevation of the Interior Douglas Fir (IDF) zone and below the elevation of the Engelmann Spruce Subalpine Fir (ESSF) zone. It usually occupies a very narrow elevational band, between 300 m and 400 m wide (Meidinger and Pojar, 1991). In the project area, the MS zone largely occupies the Kicking Horse River valley. Generally, the climate within the MS zone is continental, characterized by warm, short summers and cold winters. The mean annual temperature ranges from 0.5°C to 4.7°C (Meidinger and Pojar, 1991).

The BEC zone at the very eastern end of the project area, between approximately km 88+000 and km 90+000, is within the Engelmann Spruce Subalpine Fir dry cool (ESSF dk2) subzone. The ESSF zone exists below the Interior Mountain-heather Alpine Zone (IMA) at elevations from 1500 m to 2300 m and so is the upper most forested zone in the southern portion of interior BC (Meidinger and Pojar, 1991). Similar to the MS zone, the climate is mostly long cold winters with abundant snow cover with short, cool growing seasons with mean annual temperatures between -2°C and +2°C (Meidinger and Pojar, 1991).

Vegetation within the MS zone landscape is typically dominated by extensive, young and maturing stands of lodgepole pine (*Pinus contorta*) that have formed following fire. Hybrid white spruce (*Picea engelmannii x glauca*) and subalpine fir (*Abies lasiocarpa*) dominate climax stands. Forest understory is characterized by black huckleberry (*Vaccinium membranaceum*), Utah honeysuckle (*Lonicera utahensis*) and grouseberry (*Vaccinium scoparium*) (Meidinger and Pojar, 1991).

Vegetation within the ESSF zone is dominated by subalpine fir and Engelmann spruce in the tree layer with false azalea (*Menziesia ferruginea*), Utah honeysuckle, Indian hellebore (*Veratrum viride*), clasping twistedstalk (*Streptopus amplexifolius*), and grouseberry as common understory plants (Meidinger and Pojar, 1991).

The CDC Internet Mapping tool, BC Species and Ecosystems Explorer, and Parks Canada's Biotics Web Explorer were used to determine potential occurrences of rare vegetation species at or near the rock slope remediation areas. Search results are included in Appendix 4.

No sensitive vegetation species were documented at or immediately adjacent to either the Sherbrooke or Lower Sherbrooke (km 88+500 to 89+420) sites, at the Phyllite site (km 124+270 to 124+570) or at any of the two Storage Sites. An occurrence of Crawe's Sedge is documented adjacent to the Little Topple site (km 115+650 to 115+860). Several occurrences were documented as being located within 5 km of one or more of the sites and are described in Table 3 below.

Table 3: Rare Plant Species Known to Occur Near a Project Area

Name	Scientific Name	Shape ID	Proximate Site	Status	Habitat
Limber Pine	*Pinus flexilis*	67689	Sherbrooke & Lower Sherbrooke Slopes	BC (Red) COSEWIC (E)	Dry rocky sites at 1,500 m to 3,600 m.
Whitebark Pine	*Pinus albicaulis*	68450	Little Topple	BC (Blue) SARA (1-E) COSEWIC (E)	Thin, rocky soil near timberline (1,300-3,700 m).
		68416	Sherbrooke & Lower Sherbrooke Slopes		
Linear Leaf Moonwort	*Botrychium lineare*	88692	Sherbrooke & Lower Sherbrooke Slopes	BC (Red)	Diverse habitat preferences but generally at 1,500 to 3,000 m.
McCalla's Dwarf Braya	*Braya humilis ssp. maccallae*	52263	Sherbrooke & Lower Sherbrooke Slopes	BC (Red)	Sandy gravelly riverbanks & floodplains, sometimes on slopes and glacial moraines.
		52265	Mount Vaux Storage; Phyllite Slope		
Macoun's Fringed Gentian	*Gentianopsis macounii*	2090	Mount Vaux Storage; Phyllite Slope	BC (Blue)	Wet to moist fens, meadows & streamsides in the montane zone.
		37895	Mount Vaux Storage; Phyllite Slope		
Crawe's Sedge	*Carex crawei*	3324	Mount Vaux Storage; Phyllite Slope	BC (Blue)	Wet meadows and fens in montane zone.
		46968	Little Topple		
		51299	Mount Vaux Storage; Phyllite Slope		

BC Provincial List	**Species At Risk Act (SARA)**	**Committee on the Status of Endangered Species in Canada (COSEWIC)**
Red: Species that are extirpated, endangered, or threatened Blue: Species considered to be of special concern (formerly vulnerable)	Schedule 1 (1) Schedule 2 (2) Schedule 3 (3) Endangered (E) Extirpated (XT) Threatened (T) Special Concern (SC)	Extinct (X) Extirpated (XT) Endangered (E) Threatened (T) Special Concern (SC) Not at Risk (NAR) Data Deficient (DD)

Both limber pine and whitebark pine are predominantly found at higher elevations, though can be found in appropriate habitats at lower elevations. Neither species is likely to be encountered within the project areas. The other four plant species are found mostly in wet areas, such as the riparian zone of Kicking Horse River. Because the work areas of each slope or storage area are outside the riparian zone of any watercourse, there is low potential for these species to be encountered.

Wildlife:

A wildlife track survey, conducted by Tetra Tech EBA from January 28 to 30, 2015, identified two bird and six mammal species in the project area. A potential mammal den was identified at the Spiral Tunnels Hill Slope but it was not confirmed if it was active.

Table 4: Wildlife Species Observed During Winter Track Survey

Common Name	Scientific Name	Common Name	Scientific Name
Common Raven	*Corvus corax*	Stellar's Jay	*Cyanocitta stelleri*
American Red Squirrel	*Tamiasciurus hudsonicus*	American Marten	*Martes Americana*
Coyote	*Canis latrans*	Snowshoe Hare	*Lepus americanus*
Unidentified small mammal spp.			

Numerous other wildlife species are known to inhabit YNP and may occur at or near the Project Site. These include Moose (*Alces alces*), Canada Lynx (*Lynx canadensis*), Black Bear (*Ursus americanus*), Wolf (*Canis lupus*), White-Tailed and Mule Deer (*Odocoileus virginianus* and *O. hemionus*), Elk (*Cervus elaphus*) and Mountain Goat (*Oreamnos americanus*) among others.

There is regular Mountain Goat activity in the area between km 88+250 and where the Kicking Horse River crosses the TCH (approximately km 93+500) from spring to fall (especially in the early summer) mainly on the Sherbrooke and Lower Sherbrooke rock slopes and on the adjacent highway. In this area, goats are known to lick salt on the road and on the rock. It is unknown if goats cross the TCH (Personal Communication: Trevor Kinley, PCA Environmental Assessment Scientist with Anders Frappell, Tetra Tech EBA Team Leader, Rock Engineering Group, March 23, 2015).

There is an active raven nest on Sherbrooke Slope, directly across from the highway pullout. (Personal Communication: Trevor Kinley, PCA Environmental Assessment Scientist).

A list of wildlife species listed under SARA and COSEWIC known to occur within the project area was compiled by querying species ranges assembled by Ridgely (Ridgely, 2007), the International Union for Conservation of Nature 2014 (International Union for Conservation of Nature, 2014), and the BC Conservation Data Centre's (CDC) Species and Ecosystem Explorer and Parks Canada Biotics Web Explorer for YNP.

Table 5: Wildlife Species in Yoho National Park listed under SARA and COSEWIC

Common Name	Scientific Name	SARA Schedule	SARA Legal Status	COSEWIC Status
Amphibians				
Western Toad (non-calling population)	*Anaxyrus boreas pop. 3*	Schedule 1	Special Concern	Special Concern
Birds				
Bank Swallow	*Riparia riparia*	-	-	Threatened
Barn Swallow	*Hirundo rustica*	-	-	Threatened
Common Nighthawk	*Chordeiles minor*	Schedule 1	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	Schedule 1	Threatened	Threatened
Peregrine Falcon	*Falco Peregrinus anatum/tundrius*	Schedule 1	Special Concern	Special Concern
Short-eared Owl	*Asio flammeus*	Schedule 1	Special Concern	Special Concern
Western Grebe	*Aechmophorus occidentalis*	-	-	Special Concern
Yellow Rail	*Coturnicops noveboracensis*	Schedule 1	Special Concern	Special Concern
Red-necked Phalarope	*Phalaropus lobatus*			Special Concern

Common Name	Scientific Name	SARA Schedule	SARA Legal Status	COSEWIC Status
Mammals				
American Bison (Wood Bison subspecies)	*Bos bison*	Schedule 1	Threatened	Threatened
Grizzly Bear	*Ursus arctos*	-	-	Special Concern
Little Brown Myotis	*Myotis lucifugus*	Schedule 1	Endangered	Endangered
Wolverine (western population)	*Gulo gulo pop.1*	-	-	Special Concern

Aquatics:

The TCH within the project area roughly parallels the Kicking Horse River. A desktop review of information pertaining to the Kicking Horse River and its tributaries within km 88 to 91 and km 114 to 128 was conducted. No field surveys for fish and fish habitat has been conducted in the project area to date.

- The **Kicking Horse River** (watershed code: 380) generally flows parallel to the TCH and is in the vicinity of all five slopes and storage sites, though generally greater than 30 m away. It is a Canadian Heritage River (CHRS 2011) with nine species of fish known to be present (see Table 6 below). Wapta Falls, with a 30 m drop, is located on the Kicking Horse River approximately 5 km southeast of km 124+270 (Phylitte Slope) and is considered a barrier to fish passage. However, Brook Trout (*Salvelinus fontinalis*) and Rainbow Trout (*Oncorhynchus mykiss*) are identified in tributaries of Kicking Horse River upstream of Wapta Falls and are likely present in the River.
    - According to Shelley Humphries, Aquatics Specialist, Banff, Yoho, Kootenay National Parks Canada (Pers.Comm, May 5, 2015) several species of fish not presented in the database searches are also present in Kicking Horse River:
        - Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*) are found in six headwater lakes near Lake O'Hara (approximately 9.5 km south of km 88+00) and have been occasionally reported in the main Kicking Horse River.
        - Longnose Sucker (*Catostomus catostomus)* are found in the ponds connected to the river at the western end of YNP as well as in Kicking Horse River itself.
        - Lake Trout (*Salvelinus namaycush*) are found in Sherbrooke Lake (approximately 2 km north of km 88+500) and Wapta Lake (approximately 850 m east of km 88+000) as well as the upper reaches of the Kicking Horse River.
- Using the DataBC online mapping service, iMapBC, **several smaller watercourses** are proximate to the slope sites in addition to the Kicking Horse River. Two tributaries near the Sherbrooke Creek (unnamed tributary 95 m east of Sherbrooke Creek) and Little Topple Rock Slopes (Porcupine Creek) are present on the opposite site of the Kicking Horse River, no potential to be impacted by the Project and are not discussed in this section:
    - Sherbrooke Creek Rock Slope (km 88+500 to 80+090)
        - Sherbrooke Creek (watershed code: 380-971100) crosses the TCH approximately 40 m east of km 88+500. It is a third order stream that flows into Kicking Horse River. No information was available for this watercourse in FIDQ but no barriers to fish passage were indicated on iMapBC therefore fish present in Kicking Horse River are potentially present in Sherbrooke Creek. As mentioned above, according to PCA Aquatic Specialist Shelley Humphries (Pers.Comm. May 5, 2015) Lake Trout are found in Sherbrooke Lake and Kicking Horse River so they are present within Sherbrooke Creek.
    - Lower Sherbrooke Creek Rock Slope (km 89+090 to km 89+420)
        - An unnamed tributary with no watershed code is reportedly present at approximately 89+300 (Pers.Comm. Trevor Kinely, April 30, 2015) although it is not

visible on iMapBC, HabitatWizard or the BC Water Resource Atlas. Fish species or barriers to fish passage on this watercourse are unknown.

- An unnamed tributary with no watershed code is present approximately 345 m west of km 89+500. No information was available for this watercourse in FIDQ, but no barriers to fish passage were indicated on iMapBC, therefore fish present in Kicking Horse River are potentially present in this tributary.

- Little Topple Rock Slope (km 115+650 to km 115+860)
  - None.
- Phyllite Rock Slope (km 124+280 to km 124+580)
  - An unnamed tributary (watershed code: 380-497100) is present approximately 290 m north of km 124+270. It flows eastward and crosses the TCH approximately 1.9 km east of km 124+270 before flowing through a wetland complex and into Kicking Horse River. No information was available for this watercourse in FIDQ, but no barriers to fish passage were indicated on iMapBC, therefore fish present in Kicking Horse River are potentially present in this tributary.
  - Another unnamed tributary with no watershed code flows parallel to the south side of TCH near km 124+570. Approximately 1500 m northwest of km 124+570 this tributary turns south and joins Kicking Horse River. No information was available for this watercourse in FIDQ, but no barriers to fish passage were indicated on iMapBC, therefore fish present in Kicking Horse River are potentially present in this tributary.

In addition to the Kicking Horse River, one unnamed tributaries with no watershed codes are present in the vicinity of the Storage Sites:

- Mount Vaux (km 119+500) - one tributary, > 30 m away. No information was available in FIDQ but no barriers to fish passage were indicated on iMapBC, therefore fish present in Kicking Horse River are potentially present.
- AB/BC Border (km 82+000) – none.
  The AB/BC Border Storage Site is not located within the Kicking Horse River watershed. It is within the Bath Creek portion of the Upper Bow River system. The nearest watercourse visible on available mapping databases is almost 1 km east of the site.

Table 6: Fish Species Present in Kicking Horse River[2]

Bull Trout (*Salvelinus confluentus*)	Brook Trout (*Salvelinus fontinalis*)
Rainbow Trout (*Oncorhynchus mykiss*)	Kokanee (*Oncorhynchus nerka*)
Pygmy Whitefish (*Prosopium coulterii*)	Mountain Whitefish (*Prosopium williamsoni*)
Slimy Sculpin (*Cottus cognatus*)	Torrent Sculpin (*Cottus rhotheus*)
Mottled Sculpin (*Cottus spp.*)	Redsided Shiner (*Richardsonius balteatus*)*
Lake Trout (*Salvelinus namaycush*)	Longnose Sucker (*Catostomus catostomus)*
Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)	*Recorded only in a tributary to Kicking Horse River

None of these species are listed as Threatened or Endangered under Schedule 1 of SARA. However, the BC population of Westslope Cutthroat Trout is listed as SARA Schedule 1 Special Concern and COSEWIC has ranked Bull Trout as Special Concern and Kokanee as Endangered.

[2] Source: Fish Inventory Data Queries (FIDQ): http://www.env.gov.bc.ca/fish/fidq/index.html; habitat wizard: http://maps.gov.bc.ca/ess/sv/habwiz/ and McPhail 2007. Information on underlined species provided by PCA Aquatic Specialist Shelley Humphries (May 5, 2015).

The Kicking Horse River, as well as its tributaries, contains and provides a source of water, food and nutrients to, fish and fish habitat and is, therefore, subject to the Federal *Fisheries Act.* No instream works are anticipated to occur during the Project and it is unlikely that harm to fish will occur if construction activities are appropriately mitigated. Since the proposed works will generally occur more than 30 m from a watercourse and mitigation measures presented herein are protective of the watercourses, it is unlikely that this Project would require a Request for Review or Authorization from Fisheries and Oceans Canada (DFO).

Cultural Resources:

Parks Canada describes a number of National Historic Sites (Abbot Pass Refuge Cabin, Spiral Tunnels) and Federal Heritage Buildings (Takkakaw Falls Warden Cabin, Yoho Ranch Cabin) within YNP. None of these sites are located directly within the 2015 project areas and are unlikely to be affected by the proposed rock reprofiling.

The transportation corridor from Field to Lake Louise is part of the Kicking Horse Pass National Historic Site (NHS). There are three identified historic sites associated with that NHS falling in the project area at the Lower Sherbrooke site. These include:

- The historic bridge (521T) across the highway from the Lower Sherbrooke rock slope;
- A historic CPR spur line (438T) upslope of the rock slope (at approximately 89+100 starting near the highway edge just east of the slope and diverging away from the slope to the west); and
- A train wreckage site (530T) on the south side of the spur, about 20 m from the rock edge.

LiDAR images show a depression near the Lower Sherbrooke rock slope that appears consistent with an arrester site, but no distinct features are discernable on Google Earth images, which shows only thick vegetation. A site visit conducted by Trevor Kinley of PCA on April 8, 2015 confirms that the spur line alignment roughly parallels the TCH at 89+100 but sharply turns westward at 89+200. Mr. Kinley also noted that there are artifacts from an old train scattered in the vegetation adjacent to the alignment, most of which are buried in the damp ground below the switch (Trevor Kinley, Pers. Comm., March 9, 2015). Certain sections of this historical location has potential to be affected by Project activities such as vegetation clearing, constructing access roads and reprofiling work, including blasting, depending on the methodology used to complete the work (i.e., machinery vs. hand equipment). According to Mr. Kinley, McElhanney indicated that the vegetation clearing and the access road for rock resloping can be cut below the spur line (438T) so that it is not impacted. Similarly, vegetation clearing near the train wreckage (530T) has been flagged approximately 3 m south of the wreck. If clearing and construction activity remains within the flagged boundaries the 530T site should not be impacted.

The historic bridge (521T) is gated and is not likely to be affected by the project.

A historic highway grade (439T) that is part of the Kicking Horse Trail is also present in the vicinity of the Little Topple slope. This grade will be used to access sites for clearing vegetation.

The Kicking Horse River was designated as a Canadian Heritage River in 1989. The Canadian Heritage Rivers System (CHRS) was established to conserve rivers with outstanding natural, cultural and recreational heritage. The Kicking Horse River is a classic example of a glacial mountain river and the valley provides excellent opportunity to explore natural features; the river valley also played a major role in the exploration and development of the Canadian West (CHRS 2011).

Visitor Use and Experience:

The Project area is within YNP, part of Canadian Rocky Mountains UNESCO World Heritage Site, which is renowned for its scenic splendour. The name “Yoho” is a Cree expression of awe and wonder (Parks Canada, 2014). With 28 peaks over 3000 m, unique geological formations and multiple waterfalls, YNP is an attractive destination. Visitors can participate in many outdoor activities such as hiking, camping, canoeing, skiing and cycling in addition to enjoying the natural viewscapes.

Direct human use of the Project area is primarily related to the TCH, the main transportation corridor through YNP. TCH will remain open to traffic but lane closures and traffic control will be required to conduct the rock slope reprofiling. It is expected that there will be traffic delays throughout the project.

Valued Components:

Valued components for which there is potential for project effects include:

- Plant and wildlife species (including rare species) – wildlife encounters, habitat disturbance or loss (vegetation removal etc.);
- Vegetated areas within the work zones;
- Aquatic wildlife (amphibians) with potential to make use of the riparian area for breeding;
- Aquatic components – Kicking Horse River and tributaries water quality from the introduction of deleterious substances;
- Fish habitat identified within Kicking Horse River and tributaries;
- Visitor experience – traffic delays and altered viewscapes (changes to rock slopes and visible material storage along TCH); and
- Cultural resources (historic road grade, historic spur line and train wreckage site at Lower Sherbrooke rock slope and previously unidentified artifacts) – damage or destruction by equipment, blasting or rock removal.

10. EFFECTS ANALYSIS

Please see the Effects Identification Matrix in Appendix 1 for further identification of Direct Project effects. No indirect effects from the rock slope remediation works are anticipated given that the tasks are of a routine nature and all will take place in or immediately adjacent to an existing transportation corridor (TCH). The natural environment in transportation right-of-ways (ROW) is well understood and is considered to be previously disturbed.

Vegetation:

1. Vegetation clearing is anticipated to be minimal within each of the zones proposed for remediation. Where vegetation is established along cliff edges or close to edges of slopes, removal may be necessary as a safety consideration. These areas have been previously disturbed for highway development and use and during previous rock slope remediation programs which limits, but does not preclude, the presence of sensitive or rare species.
2. Tree felling will be required at all slopes and potentially at both storage sites.
3. Vegetation trampling may occur where construction crews are required to access the rock slopes.
4. Vegetation in the immediate vicinity of the proposed project works may be affected by dust accumulation caused by construction activities.
5. An accidental spill of a harmful substance on site could affect surrounding vegetation.
6. Rare vegetation species have potential to be encountered as previous occurrences have been identified within 5 km of the Project areas (See Section 9, Table 3) though none are known to occur at the Project areas. Although the habitat preferences of the identified species suggest it is unlikely they will be encountered in the Project areas, rare vegetation may be disturbed or destroyed by Project activities.
7. Colonization of non-native and/or invasive species may occur as a result of equipment not properly cleaned prior to coming to a site.

Wildlife:

1. Avoidance behaviors from local wildlife, including rare species, may occur as a result of increased noise and human presence from project activities resulting in disruption or impediment to wildlife movement.

2. Project activities are expected to overlap the nesting season and may impact nesting activities. Work conducted during the nesting season will require pre-construction nest sweep to identify bird nests that may be affected.
3. Local wildlife may be affected by an accidental spill of a harmful substance on site, particularly if spilled into a waterbody.
4. Dust generated from work activities may affect air quality, having a short-term negative effect on local wildlife, or on aquatic animals should excessive dust settle within nearby watercourses.
5. Garbage and waste generated by the construction activities may attract local wildlife and lead to human-wildlife interactions.
6. The potential mammal den that was identified during the winter track count at the Spiral Tunnels Hill Slope could be affected by project activities if the den is active.

Aquatics:

1. Deleterious substances (from equipment, construction materials, dust and worksite refuse) may enter waterbodies during construction and affect water quality and aquatic life at and downstream of the project site.
2. Aquatic life may be affected at and downstream of the project site should an accidental spill of harmful substance enter the Kicking Horse River or one of the tributaries.
3. Fish and aquatic wildlife (amphibians) may be negatively affected (e.g., physiological response, behavioural avoidance) by blasting activities that occur close to a watercourse.
4. Aquatic habitat may be destroyed or harmfully altered if construction activities occur within or adjacent to a watercourse (i.e., the riparian zone).
5. The proposed AB/BC Border Storage area is unlikely to have significant impacts to aquatic resources as the closest watercourse is almost 1 km east. The proposed Mt Vaux Storage Area is unlikely to have significant negative impacts to the Kicking Horse River or its tributaries given its placement adjacent to the TCH. Sufficient distance appears available between the storage locations and any watercourse, and along with standard mitigation measures, this storage will be unlikely to negatively affect aquatic resources.

Cultural Resources:

1. Unknown cultural resources (e.g., unidentified archaeological sites) may be affected by vibrations during blasting activities, machinery use or reprofiling works.
2. The historical alignment of CPR spur (438T), the historic road grade (439T) and the semi-buried artifacts of a train wreckage (530T) near the Lower Sherbrooke slope may be disturbed or destroyed by vegetation clearing, constructing access roads and reprofiling work, including blasting, depending on the methodology used to complete the work (i.e., machinery vs. hand equipment).

Visitor Experience:

1. Traffic delays are likely to occur during the Project.
2. Visitors may experience temporary increased noise and vibration during blasting activities.
3. Project activities may result in a temporary increase of dust.
4. Viewscapes will be altered by rock slope reprofiling and temporary storage of materials.

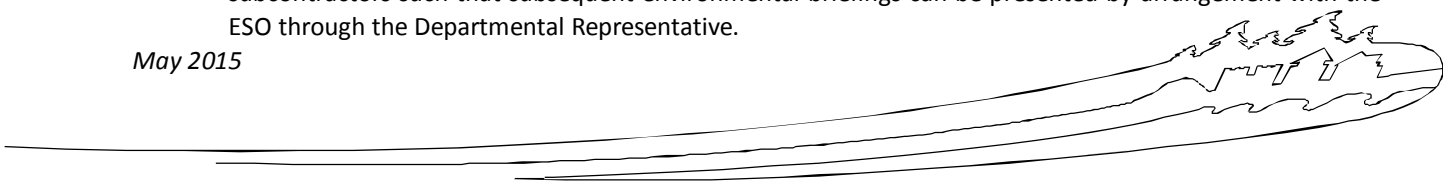
11. MITIGATION MEASURES

Mitigation measures can be applied by adhering to operational protocol or through project design alterations adopted by the Project to reduce potential adverse effects to identified VCs.

Project Measures:

General

1. The Contractor is required to prepare an Environmental Protection Plan (EPP) in accordance with Parks Canada Environmental Procedures. The EPP shall include, but is not limited to:
    a. An access plan including access routes, type of equipment used for various construction phases, and lay down areas in order to prevent/minimize disturbance to vegetation and soils. Lay down areas shall occur on paved and/or hardened surfaces. Any new laydown areas will require approval from the Environmental Surveillance Officer (ESO) and Departmental Representative.
    b. Details on how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur and to ensure that the environment is not impacted or damaged by workers or construction equipment beyond the work limits.
    c. Details on how to prevent/minimize impacts to the historic rail spur, historic road grade and train wreck sites located near the Lower Sherbrooke slope.
    d. An erosion and sediment control plan to prevent/minimize sedimentation and erosion into watercourses within or adjacent to the Project area and which will outline appropriate dewatering and erosion and sediment control measures for the project, if required.
    e. A Spill Response Plan will be prepared by the Contractor and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The Plan shall include a list of products and materials to be used or brought to the work site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, cement and/or resin based grout (for rock anchors), non-ANFO explosives and hydrocarbon products.
    f. An emergency response plan that outlines procedures to follow in the case of an emergency (e.g., wildlife encounter, equipment malfunction/failure, fire or blasting incident).
    g. A fire prevention plan which describes the fire prevention equipment (fire extinguishers etc.) and procedures on site in the event of a fire. Should a fire occur, Banff dispatch and the Fire Duty Officer must be notified immediately.
2. An on-site ESO will be assigned by PCA to provide periodic and unscheduled site visits to ensure that Project operations are conducted in accordance with all identified environmental protection measures (including, but not limited to those within this document, applicable legislation and construction Best Management Practices). The ESO maintains the right to halt any work that does not comply with all Project Approvals, Permits or Authorizations. The Contractor is responsible for undertaking environmental monitoring and follow up reporting of remediation works such that criteria in PCA Approvals and the EPP are being adhered to.
3. The ESO will have the authority to halt any work that does not comply with regulatory requirements or causes adverse environmental impacts. Failure to comply with or observe environmental protection procedures may result in the work being suspended pending rectification of the problems.
4. It is the responsibility of the Project Manager to ensure that all Project works are conducted in accordance with all applicable legislation, regulations and/or approvals including the *Fisheries Act, Species at Risk Act* and *Canada National Parks Act*.
5. The Contractor must obtain all necessary permits prior to the commencement of Project activities.
6. It is expected that all staff and contactors will understand and comply with all National Park regulations within the Park. All staff employed at the construction site will be required to attend an environmental briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. This information will be available on site and provided to any new workers and/or subcontractors such that subsequent environmental briefings can be presented by arrangement with the ESO through the Departmental Representative.
7. All contractors shall be subject to an environmental briefing regarding their individual and collective responsibilities to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. This information should be available on-site and provided to any new workers and/or subcontractors such that subsequent environmental briefings can be presented by arrangement with the ESO through the Departmental Representative.



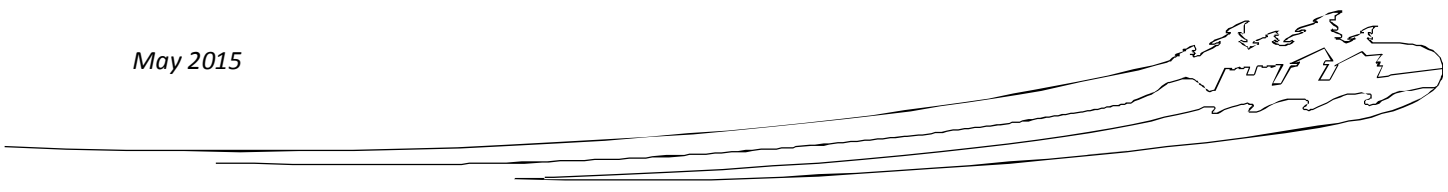
8. PCA and the Contractor should be prepared to change existing measures and BMPs should they fail or additional measures are required. The ESO/EM should be notified of any changes to ensure they are adequate and installed properly.
9. It is the responsibility of the Contractor to provide Parks Canada staff with advance notifications of Project activities and ensure that this information be included in local media.
10. All site staff are required to wear appropriate Personal Protective Equipment (PPE) and be trained to standards that comply with Worksafe BC.
11. Firearms and pets are prohibited on site.
12. Fishing on site by Project crew is prohibited.
13. The Contractor assumes any risk to public safety as a result of Project activities.

Spill Management and Hazardous Materials:

14. The EPP shall contain a section specific to Spill Management. Spill response plans should include spill prevention and spill reporting requirements along with step-by-step procedures for responding to potential spill incidents.
15. Appropriately sized and stocked spill kits shall be on site and each piece of equipment. The kits shall be suitable for the quantities and types of material in use and stored at the site. They should be capable of dealing with 110% of the largest potential spill. All staff should be aware of their location(s) on site and trained in spill response procedures.
16. Any spill of a substance that is toxic, polluting, or deleterious to aquatic life should immediately be reported to Parks Canada Dispatch and the ESO/EM.
17. Hydrocarbon and coolant storage, if required on site, shall be within an impermeable containment facility capable of holding 110% of the storage tank contents. This may be achieved through the use of double-walled storage tanks or constructing a containment berm out of durable material. These containment basins shall be inspected daily for leaks and wear points, kept clean and any measurable rainwater removed and disposed of appropriately. If practical, the containment area should be covered to prevent infilling with rainwater. Where leaks and/or wear points are found, they shall be repaired promptly to restore full containment.
18. Contractors shall ensure that small containers (i.e., jerry cans) will be stored in a secure location, protected from weather. These containers must be designed solely for the purpose of storing and pouring fuel and shall not be more than 5 years old. Containers must not leak and must be sealed with a proper fitting cap or lid.
19. Hydraulic fluids for on-site equipment will be biodegradable in case of accidental loss of fluids.
20. Hazardous materials must be labelled and disposed of according to the Workplace Hazardous Materials Information System criteria and the Transportation of Dangerous Goods (TDG) Regulations.

Machinery and Equipment:

21. Equipment and machinery should be in good operating condition, clean (power washed), free of leaks, excess oil and grease and non-native plant species. Equipment leaking or producing excessive exhaust should be repaired or replaced. Any detected leaks from equipment on site will be addressed immediately and absorbent pads will be used under equipment with chronic leaks. Equipment stored overnight should be stored on tarps with appropriate containment if required.
22. Machinery should be situated to minimize track movement.
23. Equipment servicing and maintenance should not occur on site.
24. Refueling of equipment should occur on land at least 100 m from any watercourse, where possible. Where 100 m is not possible, a location as far as possible from the watercourse should be chosen. Topographic features and slope should be considered. The refueling area should have a spill containment kit immediately accessible and personnel should be knowledgeable in its use.
25. Generally, personal vehicles shall be parked at least 10 m from any watercourse.



Air Quality and Noise:

26. Dust-generating activities should be minimized as much as possible during windy periods.
27. The Blaster of Record will ensure the blast zone is clear of people and wildlife prior to detonation. Materials to be blasted may be covered with suitable material (i.e., blast mats), if necessary, to control fly-rock.
28. No burning of oils, rubber, tires and any other material should take place on site.
29. Stationary emission sources (e.g., portable diesel generators, compressors, etc.) should be used only as necessary. Equipment and vehicles should be turned off when not in active use to reduce noise and air pollution.
30. All equipment, vehicles and stationary emission sources should be well-maintained and used at optimal loads to encourage minimal noise and air emissions.
31. To minimize noise and dust generation, blasting activities should be conducted according to industry best management practices and tender specifications. Contractors should determine appropriate charge size, pattern design and spacing to create efficient blasting and minimize frequency/size of detonation while accomplishing the task.

Erosion and Sediment Control:

32. Plan and schedule Project activities for dry weather whenever possible. When significant wet weather is encountered, then additional measures may be required to minimize erosion potential.
33. Minimize construction and equipment travel during periods of heavy precipitation. Excavation activities should be halted during heavy rainfall events. Work may be stopped completely or works may require additional erosion and sediment control measures be implemented in order to permit work to continue.
34. Minimize the area of soil exposed at any one time by: phasing construction activities; retaining vegetation as much as possible; and, once construction works are completed, stabilize the exposed soils as soon as possible using temporary measures such as mulch, erosion sediment control blankets, hydroseeding, and/or plastic sheeting or planting long-term vegetation (if during the appropriate time of year).
35. Stockpile, or have readily available, supplies of erosion and sediment control materials as appropriate on-site such as (but not limited to) rock, gravel, grass seed, silt fencing, staking, polyethylene sheeting, etc.
36. Contractors shall stabilize any waste materials removed from the work site to prevent them from entering a watercourse. All storage of waste materials shall be kept a minimum of 30 m, or as far as practical, from any watercourse to reduce the potential for any deleterious substance entering the water.
37. Erosion and sediment control measures should be routinely inspected. After a heavy rain event, it is likely that many of the controls will require repair, clean out, or reinforcement. A quick response to assess and correct damages of the controls is required, especially before subsequent precipitation events.

Vegetation:

The following mitigation measures are suggested to reduce the potentially negative impacts to vegetation:

1. A rare plant survey will be conducted by the Departmental Representative prior to the commencement of construction. If rare plants are found, PCA will be contacted and appropriate mitigation measures will be implemented.
2. No clearing of whitebark pine or other rare vegetation species is to occur without acquisition of appropriate permits (e.g., SARA). The slopes scheduled for remediation in 2015 were inspected for rare tree species by Trevor Kinley (PCA Environmental Assessment Scientist) and no whitebark pine or limber pine were found.
3. All Contractor's equipment will be stored either on the road or on previously disturbed or hardened surfaces in order to avoid trampling roadside vegetation and compaction of soils.
4. Efforts shall be made to ensure the minimum amount of vegetation is cleared or disturbed at each site. Areas to be cleared should be visibly delineated to reduce potential for unnecessary vegetation removal.
5. The area(s) to be cleared should be clearly marked with highly visible materials (i.e., flagging tape, snow fencing) to ensure equipment operators are aware of the area they are to work in.

Equipment operators should work carefully to ensure they do not cause mechanical damage to trees and other vegetation outside the designated clearing area.

6. Prior to accessing Yoho National Park, construction equipment, particularly tire treads, shall be pressure washed to prevent the introduction of non-native species.
7. Should non-native species be identified on-site and presence is suspected to have occurred during construction, PCA shall be notified and the appropriate removal should be undertaken.
8. Vegetation removal that will affect trees used by all birds and other wildlife should be avoided wherever possible while they are breeding, nesting, roosting or rearing young.
    - If vegetation removal is required during the nesting period, an appropriately qualified environmental professional should survey vegetation to be removed to identify any breeding, nesting, roosting or rearing birds and determine species-specific BMPs.
    - Environment Canada's General Regional Nesting Period for the Northern Rockies, Zone A4 is mid-April to mid-August (Environment Canada 2014). It is anticipated that the Project will occur between June and October 2015 which is during the sensitive nesting period of many bird species.
9. In addition to conducting a pre-disturbance nest survey, trees felled during the nesting period may require a Restricted Activity Permit from PCA. The contractor should consult with PCA to determine the need for and specific requirements of a RAP, including best management practices which *may* include (AXYS 1998):
    - Minimizing tree removal as much as possible;
    - Visibly marking the trees to be removed;
    - Leaving a buffer of vegetation to maintain aesthetic values, where possible, when felling occurs within line-of-site of roads or trails. Consult with PCA to determine potential alternatives;
    - Felling trees by hand where possible;
    - Avoid felling obvious wildlife trees where possible;
    - Avoid felling mature trees (DBH >30 cm) where possible;
    - Salvage trees with DBH >15 cm for firewood or merchantable timber (may require a timber salvage permit from PCA);
    - Timber decking sites should occur within the existing work space; and
    - Preference is for slash to be piled and burned on site. Piles cannot exceed 2 m in width and 1.5 m in height. Piles must be located far enough from retained trees so that they are not damaged or killed. If chipping, chips may cover up to 25 m^2/ha to a depth of < 8 cm note that burning is typically not approved within 100 m of a road, 200 m of a named watercourse or 500 m of residences/campgrounds.

      Tetra Tech EBA notes that Tree Felling activities are fully assessed in a separate BIA (File # 2015-017Y), which should be referred to for complete mitigation measures.
10. Vegetation in areas temporarily disturbed by heavy equipment and other construction-phase related activities (including lay-down sites, temporary work sites, and material stock pile sites) should be restored as quickly as possible. This may be accomplished by planting grass seed or hydroseeding (using certified "weed free" mixtures approved by PCA).
11. Should impacts to surrounding vegetation be detected, appropriate measures to re-vegetate and rehabilitate should be implemented using PCA approved methods and seed mix.

Wildlife:

The following mitigation measures are recommended to reduce the potentially negative impacts to wildlife:

1. Works shall be scheduled to occur outside sensitive wildlife periods (nesting, rutting, breeding etc.) as much as possible. Where works are required to occur within sensitive wildlife periods, care will be taken to prevent disturbance or harm to wildlife during the rock slope remediation activities.
   Tetra Tech EBA notes that Mountain Goats are potentially present near the Sherbrooke Slope and Lower Sherbrooke Slope (the west end). The project should be scheduled such that

construction activities occur in these areas after August 15 and for Lower Sherbrooke Slope, as the last are worked on in the year.

2. Vegetation removal that will affect trees used by birds (both migratory and non-migratory) and other wildlife should be avoided wherever possible while they are breeding, nesting, roosting or rearing young.
    - If vegetation removal is required during the nesting period, an appropriately qualified environmental professional should survey vegetation to be removed to identify any breeding, nesting, roosting or rearing birds and determine species-specific BMPs.
    - Environment Canada's General Regional Nesting Period for the Northern Rockies, Zone A4 is mid-April to mid-August (Environment Canada 2014). It is anticipated that the Project will occur between June and October 2015 which is during the sensitive nesting period of many bird species.
3. PCA shall be notified immediately in the event of human-wildlife interactions, or activity or encounters with bears, goats, cougars, wolverine or any species at risk. In the event of encounters with dens, litters, nests, carcasses (road kills), bear activity or wildlife encounters in or around the site, the ESO and Departmental Representative shall be immediately notified. Other wildlife-related encounters shall be reported within 24 hours.
4. Feeding, harassment or destruction of any wildlife is strictly prohibited. Wildlife encountered at or near project locations will be allowed to passively disperse without undue harassment.
5. All efforts to prevent wildlife from accessing human food, garbage or other domestic wastes shall be made by the Contractor and contract staff while undertaking work in National Parks. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal from the Park and off-site disposal of food scraps, food wrappers, pop cans, domestic waste, and other potential wildlife attractants is mandatory. Existing Parks Canada waste receptacles shall not be used for disposal of such wastes without prior arrangement with PCA. Incidents involving wildlife accessing garbage or attractants should be reported immediately to PCA.
6. Where catchment ditch clearing is required prior to remediation works to increase catchment ditch area, ditches containing water shall be inspected for breeding amphibians by the Departmental Representative. Timing of ditch clearing activities shall be scheduled to avoid sedimentation during periods when larvae or eggs may be destroyed, if possible. Any locations deemed to be permanent amphibian habitat shall be identified and avoided. If these areas are required for ditch clearing works, PCA shall be consulted to determine appropriate actions to avoid amphibian mortality.
7. Prior to blasting, the Contractor shall "sweep" the work area and maintain a continuous watch for wildlife that may be present. If wildlife is present, work shall be halted until the wildlife have passed through the area and/or have been hazed out of the area by the ESO, representative of Parks Canada or appropriately qualified biologist. The sweep will be done as soon before blasting and as close to the blasting as can be safely achieved, and that binoculars will be used where needed.
8. The Contractor shall describe the proposed type and quantities of explosives to be used to the satisfaction of the Departmental Representative and ESO. Blasting products that may produce high residual nitrogen concentrations (such as ANFO) will not be permitted.
9. Species at risk could potentially be observed on or near the Project locations. Should this occur, operations in the immediate vicinity of the species should be halted and should re-commence only when the species has left the immediate area. PCA Resource Conservation staff shall be notified immediately via Banff Dispatch at 403-762-4506 (emergencies) or the Wardens Office in Yoho at 250-343-6324 (non-emergencies).
10. All work activities shall meet or exceed the standards outlined in DFO's "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters"; Canadian Technical Report of Fisheries and Aquatic Sciences 2107, 1998.
11. Best Management Practices for working in and around water will be applied when working near watercourses. Considerations for working near water, such as erosion and sediment control measures, are to be incorporated into the project EPP.
12. Construction traffic should yield right-of-way to wildlife. A Traffic Safety Plan will incorporate protocol for wildlife occurrences along roads within the project area, due to presence of bears, cougars, elk or moose which can be aggressive towards humans.

13. The potential mammal den that was identified during the winter track count at the Spiral Tunnels Hill Slope will be checked this year by the Departmental Representative to determine if it is an active den. If it is active, PCA will be contacted to discuss mitigations options. Mitigation measures will then be incorporated in to amended or new BIAs as needed.

Aquatics:

Impacts to fisheries resources can be mitigated through application of Best Management Practices for working in or around water. Unless otherwise stated, the requirements related to sediment, drainage, and water quality management for the Project are applicable to all Project construction areas. The mitigation and monitoring measures described below will be used as the basis for preparing the final sediment, drainage, and water quality management plan:

1. The Contractor is responsible for ensuring that the Project avoids causing 'serious harm to fish' as per the *Fisheries Act*. While the Project is not anticipated to require input from DFO, 'measures to avoid causing harm to fish and fish habitat' (available at: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html) are to be employed as appropriate. Advice within these Measures replaces former Operational Statements produced by DFO.
   Blasting activities will be conducted to meet or exceed the standards outlined in Department of Fisheries' and Ocean's (DFO's) "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters"; Canadian Technical Report of Fisheries and Aquatic Sciences 2107, 1998.
2. Disturbance to natural materials and vegetation that contribute to fish habitat or stream channel stability will be minimized. Should vegetation which contributes to fish habitat need to be removed, a restoration plan that meets the Parks Canada requirements for re-vegetation will be compiled subject to YNP review and acceptance.
3. The natural hydrological regimes should be maintained during all phases of activity where possible.
4. Regarding the unnamed tributary near 89+300 on Lower Sherbrooke slope:
   - Reprofiling will require disturbance to the riparian zone and wetted channel of this watercourse. Given the steep slope and that it appears to be a headwater stream, it is unlikely that fish are present (though this is unconfirmed). However, it does contribute nutrients and water to Kicking Horse River and should be protected from having deleterious substances, including sediments, enter it.
   - Flows should be maintained during reprofiling works. It may be necessary to dam the tributary well upstream of the reprofiling cut area and pump the water downslope to the ditch.
   - Reprofiling in the wetted area must be conducted such that a similar tributary "channel" exists post-work (i.e., the tributary must have similar morphology so that it enters the ditch at the point as the original channel).
5. If the work schedule requires working during high precipitation periods or high runoff periods, the area of work must be isolated and appropriate sediment and erosion controls must be installed to prevent the release of sediment laden water or any other deleterious substance. As works for the Project will involve the disturbance of soils, prevent the transport of sediment through application of appropriate erosion and sediment control mitigation guidelines as per DFO Measures.
6. No water is to be extracted from a local stream, river or other water body within a National Park without a Restricted Activity Permit.
7. Deleterious substance control and spill management will be incorporated into the project EPP and will include, but not be limited to, a Spill Response Plan, an Erosion and Sediment Control Plan and a Hazardous Waste Management Plan. The EPP is subject to PCA review.
8. Work will be undertaken and completed in such a manner as to prevent the release of sediment-laden water, raw concrete or concrete leachate, or any other deleterious substance into a watercourse, tributary or drainage ditch which leads to fish habitat.
9. Contractors shall identify equipment and vehicle fuelling locations for approval by PCA and the ESO. Vehicles and equipment will not be serviced or refuelled within 30 m of any watercourse, tributary or drainage ditch which connects to fish habitat. Tanks, hoses and connections will be inspected prior to use. All hose connections will be wrapped and secured with absorbent pads during fuel/oil

transfers. All hoses, valves and equipment are to be kept in a containment area whenever possible. Hose length and the number of connections shall be minimized - use dripless connections if possible. Drain hoses when finished. Gravity fed systems are not permitted within YNP, manual or electric pump delivery systems shall be used.

Cultural:

Impacts to cultural resources can be avoided or minimized with the implementation of the following mitigation measures:

1. If artifacts or features are encountered, construction should be stopped and the Departmental Representative should wait for instructions before proceeding with the work. The YNP Environmental Surveillance Officer or Cultural Resource Management Officer will be notified who will contact Parks Canada's Terrestrial Archaeology Section for further guidance. In order to assess the situation, documentation should include, what was seen, the location of where the material was encountered, what the surrounding soil looked like, how deep it was from the ground surface, or if it was at ground surface. If possible, a photograph should be taken and sent along with the description information to the archaeologist. Preferably, artifacts should be left in place until a Parks Canada archaeologist has been consulted.
2. All known artifacts of historical importance at or near worksites will be left undisturbed.
    - The historic highway bridge across from the Lower Sherbrooke slope is to be avoided. Activities must be planned in such a way as to eliminate risk of impact to this structure by machinery, logs or other causes.
    - The train wreckage site is to be avoided. Activities must be kept as close to the rock edge as feasible.
    - Care must be taken to not impact the rail spur with heavy machinery or tracked vehicles without mitigating adverse effects on the rail grade. If feasible, hand falling is the preferred method of harvesting at this site.
    - Care must be taken to not impact the old highway grade with heavy machinery or tracked vehicles without mitigating the effects on the road grade.
3. Work around a known cultural resource should be conducted in a manner to minimize potential disturbance. This may include:
    - Designing access roads and slope profiles to minimize area of disturbance while accomplishing safety/maintenance objectives.
    - Visibly delineating boundaries of work areas to prevent unintentional disturbances.
    - Limit vegetation clearing and machinery movement to minimize physical disturbances.
    - Conduct an "artifact sweep" prior to physical disturbances. PCA should be contacted to assess whether it is feasible or desirable to salvage artifacts.
4. All wildlife artifacts (e.g., antlers, bones, skulls) at or near worksites will be left undisturbed.

Visitor Use and Experience:

Potential effects to human use of the Project area are expected to be temporary. By implementing the mitigation measures described in other sections, effects on human use will be reduced (e.g., Air Quality and Noise measures). Changes to the viewscape at the rock reprofiling sites will be permanent and cannot be mitigated however, these changes will occur along a transportation corridor that has been previously altered and represents a small portion of the total park area.

Changes to the viewscape at the Storage Sites are expected to be temporary. Although large stockpiles will change the visual aesthetics of the area, it is anticipated that the materials will be used for future road maintenance/upgrade projects within the YNP. Storage Sites are located in previously disturbed areas to further minimize impacts.

Accidents and Malfunctions:

During the Project, there will be potential for the release of deleterious substances and/or the risk of project related accidents/malfunctions. The following mitigation will be implemented during Project works:

1. An Environmental Protection Plan (EPP) will be developed and implemented by the Contractor prior to Project initiation. These plans will be submitted to the Yoho Field Unit or ESO for review prior to implementation. These plans will be available to all staff during project activities and will detail appropriate work methods, spill response procedures, erosion control methods, spill and emergency response contacts, and a fire suppression plan.
2. An on-site environmental professional should be used for construction/effects monitoring intermittently over the construction period or according to regulatory approval criteria.
3. A spill containment kit will be kept on site and readily accessible. All equipment on site will be equipped with a spill kit adequate for the specific type and size of individual items.
4. The storage of fuels and deleterious substances will be kept at least 100 m from any drainage course and will be sufficiently contained to accommodate at least 110% of the maximum volume stored. All fuels and deleterious substances will be stored in accordance with applicable Workplace Hazardous Materials Information System (WHMIS) standards.
5. All workers will be instructed to abide by all applicable Work Safe BC guidelines and will complete a project-specific worker safety orientation prior to working on site.
6. Public access to the Project work area will be denied during Project activities.
7. Erosion and sediment control devices will be kept in place and in good working order during the Project. These will be further specified in the EPP.
8. No fires are permitted at work sites and adequate fire response equipment will be available in order to respond to accidental fires.
9. In case of fire, the Contractor or worker shall immediately take action to extinguish the fire if safe to do so. The ESO and Departmental Representative shall be notified of any fire immediately. If not available, Banff Dispatch will be contacted (403-762-4506) and 911 (emergencies) or the Wardens Office in Yoho at (250-343-6324).

12. CONSIDERATION OF THE NEED FOR PUBLIC PARTICIPATION & ABORIGINAL CONSULTATION

12 a) Indicate whether opportunity for public participation should be offered:

__X__ No ____ Yes

12 b) Indicate whether there is a requirement for Aboriginal Consultation:

__X__ No ____ Yes

13. EFFECT SIGNIFICANCE

Temporary Effects:

Temporary effects resulting from the proposed project activities include:

- Possible avoidance behavior of local wildlife due to increased noise and human presence at the project site.
- Conversely, attraction of wildlife to site due to garbage and waste generated by the construction activities and crew.
- Potential spills and leaks resulting from the proposed project activities and equipment.
- Disturbance to vegetation due to construction activities, laydown areas or parking locations.
- Traffic delays.
- Increased noise and vibration from blasting activities.
- Altered viewscapes due to temporary storage of materials.

Permanent Effects:

- Altered landscape due to reprofiling activities (i.e., changes to viewscape).

Residual Effects:
It is anticipated that there will be no significant adverse residual environmental effects as a result of the proposed project activities provided all mitigation measures discussed in this report are followed. The majority of effects are limited in magnitude, geographic extent or duration which results in *no significant adverse effects.*

Although the altered landscape and changes to viewscape is a permanent effect, it is considered to be of low magnitude (slight decline in the resource) because it is congruent with transportation corridor appearances and is unlikely to considerably alter the overall visual merits of YNP.

14. SITE INSPECTION

Document whether a site inspection program will be required while the project is underway.

__X__ Site inspection required
____ Site inspection not required

As per mitigation measures above, an on-site ESO or other Parks Canada Representative will be available to oversee the construction activities. The ESO will complete periodic and unscheduled site visits to ensure that Project operations are conducted in accordance with all identified environmental protection measures. The ESO maintains the right to halt any work that does not comply with all Project Approvals, Permits or Authorizations. The Contractor is responsible for undertaking environmental monitoring and follow up reporting of remediation works such that criteria in PCA Approvals and the EPP are being adhered to.

15. SPECIES AT RISK MONITORING

There are not expected to be any adverse effects to species at risk prior to, during or following rock reprofiling along the Trans-Canada Highway provided mitigation measures outlined are adhered to.

16. SARA NOTIFICATION

Effects to SARA listed species are not expected to occur as a result of this Project provided mitigation measures identified herein are adhered to.

17. EXPERTS CONSULTED

Department/Agency/Institution: PCA	Date of Request: March 10, 2015
Expert's Name: Trevor Kinley	Title: Environmental Assessment Scientist
Contact Information: 250-347-6634 P.O. Box 220, Radium Hot Springs, BC V0A 1M0 trevor.kinley@pc.gc.ca	
Expertise Requested: Known wildlife observances, use, studies etc. within the project areas.	
Response: Information included in Section 9	
Department/Agency/Institution: Tetra Tech EBA	Date of Request: throughout BIA
Expert's Name: Anders Frappel, P.Eng. FGS	Title: Team Leader - Rock Engineering Group
Contact Information: 778-945-5833 Anders.Frappel@tetratech.com	
Expertise Requested: information regarding limits of project areas, volumes to be resloped, construction methods etc.	
Response: Information incorporated throughout BIA	

Department/Agency/Institution: PCA	Date of Request: May 1, 2015
Expert's Name: Shelley Humphries	Title: Aquatic Specialist
Contact Information: 250-343-6108 P.O. Box 99, Field, BC V0A 1G0 Shelley.humphries@pc.gc.ca	
Expertise Requested: Confirmation of fish species present within Kicking Horse River (especially upstream of Wapta Falls) and within tributaries near Project sites.	
Response: email reply on May 5 2015. Information included in Section 9, Aquatics	

18. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

____ not likely to cause significant adverse environmental effects.

____ likely to cause significant adverse environmental effects.

19. SIGNATURES AND APPROVAL

EA Author *(Add additional signature blocks for multiple authors as required)*

Name: Shawneen Walker, R.PBio.,P.Biol. EP	Date: May 5, 2015
Position: Biologist	
Signature: **ISSUED FOR REVIEW**	

EA Review *(Add additional signature blocks for multiple authors as required)*

Name: Nigel Cavanagh, M.Sc., R.P.Bio., P.Biol.	Date: May 5, 2015
Position: Senior Biologist, Team Lead – Aquatics and Fisheries Discipline	
Signature: **ISSUED FOR REVIEW**	

Decision Approval

Name: A. KOLESCH	Date: YYYY-MM-DD 2015-05-19
Position: (*Field Unit Superintendent, or Designate*) MANAGER, LUPP	
Signature: A. Kolesch	

20. REFERENCE LIST

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Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p.

21. ATTACHMENTS LIST

Appendix 1: Environmental Impact Analysis Tools: Effects Identification Matrix
Appendix 2: SARA-Compliant Authorization Decision Tool
Appendix 3: Cultural Resources Assessment Questionnaire (in development**)
Appendix 4: Species at Risk database search results

22. ADDITIONAL CONSIDERATIONS / COMMENTS

Use this space to record additional content as needed.

23. TRACKING SYSTEM

The project must be registered in the Parks Canada Interim Tracking System within the fiscal year the project took place. If the project is on hold, was cancelled, or was determined to be likely to cause significant adverse effects and did not go ahead, please indicate this information in the tracking system (see selections in the *Assessment Status/Decision* field).

Appendix 1 Environmental Impact Analysis Tools: Effects Identification Matrix

Use the matrix to identify potential impacts.

Section A *focuses on direct effects of the project and* ***Section B*** *on indirect effects that are caused by changes to the environment.*

A. Direct Effects (during preparation/construction phases)														
			Components potentially directly affected by the proposed project											
			Natural Resources					Cultural Resources		Visitor Experience				
			Air	Soil & landforms	Water (Kicking Horse River, tributatires, road drainage, etc.)	Flora	Fauna (birds, mammals, fish)	Heritage River (see "Water)	Historic Sites & buildings	Visitor access &	Recreational/Accomm. opportunities	Viewscapes and soundscapes	Visitor Safety	Essence of place
	Phase	Project Activities												
Project Components	Preparation / construction	Supply and storage of materials	☐	☒	☒	☒	☒	☐	☐	☒	☐	☐	☒	☐
		Clearing	☐	☐	☐	☒	☒	☐	☐	☒	☐	☒	☒	☐
		Disposal of waste	☐	☒	☒	☒	☒	☐	☐	☒	☐	☒	☒	☐
		Blasting	☒	☒	☒	☒	☒	☐	☐	☒	☐	☒	☒	☐
		Excavation of catchments	☒	☒	☒	☒	☒	☐	☐	☒	☐	☒	☒	☐
		Use of machinery	☒	☒	☒	☒	☒	☐	☐	☒	☐	☒	☒	☐
		Transport of materials/ equipment	☒	☒	☐	☐	☒	☐	☐	☒	☐	☐	☒	☐

SAR- species at risk

A. **Direct effects continued** (during operation/implementation/decommissioning phases)														
			Components potentially affected by the proposed project											
			Natural Resources					Cultural Resources		Visitor Experience				
			Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Flora (specify, including SAR)	Heritage River (see "Water")	Historic Sites & buildings	Visitor access & services	Recreational & Accomm. opportunities	Viewscapes and soundscapes	Visitor Safety	Essence of place
	Phase	**Examples of Associated Activities**												
Project Components	Operation/Implementation/Decommissioning	Waste disposal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Wastewater disposal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Maintenance	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Use	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Use/Removal of temporary facilities	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Use of Chemicals	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Active fire stage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Prescribed burn cleanup	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Planting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Culling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Vehicle Traffic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Other…	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Section B- next page

Section B *of the matrix should be used to identify potential indirect effects that may result from impacts on components of the environment you have identified on the preceding pages (see Section A - direct effects to natural resources). This is required under CEAA 2012 Sections 5(1)(c) and 5(2)(b).*

No indirect effects are anticipated to occur as a result of this project.

B. Indirect Effects (all phases)				
		Impacts as a result of changes to the environment		
		With respect to non-Aboriginal peoples:	With respect to Aboriginal peoples:	
		Health and socio-economic conditions	Health & socio-economic conditions	Current use of lands and resources for traditional purposes
Phase	**Natural resource components affected by the project**			
All phases: Preparation /construction operation/implementation/decommissioning	Could impacts to <u>air</u> lead to adverse effects on…	☐	☐	☐
	Could impacts to <u>soils and landforms</u> lead to adverse effects on…	☐	☐	☐
	Could impacts to <u>water</u> (e.g. surface, ground water and water crossings) lead to adverse effects on…	☐	☐	☐
	Could impacts to <u>flora</u> (including SAR) lead to adverse effects on…	☐	☐	☐
	Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on…	☐	☐	☐
	Other…	☐	☐	☐

Appendix 2: SARA-Compliant Authorization Decision Tool

(Note: Please consult a representative of the Species Conservation and Management team when completing this form)

Date:	Topic/Issue:	Species :	Where: (PCA site)	Who: (your name)

Part A – Is a SARA authorization required?

1. Will the activity directly or indirectly affect a listed endangered, threatened or extirpated species at risk, its residence or critical habitat?

Affect = kill, harm, harass, capture, or take individuals; possess, collect, buy, sell or trade individuals or parts of individuals; damage or destroy residence; destroy any part of critical habitat

☒ **No**	**SARA authorization is NOT required.** *Provide explanation and **STOP HERE.*** • *Describe the activity and explain why there is no expected effect, including an explanation of mitigation measures taken to prevent potential effects on species at risk, their residence or their critical habitat.* • *If an environmental assessment (EA) process is being conducted, refer to the mitigations in the EA.* • ***Refer to Section 10 and 11 in BIA report***
☐ **Yes**	**SARA authorization IS required.** *Describe the activity and its effects on the species and continue to Question 2.* *Note: If you are contemplating an activity that may destroy critical habitat, it must be discussed with VPs and the CEO due to a recent federal court decision. If possible, find alternatives and mitigation measures to prevent destruction of critical habitat (i.e., to avoid an effect on the critical habitat and the requirement for an authorization).*

2. Is the activity already authorized in a final recovery document or required for public safety?

☐ **Yes**	**SARA authorization is NOT required.** *Explain why the activity is exempt and **STOP HERE.*** • *Explain why the activity is needed for public safety and make a reference to the Act of Parliament under which the activity is authorized; OR* • *if the activity is authorized in a final recovery document, refer to the published recovery and explain why the activity is exempt under section 83 of SARA).*
☐ **No**	**SARA authorization is required.** *Continue to Part B.*

Part B – Can a SARA authorization be issued?
******Complete ONLY if you have answered Yes to Questions 1 or 2, above******

3. Does the activity fall into one of the following three categories? *Check the appropriate box and continue to Question 4. If the proposed activity DOES NOT fit in any of the three categories below, the activity CANNOT be authorized and you should continue to Part C to summarize your decision.*

☐ The activity is scientific research related to the conservation of the species and conducted by qualified persons; OR

☐ The activity benefits the species or is required to enhance its chance of survival in the wild ; OR

☐ Affecting the species is incidental to the activity (i.e., the purpose of the activity is not a prohibited activity, for example, fishing for a listed species cannot be permitted, but accidental by-catch *may* be, and repairs to a bridge that incidentally disturbs a nearby plant *may* be).

4. If you concluded that the activity can be authorized, have alternatives that would reduce the impact(s) on the species been considered?	
☐ **No**	**The activity CANNOT be authorized as alternatives have not been/cannot be considered**. *Continue to Part C to summarize your decision.*
☐ **Yes**	**The activity MAY be authorized.** *Provide explanation and continue to Question 5.* • *Identify all reasonable alternatives that were considered to reduce the impact on the species (including alternatives to the project and alternative means of carrying out the project, including a "no action" alternative). The explanation must demonstrate that the best solution has been adopted.*
5. Will all feasible measures be taken to minimize the impact of the activity?	
☐ **No**	**The activity CANNOT be authorized.** *If it is <u>not possible</u> to implement all feasible measures, continue to Part C to summarize your decision.*
☐ **Yes**	**The activity MAY be authorized.** • *Identify all feasible measures to avoid or lessen potential impacts of the project on the species and continue to Question 6. Measures and conclusions must be consistent with existing recovery documents, COSEWIC assessments etc.* • *Note: If this authorization is considered as part of an EA process, the information provided should be consistent with the mitigation section of the EA.*
6. Will the activity jeopardize the survival or recovery of the species?	
☐ **Yes**	**The activity CANNOT be authorized.** *If the survival or recovery of the species <u>will</u> be jeopardized, continue to Part C to summarize your decision.*
☐ **No**	**The activity MAY be authorized.** *Provide explanation and continue to Part C.* • *A strong justification is required to demonstrate that the activity will not jeopardize survival or recovery. The justification must demonstrate that the activity will not jeopardize the achievement of the recovery goal and objectives identified in the recovery strategy (if available).* • *Provide a justification that the activity will not contribute to increasing an existing threat, or that it is not an activity that might destroy critical habitat for the species (if identified).* • *Indicate whether the project will increase mortality, decrease fertility/recruitment, affect a key life stage/cycle.* • *Make reference to known effects of similar activities based on existing literature.*
Part C – Summary - Will the SARA authorization be issued?	
7. Will the SARA Authorization be issued?	
☐ **No** *(indicate selection)*	**The activity WILL NOT be authorized because:** **a. The activity does not fit into one of the three required categories** *(see response to Question 3).* **b. Alternatives have not been considered** *(see response to Question 4).* **c. All feasible measures cannot be taken to minimize impacts** *(see response to Question 5).* **d. The activity will jeopardize the survival or recovery of the species** *(see response to question 6).*
☐ **Yes**	**The activity *WILL* be authorized, as the requirements in Part B have been met.**

Part D - How will the SARA authorization be issued?	
8. Which process will be used? *Existing PCA processes such as the EA process and the Research and Collection Permit System can be used to issue a SARA-compliant permit, as long as the SARA requirements are met.*	
☐ **SARA permit (s.73)**	• The SARA-compliant authorization must be issued (see template on intranet). • An explanation must be posted on the SARA public registry (using the information provided above) – see template on intranet.
☐ **An existing PCA process (and SARA s.74)**	• Explain which permitting process will be used (i.e., EA, research permit, etc.). • The SARA authorization cover letter must be attached to the EA or permit (see template on intranet). • An explanation must be posted on the SARA public registry (using the information provided above) – see template on intranet.

Appendix 3: Cultural Resources Assessment Questionnaire (in development**)

Please consult with or provide this form to a Cultural Resources Management Specialist.

** The National EA Team is working with the Heritage Conservation and Commemoration Directorate to provide a questionnaire that facilitates consideration of potential impacts to cultural resources. In the interim of the questionnaire being finalized, please work with a CRM specialist to ensure you have appropriately integrated information related to potential effects of the project on cultural resources.

Appendix 4: Species At Risk Database Search Results

Parks Canada Parcs Canada

Canada

Home > Biotics Web Explorer > Biotics Web Explorer

Biotics Web Explorer

Back

Scientific Name	Common Name	SARA Schedule	COSEWIC Status	Managed Area Name	Regularity	Distribution Confidence	SARA Legal Status
Contopus cooperi	Olive-sided Flycatcher	Schedule 1	Threatened (T)	Yoho National Park of Canada	Regularly occurring	Confident	Threatened
Myotis lucifugus	Little Brown Myotis	Schedule 1	Endangered (E)	Yoho National Park of Canada	Regularly occurring	Confident	Endangered
Oncorhynchus clarkii pop. 8	Westslope Cutthroat Trout - British Columbia population	Schedule 1	Special Concern (SC)	Yoho National Park of Canada	Regularly occurring	Confident	Special Concern
Pinus albicaulis	Whitebark Pine	Schedule 1	Endangered (E)	Yoho National Park of Canada	Regularly occurring	Confident	Endangered
						Number Of Records Returned 4	

Back

Date Modified: 2013-10-09

BC Species and Ecosystems Explorer Search Results

		Status					
Scientific Name	**English Name**	**Provincial**	**BC List**	**COSEWIC**	**SARA**	**Global**	**CF Priority**
Anaxyrus boreas	Western Toad	S3S4 (2010)	Blue	SC (2012)	1-SC (2005)	G4 (2008)	2
Gulo gulo luscus	Wolverine, *luscus* subspecies	S3 (2010)	Blue	SC (2014)		G4T4 (1996)	2
Hemphillia camelus	Pale Jumping-slug	S3 (2008)	Blue			G4 (2006)	2
Magnipelta mycophaga	Magnum Mantleslug	S2S3 (2008)	Blue	SC (2012)		G3 (2006)	2
Oncorhynchus clarkii lewisi	Cutthroat Trout, *lewisi* subspecies	S3 (2004)	Blue	SC (2006)	1-SC (2010)	G4T4 (2013)	2
Polites themistocles themistocles	Tawny-edged Skipper, *themistocles* subspecies	S3 (2013)	Blue			G5TNR	4
Salvelinus confluentus	Bull Trout	S3S4 (2011)	Blue	SC (2012)		G4 (2011)	2
Ursus arctos	Grizzly Bear	S3 (2010)	Blue	SC (2002)		G4 (2000)	2

Search Summary

Time Performed Mon Mar 16 14:01:02 PDT 2015

Results 8 records.

Search Criteria
Search Type: Animal
AND Forest Districts:Columbia Forest District (DCO) (Restricted to Red, Blue, and Legally designated species)
AND MOE Regions:4- Kootenay (Restricted to Red, Blue, and Legally designated species)
AND Municipalities: Golden (Restricted to Red, Blue, and Legally designated species)
AND BGC Zone:ESSF, MS
Sort Order:Scientific Name Ascending

Notes
1. Citation: B.C. Conservation Data Centre. 2015. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: http://a100.gov.bc.ca/pub/eswp/ (accessed Mar 16, 2015).

2. Forest District, MoE Region, Regional District and habitat lists are restricted to species that breed in the Forest District, MoE Region, Regional District or habitat (i.e., species will not be placed on lists where they occur only as migrants).

Modify Search | New Search | Results

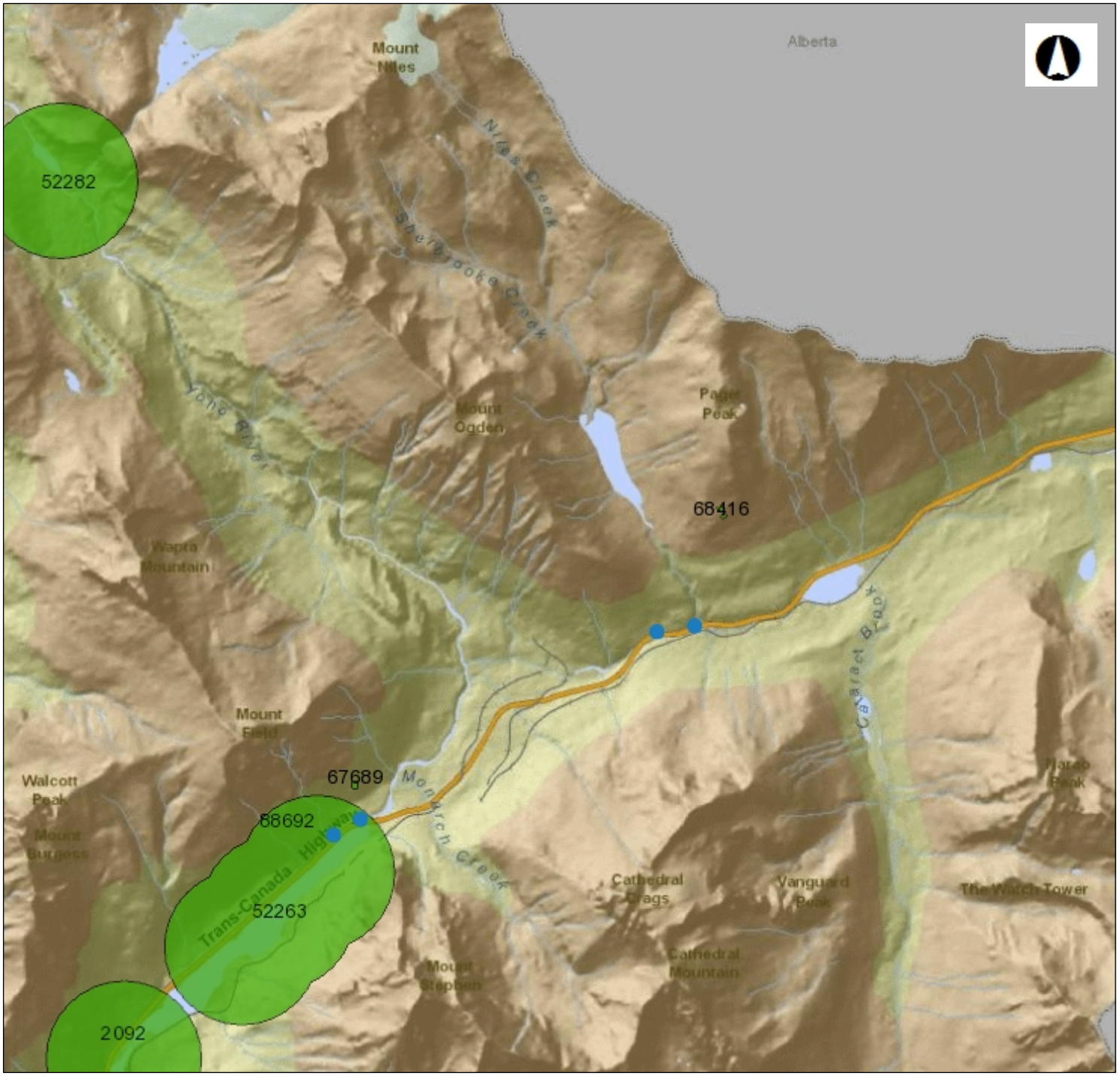
BC Species and Ecosystems Explorer Search Results

No matches could be found for your specified Search Criteria (see below). Please try again.

Search Summary

Time Performed	Mon Mar 16 13:55:43 PDT 2015
Results	0 records.
Search Criteria	Search Type: Plant AND SARA Schedule 1 Status:True AND COSEWIC Status:Endangered OR Threatened OR Special Concern AND Forest Districts:Columbia Forest District (DCO) (Restricted to Red, Blue, and Legally designated species) AND MOE Regions:4- Kootenay (Restricted to Red, Blue, and Legally designated species) AND Municipalities: Golden (Restricted to Red, Blue, and Legally designated species) AND BGC Zone:ESSF, MS Sort Order:Scientific Name Ascending
Notes	1. Citation: B.C. Conservation Data Centre. 2015. BC Species and Ecosystems Explorer. B.C. Minist. of Environ. Victoria, B.C. Available: http://a100.gov.bc.ca/pub/eswp/ (accessed Mar 16, 2015). 2. Forest District, MoE Region, Regional District and habitat lists are restricted to species that breed in the Forest District, MoE Region, Regional District or habitat (i.e., species will not be placed on lists where they occur only as migrants).

Modify Search | New Search | Results



BRITISH COLUMBIA

CDC Occurrence Map

Sherbrooke and Lower Sherbrooke Rock Slopes; AB/BC Border Storage Site

Species and Ecosystems at Risk Available Occurrences - CDC

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate
- Plant - Vascular
- Plant - Non-vascular
- Ecological Community

Species and Ecosystems at Risk (Secured) Publicly Available

Species and Ecosystems at Risk Publicly Available Occurrences

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate

0 1.49 2.98 km

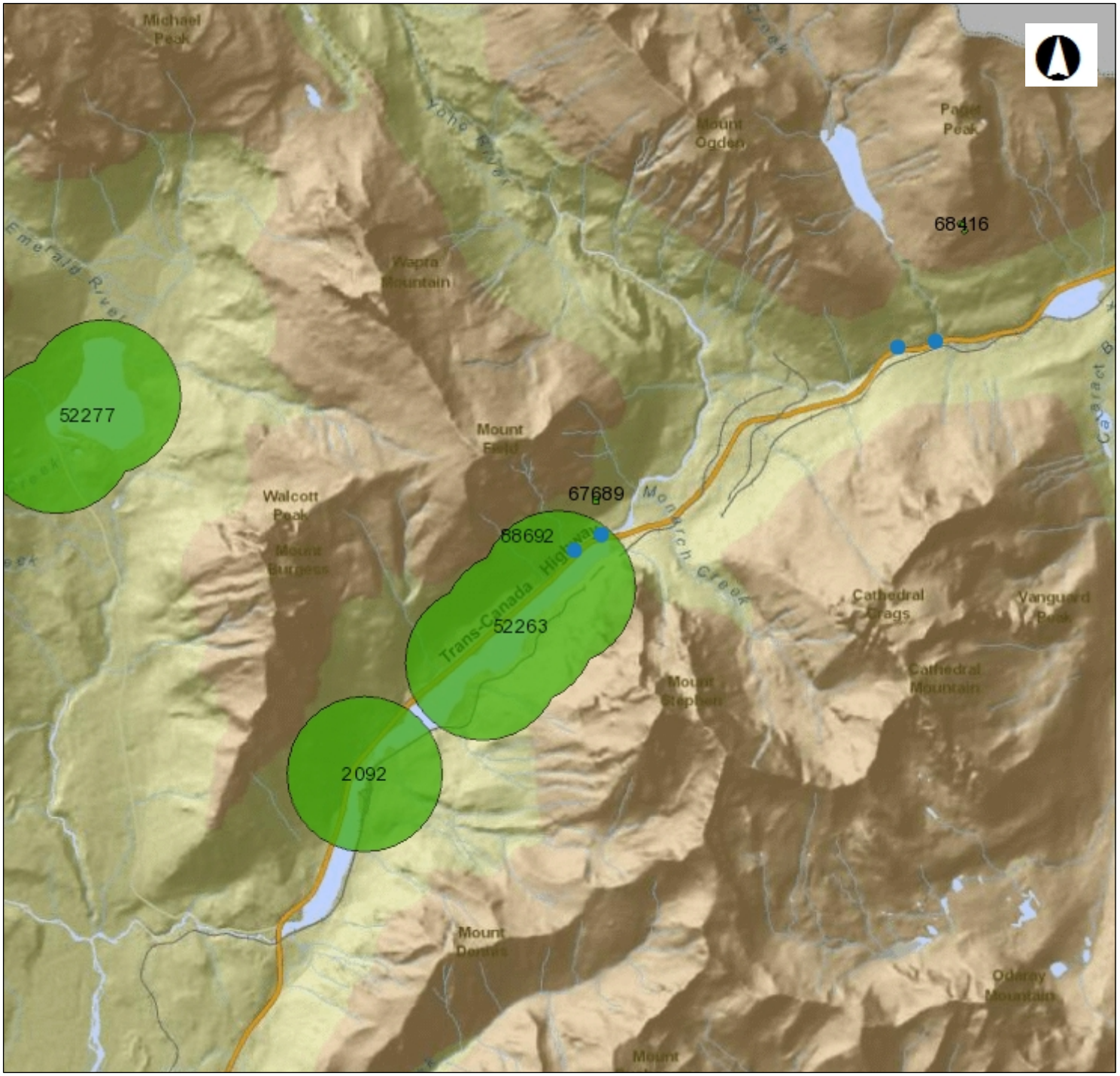
1: 73,328

Copyright/Disclaimer

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

CDC Occurrence Map

Takakkaw Falls East and West Storage Sites

Legend

Species and Ecosystems at Available Occurrences - CD

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate
- Plant - Vascular
- Plant - Non-vascular
- Ecological Community

Species and Ecosystems at Secured) Publicly Available

Species and Ecosystems at Publicly Available Occurrenc

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate

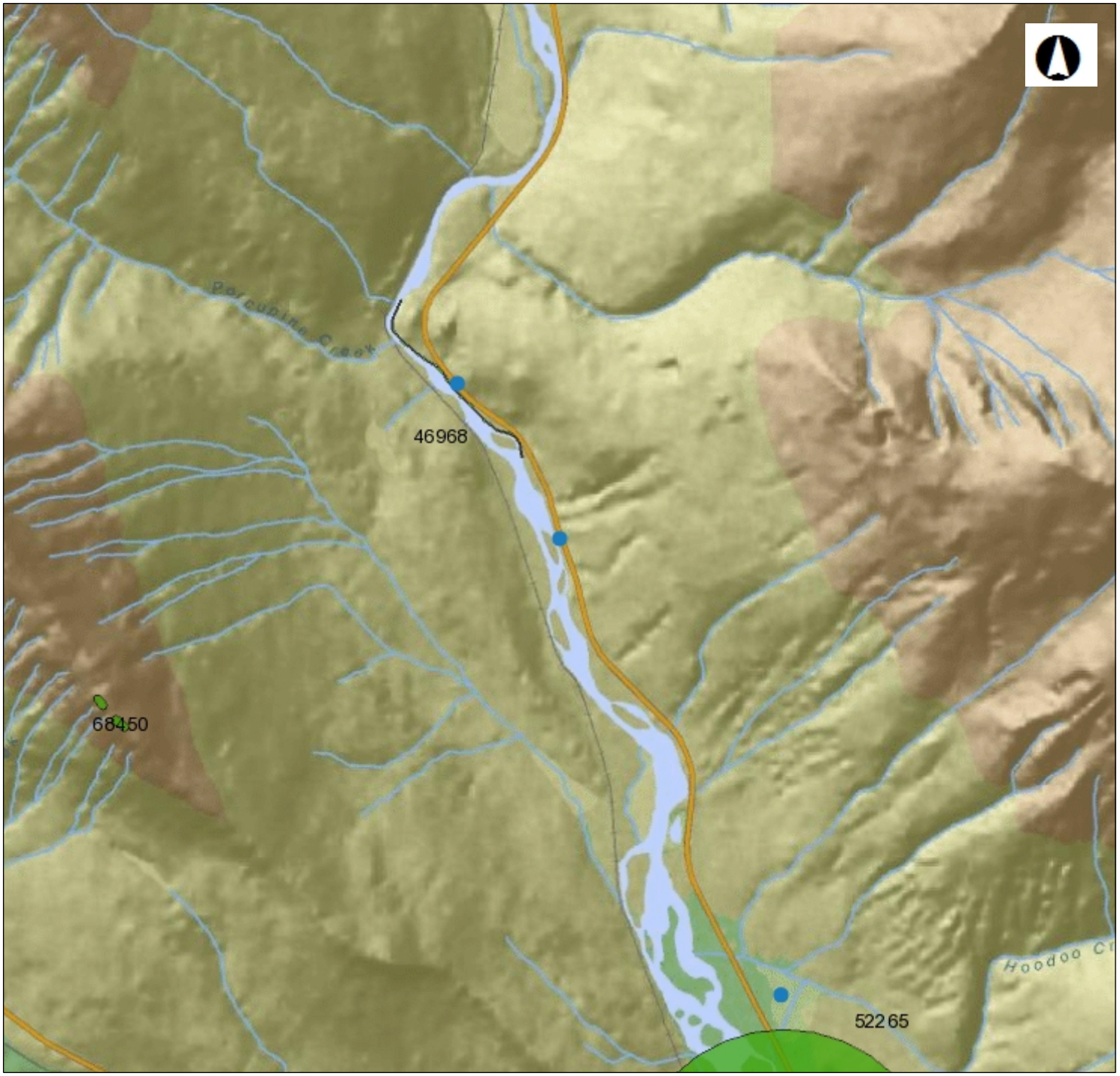
0 1.49 2.98 km

1: 73,328

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

CDC Occurrence Map

Little Topple & Mount Vaux Slopes

Legend

Species and Ecosystems at Available Occurrences - CD

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate
- Plant - Vascular
- Plant - Non-vascular
- Ecological Community

Species and Ecosystems at Secured) Publicly Available

Species and Ecosystems at Publicly Available Occurrenc

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate

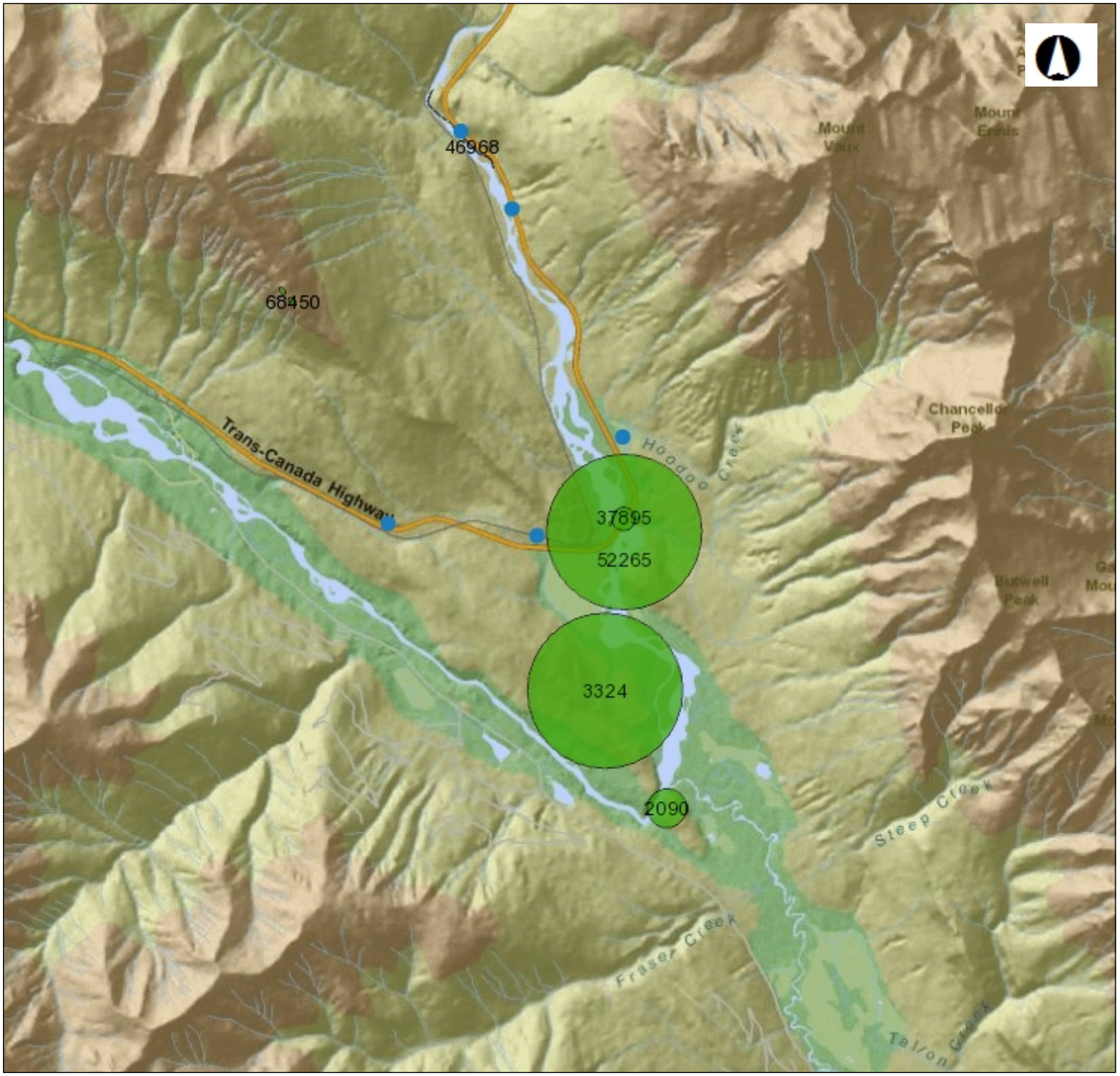
0 0.75 1.49 km

1: 36,664

Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



BRITISH COLUMBIA

CDC Occurrence Map ; Phyllite Slope; Mount Vaux & Old Quarry

Legend

Species and Ecosystems at Risk
Available Occurrences - CDC

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate
- Plant - Vascular
- Plant - Non-vascular
- Ecological Community

Species and Ecosystems at Risk
Secured) Publicly Available

Species and Ecosystems at Risk
Publicly Available Occurrences

FEATURE_CODE

- Animal - Vertebrate
- Animal - Invertebrate

0 1.49 2.98 km

1: 73,328

Copyright/Disclaimer

Datum: NAD83
Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 1371

Scientific Name: *Gentianopsis macounii*
English Name: Macoun's fringed gentian

Identifiers

Occurrence ID: 1371
Shape ID: 2090
Taxonomic Class: dicots
Element Group: Vascular Plant

Status

Provincial Rank: S3
BC List: Blue
Global Rank: G5
COSEWIC:
SARA Schedule:

Locators

Survey Site: YOHO NATIONAL PARK, WAPTA FALLS
Directions:
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 1960-09-21 **Last Observation Date:** 1995

Occurrence Data:

1995: Observed along the trail into the falls in a fairly flat, damp area with no overstory (S. Runyan, pers. comm. 2007).

Area Description

General Description:

Vegetation Zone: Montane
Min. Elevation (m): **Max. Elevation (m):**
Habitat: TERRESTRIAL:

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 1995
Rank Comments:

Not enough information to rank this occurrence, but has persisted since 1960.

Condition of Occurrence:

[No data provided.]

Size of Occurrence:

[No data provided.]

Landscape Context:

[No data provided.]

Version

Version Date: 10/26/2007 12:00:00 AM **Version Author:** Donovan, M.

Mapping

Estimated Representation Accuracy:	Low
Estimated Representation Accuracy Comments:	
Confident that full extent is represented by Occurrence:	N
Confidence Extent Comments:	Confident full extent of EO is NOT known
Additional Inventory Needed:	Y
Inventory Comments:	To determine precise location, full extent and viability of population.

Documentation

References:

Biosystematic Research Centre., Agric. Can., Cent. Exp. Farm, Ottawa, K1A 0C6.

Runyan, S. Personal communication. Summit Environmental Consultants. Nelson, B.C.

Specimen: 823

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.
Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 2090. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Species Occurrence Report

Shape ID: 2092

Scientific Name: *Gentianopsis macounii*

English Name: Macoun's fringed gentian

Identifiers

Occurrence ID: 4318

Shape ID: 2092

Taxonomic Class: dicots

Element Group: Vascular Plant

Status

Provincial Rank: S3

BC List: Blue

Global Rank: G5

COSEWIC:

SARA Schedule:

Locators

Survey Site: YOHO NATIONAL PARK, FIELD

Directions:

Biogeoclimatic Zone:

Ecosection: SPK

Occurrence Information

First Observation Date: 1958-08-07 **Last Observation Date:** 1958-08-07

Occurrence Data:

Occasional on marly flat on west bench of Kicking Horse River.

Area Description

General Description:

Vegetation Zone: Montane

Min. Elevation (m): 372 **Max. Elevation (m):**

Habitat: TERRESTRIAL: Grassland/Herbaceous

Occurrence Rank and Occurrence Rank Factors

Rank: H : Historical

Rank Date:

Rank Comments:

Condition of Occurrence:

Size of Occurrence:

Landscape Context:

Version

Version Date: 1/25/1993 12:00:00 AM

Version Author: LEE, J.S.

Mapping Information

Estimated Representation Accuracy:

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence:

Confidence Extent Definition:

Additional Inventory Needed: N

Inventory Comments:

Documentation

References:

Biosystematic Research Centre., Agric. Can., Cent. Exp. Farm, Ottawa, K1A 0C6.

Specimen: COLLECTOR: TAYLOR, R.L.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary, Shape ID: 2092, Macoun's fringed gentian. B.C. Ministry of Environment. Available: http://delivery.maps.gov.bc.ca/ess/sv/cdc, (accessed Apr 1, 2015).

BC Conservation Data Centre: Occurrence Report

Occurrence ID: 5370

Scientific Name: *Carex crawei*

English Name: Crawe's sedge

Identifiers

Occurrence ID: 5370
Shape ID: 3324
Taxonomic Class: monocots
Element Group: Vascular Plant

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G5
COSEWIC:
SARA Schedule:

Locators

Survey Site: WAPTA FALLS, TRAIL TO
Directions:
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 1944-08-04 **Last Observation Date:** 1944-08-04

Occurrence Data:

Damp flat ground in open woods.

Area Description

General Description:

Vegetation Zone: Montane

Min. Elevation (m): 325 **Max. Elevation (m):**
Habitat: TERRESTRIAL; WOODLAND NEEDLELEAF

Occurrence Rank and Occurrence Rank Factors

Rank: H : Historical
Rank Date:
Rank Comments:

Condition of Occurrence:

Size of Occurrence:

Landscape Context:

Version

Version Date: 3/20/1996 12:00:00 AM **Version Author:** DOUGLAS, G.W.

Mapping

Estimated Representation Accuracy:

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence:

Confidence Extent Comments:

Additional Inventory Needed: N

Inventory Comments:

Documentation

References:

University of British Columbia. Dep. Bot., Dep. Zool., Biol. Sci. Bldg., 6270 Univ. Blvd., Vancouver, BC.

Specimen: COLLECTOR: MCCALLA, W.C.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.
Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 3324. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 7473

Scientific Name: *Gentianopsis macounii*
English Name: Macoun's fringed gentian

Identifiers

Occurrence ID: 7473
Shape ID: 37895
Taxonomic Class: dicots
Element Group: Vascular Plant

Status

Provincial Rank: S3
BC List: Blue
Global Rank: G5
COSEWIC:
SARA Schedule:

Locators

Survey Site: YOHO NATIONAL PARK, KICKING HORSE RIVER
Directions: North side of Highway 1.
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2004-09-24 **Last Observation Date:** 2004-09-24

Occurrence Data:

2004-09-24: Ca. 30 plants, mostly fruiting, but some still with flowers, widely but sparsely scattered in meadow. With Pentaphylloides floribunda, Carex crawei, Primula mistassinica and Anemone parviflora. Also observed on south side of Highway 1 in calcarous fen where it was more abundant (University of British Columbia herbarium).

Area Description

General Description:
Calcareous floodplain meadow and calcareous fen.

Vegetation Zone: Montane

Min. Elevation (m): **Max. Elevation (m):**
Habitat: RIVERINE: Floodplain; PALUSTRINE: Bog/Fen

Occurrence Rank and Occurrence Rank Factors

Rank: BC : Good or fair estimated viability
Rank Date: 2004-09-24
Rank Comments:
Medium-sized population that is reproducing and under no apparent threat.
Condition of Occurrence:
Plants were mostly fruiting, but some were still in flower (F. Lomer, pers. comm. 2004).
Size of Occurrence:
In 2004, 30 widely scattered plants in meadow and more abundant in fen on south side of highway (F. Lomer, pers. comm. 2004).
Landscape Context:

[No data provided.}

Version

Version Date: 10/26/2007 12:00:00 AM **Version Author:** Donovan, M.

Mapping

Estimated Representation Accuracy: Medium

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: ?

Confidence Extent Comments: Uncertain whether full extent of EO is known

Additional Inventory Needed: Y

Inventory Comments: To determine full extent and viability of population.

Documentation

References:

Lomer, F. Personal communication. Botanical Consultant.

University of British Columbia. Dep. Bot., Dep. Zool., Biol. Sci. Bldg., 6270 Univ. Blvd., Vancouver, BC.

Specimen: Lomer, F. (5511). 2004. UBC.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 37895. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report

Occurrence ID: 8029

Scientific Name: *Carex crawei*

English Name: Crawe's sedge

Identifiers

Occurrence ID: 8029
Shape ID: 46968
Taxonomic Class: monocots
Element Group: Vascular Plant

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G5
COSEWIC:
SARA Schedule:

Locators

Survey Site: PORCUPINE CREEK, YOHO NATIONAL PARK
Directions: East bank of Kicking Horse River, above "Misko Station", west of Mt. Vaux.
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 1978-08-10 **Last Observation Date:** 1978-08-10

Occurrence Data:

Observed on low gravel flat by Kicking Horse River, with a few small Picea glauca and Betula occidentalis (Brayshaw 1978; Royal British Columbia Museum herbarium specimen).

Area Description

General Description:

Medium sized river in the Columbia Mountains, with gravelly bed and flats.

Vegetation Zone: Montane

Min. Elevation (m): 1097.28 **Max. Elevation (m):**
Habitat: RIVERINE: Floodplain, Sand/Gravel Bars

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 1978-08-10
Rank Comments:

There is insufficient information to rank this occurrence, but it is assumed to still be extant since located in a remote area in a National Park. A survey will be necessary to confirm the continued existence of this population.

Condition of Occurrence:

[No data]

Size of Occurrence:

[No data]

Landscape Context:

[No data]

Version

Version Date: 8/26/2009 12:00:00 AM **Version Author:** Hartwell, S.

Mapping

Estimated Representation Accuracy:	Medium
Estimated Representation Accuracy Comments:	Located using map, lat/long and elevation from Brayshaw 1978.
Confident that full extent is represented by Occurrence:	?
Confidence Extent Comments:	Uncertain whether full extent of EO is known
Additional Inventory Needed:	Y
Inventory Comments:	Site has not been surveyed since 1978.

Documentation

References:

Brayshaw, T.C. 1978. Report on plant collections made in Yoho National Park: August, 1978. B.C. Provincial Museum. Victoria, BC. 5 pp.

Royal British Columbia Museum. 675 Belleville Street, Victoria, BC. V8V 1X4.

Specimen: Brayshaw, T.C. 78-548. (1978). 090394. V.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.
Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 46968. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 25, 2015).

BC Conservation Data Centre: Occurrence Report

Occurrence ID: 8317

Scientific Name: *Carex crawei*

English Name: Crawe's sedge

Identifiers

Occurrence ID: 8317
Shape ID: 51299
Taxonomic Class: monocots
Element Group: Vascular Plant

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G5
COSEWIC:
SARA Schedule:

Locators

Survey Site: KICKING HORSE RIVER, WEST SIDE
Directions: North of Highway 1.
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2004-09-24 **Last Observation Date:** 2004-09-24

Occurrence Data:

2004-09-24: On calcareous floodplain with Pentaphylloides floribunda, Muhlenbergia glomerata, Primula mistassinica and Anemone parviflora (University of British Columbia herbarium).

Area Description

General Description:

Vegetation Zone: Montane
Min. Elevation (m): 1100 **Max. Elevation (m):** 1100
Habitat: RIVERINE: Floodplain

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 2004-09-24
Rank Comments:

There is not enough information to rank this occurrence.

Condition of Occurrence:

Dwarfed plants (University of British Columbia herbarium, 2004).

Size of Occurrence:

[No data provided].

Landscape Context:

[No data provided].

Version

Version Date: 12/9/2010 12:00:00 AM **Version Author:** Donovan, M.

Mapping

Estimated Representation Accuracy:	High
Estimated Representation Accuracy Comments:	
Confident that full extent is represented by Occurrence:	?
Confidence Extent Comments:	Uncertain whether full extent of EO is known
Additional Inventory Needed:	Y
Inventory Comments:	To determine full extent and viability of population.

Documentation

References:

Royal British Columbia Museum. 675 Belleville Street, Victoria, BC. V8V 1X4.

University of British Columbia. Dep. Bot., Dep. Zool., Biol. Sci. Bldg., 6270 Univ. Blvd., Vancouver, BC.

Specimen: Brayshaw, T.C. (78-548). 1978. #090394. V.; Lomer, F. (5509). 2004. #V230200. UBC.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 51299. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 8335

Scientific Name: *Braya humilis* ssp. *maccallae*

English Name: McCalla's dwarf braya

Identifiers

Occurrence ID: 8335
Shape ID: 52263
Taxonomic Class: dicots
Element Group: Vascular Plant

Status

Provincial Rank: S1?
BC List: Red
Global Rank: G5T1T2Q
COSEWIC:
SARA Schedule:

Locators

Survey Site: KICKING HORSE RIVER, 2.5 KM EAST OF FIELD
Directions: A stretch of sandy flats of the Kicking Horse River that spans from 2-3 km east of Field (University of Alberta herbarium).
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 1943-06-24 **Last Observation Date:** 1982-06-26

Occurrence Data:

The element occurrence has been known since 1943 and was last surveyed for in the 1980s. 1980s: Specimen collected along the Kicking Horse River, 2 km above (upstream) of Field (University of Alberta herbarium). Two other historical specimens were collected; dates unknown (University of Alberta herbarium). Holotype specimen collected in 1943 on the sandy flats of the Kicking Horse River, opposite of Mt. Stephen and east of Field (University of Alberta herbarium).

Area Description

General Description:

The subpopulation is located on a stretch of sandy flats of the Kicking Horse River that spans from 2-3 km east of Field (University of Alberta herbarium).

Vegetation Zone: Lowland

Min. Elevation (m): **Max. Elevation (m):**
Habitat: RIVERINE: Floodplain, Sand/Gravel Bars

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 1986-06-26
Rank Comments:

There is insufficient information to assign a viability rank.

Condition of Occurrence:

[No data provided.]

Size of Occurrence:

[No data provided.]

Landscape Context:

[No data provided.]

Version

Version Date: 12/19/2010 12:00:00 AM **Version Author:** Chytyk, P.

Mapping

Estimated Representation Accuracy: Low

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: N

Confidence Extent Comments: Confident full extent of EO is NOT known

Additional Inventory Needed: Y

Inventory Comments: To determine precise location and extent of population.

Documentation

References:

Cameron, K. Personal communication. Yoho Visitor Centre, Yoho National Park, Parks Canada.

University of Alberta. Dep. Zool., Edmonton, AB.

Specimen: McCalla, W.C. (9566). ND. ALTA.; McCalla, W.C. (7009). ND. ALTA.; McCalla, W.C. (7539). 1943. #90777. ALTA. Holotype.; Harris, J.G. (1634). 198-. ALTA, UVSC.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 52263. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 8336

Scientific Name: *Braya humilis* ssp. *maccallae*

English Name: McCalla's dwarf braya

Identifiers

Occurrence ID: 8336
Shape ID: 52265
Taxonomic Class: dicots
Element Group: Vascular Plant

Status

Provincial Rank: S1?
BC List: Red
Global Rank: G5T1T2Q
COSEWIC:
SARA Schedule:

Locators

Survey Site: KICKING HORSE RIVER, SOUTH OF HOODOO CREEK
Directions: Approximately 5 km east of the west gate of Yoho National Park near where the Trans Canada Highway intersects the Kicking Horse River (Biosystematic Research Centre herbarium).
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 195--LATE
Last Observation Date: 195--LATE

Occurrence Data:

This occurrence has been known since the late 1950s and has not been subsequently surveyed for. Late 1950s: Specimen collected on an old gravel bar approximately 5 km east of the west gate of Yoho National Park near where the Trans Canada Highway intersects the Kicking Horse River (Biosystematic Research Centre herbarium).

Area Description

General Description:

The subpopulation is located on an old gravel bar approximately 5 km east of the west gate of Yoho National Park near where the Trans Canada Highway intersects the Kicking Horse River (Biosystematic Research Centre herbarium).

Vegetation Zone: Lowland

Min. Elevation (m):
Max. Elevation (m):
Habitat: RIVERINE: Floodplain, Sand/Gravel Bars

Occurrence Rank and Occurrence Rank Factors

Rank: H : Historical
Rank Date: 195--LATE
Rank Comments:

Condition of Occurrence:

[No data provided.]

Size of Occurrence:

[No data provided.]

Landscape Context:

[No data provided.]

Version

Version Date: 12/19/2010 12:00:00 AM **Version Author:** Chytyk, P.

Mapping

Estimated Representation Accuracy: Low

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: N

Confidence Extent Comments: Confident full extent of EO is NOT known

Additional Inventory Needed: Y

Inventory Comments: To determine precise location and extent of population.

Documentation

References:

Biosystematic Research Centre., Agric. Can., Cent. Exp. Farm, Ottawa, K1A 0C6.

Specimen: Taylor, R.L. and D.H. Ferguson. (2427). 195--LATE. DAO.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 52265. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Species Occurrence Report

Shape ID: 52277

Scientific Name: *Braya humilis* ssp. *maccallae*

English Name: McCalla's dwarf braya

Identifiers

Occurrence ID: 8340

Shape ID: 52277

Taxonomic Class: dicots

Element Group: Vascular Plant

Status

Provincial Rank: S1?

BC List: Red

Global Rank: G5T1T2Q

COSEWIC:

SARA Schedule:

Locators

Survey Site: EMERALD LAKE

Directions: Emerald Lake, head of, Yoho National Park

Biogeoclimatic Zone:

Ecosection: SPK

Occurrence Information

First Observation Date: ND

Last Observation Date: 1982-06-25

Occurrence Data:

The element occurrence is a historical record and was last surveyed for in 1982. 1982: Specimen collected at the alluvial plain at the head of Emerald Lake, Yoho National Park (University of Alberta herbarium). Historical specimens collected at the alluvial plain at the head of Emerald Lake (University of Alberta herbarium) and at Emerald Lake (Academy of Natural Sciences herbarium) .

Area Description

General Description:

One subpopulation is located at Emerald Lake and the other on alluvial plain at the head of Emerald Lake.

Vegetation Zone: Lowland

Min. Elevation (m):

Max. Elevation (m):

Habitat: RIVERINE: Floodplain, Sand/Gravel Bars

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)

Rank Date: 1982-06-25

Rank Comments:

There is insufficient information to assign a viability rank.

Condition of Occurrence:

[No data provided.]

Size of Occurrence:

[No data provided.]

Landscape Context:

[No data provided.]

Version

Version Date: 12/19/2010 12:00:00 AM

Version Author: Chytyk, P.

Mapping Information

Estimated Representation Accuracy: Low

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: N

Confidence Extent Definition: Confident full extent of EO is NOT known

Additional Inventory Needed: Y

Inventory Comments: To determine precise location and extent of population.

Documentation

References:

Academy of Natural Sciences herbarium, Philadelphia, PA.

University of Alberta. Dep. Zool., Edmonton, AB.

Specimen: Harris, J.G. (1629). 1982. #269631. ALTA.; McCalla, W.C. (7452). ND. ALTA.; McCalla, W.C. (7030). ND. ALTA.; 5625; Macoun, J. (328). ND. PH.

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary, Shape ID: 52277, McCalla's dwarf braya. B.C. Ministry of Environment. Available: http://delivery.maps.gov.bc.ca/ess/sv/cdc, (accessed Apr 1, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 9487

Scientific Name: *Pinus flexilis*
English Name: limber pine

Identifiers

Occurrence ID: 9487
Shape ID: 67689
Taxonomic Class: conifers
Element Group: Vascular Plant

Status

Provincial Rank: S2
BC List: Red
Global Rank: G4
COSEWIC: E (NOV 2014)
SARA Schedule:

Locators

Survey Site: KICKING HORSE RIVER/MONARCH CREEK, 0.5 KM NORTHWEST OF CONFLUENCE
Directions: Mount Field. Above Monarch Campground, Yoho National Park.
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2004-07-14 **Last Observation Date:** 2009-07-28

Occurrence Data:

The occurrence has been known since 2004 and was last surveyed in 2009. 2009-07-28: 42 live trees and 7 dead trees; 55.0% of live trees infected with whitebark pine rust. Eleven less than 50 cm tall seedlings and 6 greater than 50 cm tall seedlings; all with no evidence of whitebark pine rust (P. Achuff, pers. comm. 2013). 2008: Scattered individual trees or small groups within stands of Pseudotsuga menziesii, Pinus ponderosa and Juniperus scopulorum. Narrow habitat range on limestone cliff edges, ridges, outcrops and exposed sites (P. Achuff, pers. comm. 2008). 2004-07-14: 44 live trees and 6 dead trees; 27.3% of live trees infected with whitebark pine rust. Five less than 50 cm tall seedlings and 4 greater than 50 cm tall seedlings; all with no evidence of whitebark pine rust (P. Achuff, pers. comm. 2013).

Area Description

General Description:

Located on limestone cliff edges, ridges, outcrops and exposed sites.

Vegetation Zone: Montane

Min. Elevation (m): 1465 **Max. Elevation (m):**
Habitat: TERRESTRIAL: Forest Needleleaf

Occurrence Rank and Occurrence Rank Factors

Rank: BC : Good or fair estimated viability
Rank Date: 2009-07-28

Rank Comments:

In 2009, 55% of live trees were infected with whitebark pine rust as compared with 27% in 2004. In 2009, 16% of trees were dead..

Condition of Occurrence:

2004: 27.3% of live trees infected with whitebark pine rust. Five less than 50 cm tall seedlings and 4 greater than 50 cm tall seedlings; all with no evidence of whitebark pine rust (P. Achuff, pers. comm. 2013). 2008: Apparently healthy no signs of mountain pine beetle or blister rust (P. Achuff, pers. comm. 2008). 2009: 55.0% of live trees infected with whitebark pine

rust. Eleven less than 50 cm tall seedlings and 6 greater than 50 cm tall seedlings; all with no evidence of whitebark pine rust (P. Achuff, pers. comm. 2013).

Size of Occurrence:

2004: 44 live trees and 6 dead trees (P. Achuff, pers. comm. 2013). 2008: At least one tree (P. Achuff, pers. comm. 2008). 2009: 42 live trees and 7 dead trees (P. Achuff, pers. comm. 2013).

Landscape Context:

[No data provided.]

Version

Version Date:	9/26/2013 12:00:00 AM	**Version Author:**	Sinclair, L. and P. Chytyk

Mapping

Estimated Representation Accuracy:	High
Estimated Representation Accuracy Comments:	
Confident that full extent is represented by Occurrence:	?
Confidence Extent Comments:	Uncertain whether full extent of EO is known
Additional Inventory Needed:	Y
Inventory Comments:	To determine full extent and viability of population.

Documentation

References:

Achuff, P. Personal communication.Scientist Emeritus, Ecological Integrity Branch, Parks Canada, Waterton Lakes National Park, AB.

Specimen:

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 67689. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 9561

Scientific Name: *Pinus albicaulis*
English Name: whitebark pine

Identifiers

Occurrence ID: 9561
Shape ID: 68416
Taxonomic Class: conifers
Element Group: Vascular Plant

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G3G4
COSEWIC: E (APR 2010)
SARA Schedule: 1

Locators

Survey Site: PAGET PEAK
Directions:
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2003-07-10 **Last Observation Date:** 2003-07-10

Occurrence Data:

2003-07-10: Pinus albicaulis was observed (Glacier National Park).

Area Description

General Description:

Vegetation Zone: Subalpine

Min. Elevation (m): **Max. Elevation (m):**
Habitat: TERRESTRIAL: Subalpine

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 2003-07-10
Rank Comments:

Condition of Occurrence:
[No data provided.]
Size of Occurrence:
[No data provided.]
Landscape Context:

[No data provided.]

Version

Version Date: 3/31/2012 12:00:00 AM **Version Author:** Durand, R.

Mapping

Estimated Representation Accuracy: High

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: Y

Confidence Extent Comments: Confident full extent of EO is known

Additional Inventory Needed: N

Inventory Comments:

Documentation

References:

Glacier National Park. 2010. Glacier National Park 2003-04 Blister Rust Surveys. Parks Canada, BC.

Miller, M.T. 2011. Mapping Guidance for Whitebark pine in BC. Report prepared for the BC Conservation Data Centre. Victoria, BC. 14 pp.

Specimen:

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.
Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 68416. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 9564

Scientific Name: *Pinus albicaulis*
English Name: whitebark pine

Identifiers

Occurrence ID: 9564
Shape ID: 68450
Taxonomic Class: conifers
Element Group: Vascular Plant

Status

Provincial Rank: S2S3
BC List: Blue
Global Rank: G3G4
COSEWIC: E (APR 2010)
SARA Schedule: 1

Locators

Survey Site: WIEDENMAN CREEK, 2.3 KM NORTHEAST OF
Directions:
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2003-07-09 **Last Observation Date:** 2003-07-09

Occurrence Data:

2003-07-09: Pinus albicaulis was observed (Glacier National Park).

Area Description

General Description:

Vegetation Zone: Subalpine

Min. Elevation (m): **Max. Elevation (m):**
Habitat: TERRESTRIAL: Subalpine

Occurrence Rank and Occurrence Rank Factors

Rank: E : Verified extant (viability not assessed)
Rank Date: 2003-07-09
Rank Comments:

Condition of Occurrence:
[No data provided.]
Size of Occurrence:
[No data provided.]
Landscape Context:

[No data provided.]

Version

Version Date: 3/31/2012 12:00:00 AM **Version Author:** Durand, R.

Mapping

Estimated Representation Accuracy: High

Estimated Representation Accuracy Comments:

Confident that full extent is represented by Occurrence: Y

Confidence Extent Comments: Confident full extent of EO is known

Additional Inventory Needed: N

Inventory Comments:

Documentation

References:

Glacier National Park. 2010. Glacier National Park 2003-04 Blister Rust Surveys. Parks Canada, BC.

Miller, M.T. 2011. Mapping Guidance for Whitebark pine in BC. Report prepared for the BC Conservation Data Centre. Victoria, BC. 14 pp.

Specimen:

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.
Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 68450. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).

BC Conservation Data Centre: Occurrence Report
Occurrence ID: 11826

Scientific Name: *Botrychium lineare*
English Name: Linear-leaf moonwort

Identifiers

Occurrence ID: 11826
Shape ID: 88692
Taxonomic Class:
Element Group: Vascular Plant

Status

Provincial Rank: S1
BC List: Red
Global Rank: G2G3
COSEWIC:
SARA Schedule:

Locators

Survey Site: MOUNT FIELD, SOUTHWEST SLOPE, YOHO NATIONAL PARK
Directions: 3.5 km due northeast of town of Field.
Biogeoclimatic Zone:
Ecosection: SPK

Occurrence Information

First Observation Date: 2013-08-17 **Last Observation Date:** 2013-08-17

Occurrence Data:

2013-08-17: Two mature pale yellow-green; 2 plants in the same clump. Rather dry, 45% talus and scree slope with few Picea engelmannii, Pseudotsuga menziesii, under fringe of Juniperus communis (F. Lomer, pers. comm. 2013).

Area Description

General Description:

Vegetation Zone: Montane
Min. Elevation (m): 1600 **Max. Elevation (m):**
Habitat: TERRESTRIAL: Scree/Fine Talus

Occurrence Rank and Occurrence Rank Factors

Rank: B : Good estimated viability
Rank Date: 2013-08-17
Rank Comments:
Small population in national park.
Condition of Occurrence:
2013: Mature pale yellow-green plants (F. Lomer, pers. comm. 2013).
Size of Occurrence:
2013: 2 plants (F. Lomer, pers. comm. 2013).
Landscape Context:

[No data provided.]

Version

Version Date: 11/7/2013 12:00:00 AM **Version Author:** Donovan, M.

Mapping

Estimated Representation Accuracy:	High
Estimated Representation Accuracy Comments:	
Confident that full extent is represented by Occurrence:	?
Confidence Extent Comments:	Uncertain whether full extent of EO is known
Additional Inventory Needed:	Y
Inventory Comments:	To determine full extent and viability of population.

Documentation

References:

Lomer, F. Personal communication. Botanical Consultant.

Specimen:

Please visit the website http://www.env.gov.bc.ca/cdc/gis/eo_data_fields_06.htm for definitions of the data fields used in this occurrence report.

Suggested Citation:

B.C. Conservation Data Centre. 2014. Occurrence Report Summary: 88692. B.C. Ministry of Environment. Available: http://www.maps.gov.bc.ca/ess/cdc, (accessed Mar 18, 2015).