



Basic Impact Analysis (BIA)

Rock Slope Remediation

Mount Revelstoke National Park, BC

April 2015



Parks
Canada

Parcs
Canada

Canada

**1. PROJECT TITLE**

Rock Slope Stabilization within Mount Revelstoke National Park, BC.

2. PROJECT LOCATION

Mount Revelstoke National Park (MRNP), BC. Work will occur at various locations along the Trans-Canada Highway (TCH). See Figure 1.

3. PROJECT SITE(S)

The following are the key locations along TCH:

For work within MRNP, the intersection of the Meadows in the Sky Parkway or Mount Revelstoke Road (MISP) with TCH was used as km 0.000, and distances are measured to the east from this point. Right and left are relative to the direction of increasing chainage towards the east (Figure 2).

Mount Revelstoke National Park – Work Site Locations:

| Table 1. Rock Slope Stabilization Locations Along TCH | | | | | |
|---|---|---------------------------------|------------------------------|---|----------------|
| Chainage | Stabilization Methods and Approximate Volumes | | | | |
| | Scaling (hrs)* | Trim Blasting (m ³) | Excavation (m ³) | Remove and Replace Concrete Guardrail (#) | Rock Bolts (m) |
| km 20.186 to 20.271 | 120 | 120 | 200 | - | - |
| km 22.400 to 22.827 | 300 | 60 | 200 | - | - |
| km 24.619 to 24.824 | 80 | - | 300 | - | - |
| km 24.824 to 24.949 | 190 | 10 | 1400** | 50 | 20 |
| km 24.949 to 25.109 | 20 | 200 | 400 | 30 | - |
| km 27.058 to 27.143 | 40 | - | 200 | - | - |
| Total | 750 | 390 | 2,700 | 80 | 20 |

* Volume of material scaled varies greatly based on rock slopes.

** Estimated 300 m³ scaled material plus an additional 1,100 m³ by mechanical means.

4. PROPONENT

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5. PROPONENT CONTACT INFORMATION

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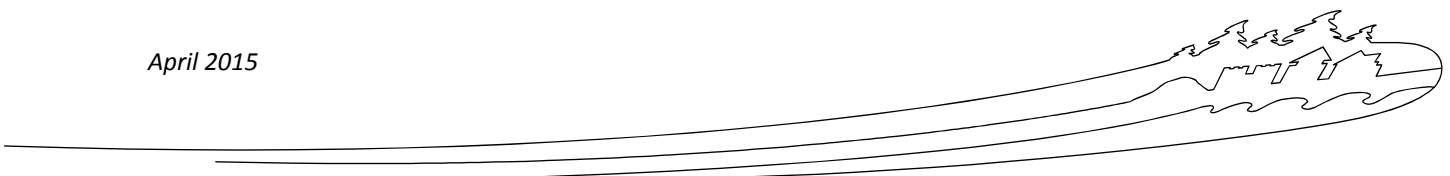
6. PROJECT DATES

Planned commencement: 2015-07-01

Planned completion: 2015-09-30

Project dates reflect timing outside of the highest occurrences of goats along the highway and rock bluffs. Mountain goat disturbance mitigation has been incorporated into this BIA.

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7. INTERNAL PROJECT FILE

8. PROJECT DESCRIPTION

Justification of works

Rock scaling work is a part of PCA's significant and ongoing rock fall hazard management program which has completed a number of programs to date within the Western Canadian National Parks over the last few years. Inspection of the rock slopes in MRNP have taken place since 1978 on a 3 to 6 year interval including work in 1989, 1992, 1996, 2001 (MOT), 2004, and 2011. Scaling programs have been designed and monitored on the slope adjacent to the TCH in 1992, 2007/2008 and in 2013.

Following on the recommendations of the 2011 inspection, a scaling program was last conducted along the TCH in MRNP in 2013 focusing on slopes between km 22.40 and km 24.949.

During the 2013 rock scaling program an on slope inspection was conducted for all of the slopes undergoing work during the scaling program. At km 24.619 Station 0+200 and at km 24.824 Station 0+060 sources of loose rock were identified. These sources of loose rock are not visible from road level. Due to budgetary constraints not all of the material was able to be removed during the 2013 program. Concrete road barriers were installed at the base of these two areas. While the barriers will increase the ability of the ditch to capture rock fall, some of the material on the slope is large and would exceed the capacity of the ditch should it be released.

Work under the rock scaling program comprises the following:

- Rock Scaling, Trimming, Rock Bolting, Common Excavation, hauling debris and excavated materials to disposal sites outside park boundaries, supply and installation of concrete guard rail, temporary removal and replacement or relocation of concrete guardrail, and other related works.
 - The rock slope remediation will include:
 - Excavation and common improvement of catchment ditches – includes the removal of accumulations of rock fall and winter gravels where necessary along the TCH. This is an ongoing activity following the winter season as significant amounts of gravels and debris are deposited into roadside catchment ditches which must be cleared to ensure the catchment has adequate volume available for fallen rock and debris. Catchment ditches which are suitably large enough will only require removal of post-remediation materials fallen from rock slopes. Following slope remediation, removal of accumulated construction debris (rock fall) from catchment areas identified in Table 1 will be required for all locations for appropriate disposal at a registered site outside MRNP boundaries. Rock and other debris which falls into the catchment area is loaded into a truck with an excavator. Debris clearing along the TCH will likely also include the removal of roadside vegetation within the catchment;
 - Scaling – includes manual removal of loose material on rock slopes using pry bars, hydraulic press, brooms, shovels and suitable power equipment by personnel using roped access to a rock face. Within km 24.824 and 24.949 mechanized scaling will also occur using an excavator to re-grade the upper slope;
 - Trim blasting – includes controlled blasts in which explosive charges are placed within a predetermined pattern of holes drilled into the unstable rock, followed by detonation;
 - Installation of rock anchors;
- Vegetation clearing of shrubs, immature and mature trees will be required above rock slopes for all tasks;
- Repair of damaged road surface, if required;

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- Mobilization and demobilization of all manpower, equipment, materials, and other resources necessary to execute the work; and,
- Provide traffic signage and traffic control in accordance with Specification Section 01 35 31 – Special Procedures for Traffic Control.

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, cultural or historic resources and visual and aesthetic 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 EIA process. The documented interactions between the projects 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:

The sites for the proposed rehabilitation works are located within the Selkirk Mountain Range which is part of the larger Columbia Mountain Range. Each site falls within the Interior Cedar Hemlock biogeoclimatic zone (ICH). As shown in Figure 2, all rock slope works will occur specifically within ICHmw3 (Thompson moist-warm variant). In southeastern BC this zone occupies the lower elevations (400 – 1500 m) of the Columbia Mountains. The climate within the ICH is typically interior, continental, influenced by easterly moving air masses which result in cool wet winters and warm dry summers. The mean annual temperature ranges from 2 – 8.7 °C; the wide range is the result of wide latitudinal span of the ICH (B.C. Ministry of Forest and Range 2011).

Vegetation:

Vegetation within the ICH landscape is typically dominated by upland coniferous forests. Comparatively, the ICH has the largest diversity of tree species than any other biogeoclimatic zone in BC. The CDC iMapBC tool, BC Species and Ecosystems Explorer and Parks Canada's Biotics Web Explorer were used to determine potential occurrences of vegetation species of concern at or near remediation sites and to ensure that federal/provincial biodiversity objectives are considered during Project planning. A description of the Provincial Conservation Status, the BC List Status, and inclusion of the identified species within Schedule 1 of SARA are included in Table 2 and shown on Figure 2. Rare plant species were identified only within one of the six work zones in Table 1 and Figure 2.

Table 2. Rare Plants Recorded in Proximity to the Rock Slope Remediation Sites at TCH km 24.619

| Common Name | Scientific Name | Habitat | Provincial Status | BC List Status | SARA Schedule |
|-----------------------|--|--|-------------------|----------------|---------------|
| least moonwort | <i>Botrychium simplex</i> var. <i>compositum</i> | Meadows, moist to wet vernal pools and ephemeral seepages | S2S3 | Blue | Not Listed |
| Sutherland's larkspur | <i>Delphinium sutherlandii</i> | Mesic to dry shrublands, open forests. Found over shallow soils within avalanche chutes and bedrock outcrops | S2S3 | Blue | Not Listed |

Note: E-Flora BC, 2013; CDC, 2012; Environment Canada, 2012.

Given the preferred habitat types of the two provincially rare plants listed in Table 2, the least moonwort is not likely to occur within the work zones identified in Table 1 due to lack of suitable moist or pool habitat. Sutherland's larkspur has low potential to exist within the work zones in Table 1. While habitat may be

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present in some locations, the work zones are mostly within previously and routinely disturbed areas within the highway right-of-way.

Whitebark Pine is an Endangered, SARA Schedule 1 tree species known within MRNP (Environment Canada, 2012 and Parks Canada 2011a). This tree grows on thin rocky soils and is most abundant on warm dry exposures such as the rocky bluffs within the Project Area; however is expected to only exist at higher elevations (BC CDC 2012).

It is noted that a rare plant survey may be required by the Mount Revelstoke-Glacier (MRG) Field Unit prior to project works, if appropriate. Measures for minimizing disturbance/trampling of vegetation shall be employed, per Section 11.

Wildlife:

The Parks Canada Biotics Web Explorer and the BC Conservation Data Centre's (CDC) Species and Ecosystem Explorer were used to determine the species present in MRNP (and therefore potential present within the Project area) that are listed under SARA and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The species identified are presented in Table 3 which are all listed as regularly occurring and having a confident distribution in MRNP, as per the search criteria on the Parks Canada Biotics Web Explorer.

Table 2: Species in Mount Revelstoke National Park listed under SARA and COSEWIC

| Common Name | Scientific Name | SARA Schedule | SARA Legal Status | COSEWIC Status |
|--|---------------------------------|---------------|-------------------|----------------------|
| Western Toad | <i>Anaxyrus boreas</i> | Schedule 1 | Special Concern | Special Concern (SC) |
| Painted Turtle – Intermountain – Rocky Mountain Population | <i>Chrysemys picta pop. 2</i> | Schedule 1 | Special Concern | Special Concern (SC) |
| Olive-sided Flycatcher | <i>Contopus cooperi</i> | Schedule 1 | Threatened | Threatened (T) |
| Common Nighthawk | <i>Chordeiles minor</i> | Schedule 1 | Threatened | Threatened (T) |
| Lewis's Woodpecker | <i>Melanerpes lewis</i> | Schedule 1 | Threatened | Threatened (T) |
| Wolverine | <i>Gulo gulo luscus</i> | - | - | Special Concern (SC) |
| Magnum Mantleslug | <i>Magnipelta mycophaga</i> | - | - | Special Concern (SC) |
| Northern Myotis | <i>Myotis septentrionalis</i> | - | - | Endangered (E) |
| Little Brown Myotis | <i>Myotis lucifungus</i> | Schedule 1 | Endangered | Endangered (E) |
| Coeur d'Alene salamander | <i>Plethodon idahoensis</i> | Schedule 1 | Special Concern | Special Concern (SC) |
| Woodland Caribou - Southern Mountain Population | <i>Rangifer tarandus pop. 1</i> | Schedule 1 | Threatened | Threatened (T) |
| Grizzly Bear | <i>Ursus arctos</i> | - | - | Special Concern (SC) |

All of the sites along the TCH are located within Caribou (*Rangifer tarandus pop. 1*, Southern Mountain population, SMP) range. The Caribou is a red-listed species, ranked provincially as S1 and as Threatened under the *Species at Risk Act* (SARA). The Columbia South herd of the SMP ranges through both Mount Revelstoke and Glacier National Parks. This herd is composed of approximately 7 Caribou, down from approximately 100 in 1994. The Columbia South herd ranges through both Mount Revelstoke and Glacier National Parks. The Southern Mountain population (SMP) of Caribou differ from other Caribou as their range varies by elevation in response to seasonal change as opposed to laterally. Specifically the Columbia South herd have adapted to the deep snow characteristic of the region, and use the deep snow pack to reach lichen growing on trees (Parks Canada, 2012).

According to Thomas and Gray (2002), the SMP caribou use low slopes and valley bottoms in early winter, moving to higher elevations where their diet is predominantly arboreal lichens when then snow pack deepens in mid to late winter. In spring, the caribou descend to lower elevations to access other vegetation. Pregnant caribou will migrate upwards in elevation to older forests in May through June to birth their calves. They tend to prefer isolated areas with low predator densities, such as islands in lakes, lakeshores, forests and tundra (Thomas and Gray 2002). Rutting typically takes place during the fall season (Parks Canada 2014).





While not listed on Schedule 1 of SARA, the Grizzly Bear (*Ursus arctos*) is listed as a species of Special Concern by COSEWIC, known to occur within MRNP and may occur at or near the rock slope remediation areas.

In the areas surrounding TCH km 20.186 to 22.827, the Northern Myotis bat (*Myotis septentrionalis*) is also a species of management concern reported within MRNP. The Northern Myotis is ranked provincially as S2S3 and is blue-listed under the BC List. The Northern Myotis hunt nocturnally and typically emerge after sunset. Habitat used to hunt includes small ponds, forest clearings and forest edges at a height of 1 to 3 meters. Winter hibernacula are generally solitary or can occur in small groups. Narrow crevices are preferred where temperatures drop to 1.6 °C or lower. Other species of bats are generally present in conjunction with the Northern Myotis. Hibernation usually begins after one or two killing frosts in September when there are no longer sufficient insects available for forage. During the summer months the Northern Myotis typically roost in crevices behind peeling bark or cavities of decaying trees. Such trees tend to be located in over-mature forest stands (Gill, 2007). Another bat species of management concern within MRNP is the Little Brown Myotis (*Myotis lucifungus*); ranked provincially as S5 and is yellow-listed within BC. This bat species has recently been added to Schedule 1 of SARA under emergency circumstances due to the extensive population declines due to White-nose Syndrome (WNS); and has been assessed as Endangered by COSEWIC 2012 (Forbes, 2012). The Little Brown Myotis uses caves and hollow trees but, has also adapted to human-made structure for resting and maternity sites and generally forage in forested areas near water (BC CDC 2012).

In the areas surrounding the TCH km 24.619 to 25.109, in addition to Caribou, Northern Myotis and Little Brown Myotis, the Vivid Dancer (*Argia vivida*), a red-listed provincially ranked S2 insect, also has potential to occur. The vivid dancer is a member of the family of narrow-winged damselflies. They are found only in localised pools near hot springs and spring-fed streams. These insects lay their eggs in aquatic vegetation and when hatched, larvae generally move to flowing water where they attach to the bottoms of stones and roots (Royal BC Museum, 2002). It should be noted that when the search was reduced to a 5 km radius for this specific location, none of the listed occurrences above were recorded.

The Coeur d'Alene salamander (*Plethodon idahoensis*) has been documented in MRNP. The Coeur d'Alene Salamander is a blue-listed S3S5 species in BC and ranked as a species of Special Concern under SARA. This species lacks lungs and breathes through its skin, and therefore requires moist, shady habitat which could include rockwalls with flowing seepages or streams, waterfall splash zones, caves, streams with exposed bedrock, avalanche paths and moist talus. Work at or near these areas shall be undertaken according to appropriate mitigation measures (Section 11). They are very unlikely to occur if rocky areas are devoid of moisture for extended periods (Environment Canada, 2015).

The Western Toad (*Anaxyrus boreas*) is known to occur at lower elevations along the TCH where breeding habitat exists, but can also be found at higher elevations. The Western Toad is a blue-listed S3S4 species in BC and ranked as a species of Special Concern under the SARA. This species spends a large majority of its time in terrestrial habitats including forested areas, moist shrublands, meadows and avalanche slopes. A wide variety of habitats are used by this species for breeding ranging from natural lakes to roadside ditches (Environment of Canada, 2015).

The Olive-sided Flycatcher (*Contopus cooperi*), Common Nighthawk and Lewis's Woodpecker have been documented within MRNP. The Olive-sided Flycatcher is a blue-listed S3S4B species in BC and is ranked as Threatened under SARA. Habitat for this species generally constitutes open areas with tall trees or snags for perching, including forest clearings, openings near water bodies or cut-blocks. Foraging occurs from high vantage points targeting flying insects (Environment of Canada, 2015). The Common Nighthawk (*Chordeiles minor*) is a yellow-listed S4B species in BC and ranked as Threatened under SARA. Habitat for the nighthawk includes a number of open and vegetation free habitats, which include rocky outcrops and riparian zones along rivers and lakes, but is also an inhabitant of mixed and coniferous forests (Environment Canada, 2015). Lewis's Woodpecker (*Melanerpes lewis*) is a red-listed S2B species in BC and is ranked as Threatened under SARA. This woodpecker species requires large, standing dead or dying trees for nesting and prefers relatively open areas for feeding (Environment Canada, 2015). All three of these species have potential to exist within the wooded areas upland of the rock scaling sites. There are approximately 183 species of birds found within Glacier and Mount Revelstoke

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National Parks. The diversity of bird species increases from April to August during the breeding season (Parks Canada, 2012a).

Two invertebrate species at risk, the Pale Jumping Slug (*Hemphillia camelus*), a blue listed S3 species in BC and the magnum mantleslug (*Magnipelta mycophaga*) a blue-listed S2S3 species in BC and designated as Special Concern also have potential to occur within MRNP. These species prefer moist coniferous forest habitat, including downed logs, depressions and within talus (BC CDC 2012).

The Northern Alligator Lizard (*Elgaria coerulea*) is also a species known within MRNP that inhabits rock outcrops and talus within open coniferous forests and areas along streams (BC CDC 2012).

Mountain goats (*Oreamnos americanus*) are also frequently observed along the TCH within MRNP, and are known to occur at Laings and Lauretta corners¹ where the bluffs are used as escape terrain. Within the first (km 20.186 to 20.271) and last (km 27.058 to 27.143) work areas, goats are not expected along the highway. Considerable goat activity along the highway and rock bluffs is expected at all other proposed work zones. Seasonal occurrences identified by PCA suggests that following July 1st is the least likely period where project related interactions may occur.

Another species of Special Concern known to inhabit that area is the Wolverine (*Gulo gulo*) and may occur at or near the Project areas. In addition, the status of two bird species, the Barn Swallow (*Hirundo rustica*), which is ranked Threatened by COSEWIC, and the Black Swift (*Cypseloides niger*) are being reviewed and each may soon receive a SARA ranking.

Numerous other wildlife species are known to inhabit MRNP and are likely to occur near the Project Site. These include Moose (*Alces alces*), Canada Lynx (*Lynx canadensis*), Black Bear (*Ursus americanus*), Coyote (*Canis latrans*), deer, Elk (*Cervus elaphus*) among others.

Following a review of habitat present within the Project Area and potential Project related interactions with wildlife populations, it was determined that a wildlife field survey will not be required due to reasonably low potential for project interaction and risk and therefore was not conducted during the preparation of this EIA. Wildlife mitigation measures, including pre-work surveys for species of management concern, are included in Section 11.

Aquatics:

The CDC iMapBC tool was used to identify watercourses between km 20.186 and km 27.143 at the northern end of the project. No fish or fish habitat surveys were conducted.

In total, 13 watercourses were identified within, or adjacent to this zone, none of which were identified by name using the Freshwater Atlas (FWA) Stream Network map layer. All watercourses are tributaries to the Illecillewaet River (watershed code: 300-746193) flowing from slopes above the TCH westbound lane to the Illecillewaet River located downslope of the TCH east bound lane (Figure 2). Fisheries data was not available from database sources for any of the 13 tributaries streams. Slopes above the TCH are generally steep, and all tributaries appear to exceed 25% gradient, thereby limiting or negating upstream migration from the Illecillewaet River above the TCH. Below the TCH; however, the same tributary gradients are gentler, and would allow upstream migration from the Illecillewaet River. Nonetheless, no fish sampling was conducted to confirm presence/absence and; therefore, it is possible that resident populations of trout or sculpin reside within lower gradient sections within the steeper upstream reaches of the tributaries. At the very least, these systems are important sources of food, nutrients and water to fish bearing waters below the TCH.

¹ Laings and Lauretta corners are approximately 20 km east of Revelstoke and 4 km west of Skunk Cabbage Boardwalk day use area.





Project locations from km 22.40 to 27.143 are all located with 300 m of the Illecillewaet River (watershed code: 360). Fish species present in the Illecillewaet River are listed in Table 4. Known locations of Bull Trout and Cutthroat Trout have been documented at the confluences of tributaries. In addition, Clachnacudainn Creek (watershed code: 300-746193-2535544), located a few kilometers west of km 20.186 is a known fish-bearing watercourse and has value in terms of reported angling (BC CDC 2013a).

Table 4: Fish Species Present in the Illecillewaet River

| | |
|--|--|
| Bridgelip Sucker (<i>Catostomus columbianus</i>) | Brook Trout (<i>Salvelinus fontinalis</i>) |
| Bull Trout (<i>Salvelinus confluentus</i>) | Kokanee (<i>Oncorhynchus nerka</i>) |
| Lake Chub (<i>Couesius plumbeus</i>) | Mountain Whitefish (<i>Prosopium williamsoni</i>) |
| Peamouth Chub (<i>Mylocheilus caurinus</i>) | Longnose Sucker (<i>Catostomus catostomus</i>) |
| Rainbow Trout (<i>Oncorhynchus mykiss</i>) | Sculpin (General) (<i>Cottus</i>) |
| Largescale Sucker (<i>Catostomus macrocheilus</i>) | Burbot (<i>Lota lota</i>) |
| Torrent Sculpin (<i>Cottus rhotheus</i>) | Westslope Cutthroat Trout (<i>Oncorhynchus clarkii lewisi</i>) |
| Prickly Sculpin (<i>Cottus asper</i>) | Slimy Sculpin (<i>Cottus cognatus</i>) |
| Northern Pikeminnow (<i>Ptychocheilus oregonensis</i>) | |

Of these species, only the Westslope Cutthroat Trout are listed under Schedule 1 of SARA as Special Concern and are on the provincial blue-list.

Cultural Resources:

Three cultural or historical sites have been identified within MRNP, however all three are not within proximity to the proposed slope remediation works. Nonetheless, these include:

- Site 569T has historical significance as the remains of the Mount Revelstoke Ski Hill, used between 1915 and 1969 (Francis and Perry, 2000). This site is located approximately 500 m east of the junction with the MISP and consists of ski jump platforms and a judge's tower.
- Site 1511T is a historic wood cistern located along the MISP (Francis and Perry, 2000). The reason and purpose for the cistern is unknown but subject to archival research.
- Site 1895T is a World War I internment camp located on the MISP (Francis, 2011). The camp existed for less than a year, being dismantled in late 1915 or early 1916. Remaining structures include building footprints, depressions, stone-built beehive ovens, and a compound security fence among others.

Human Use:

All work zones are located on the TCH, the main transportation route through the park and therefore important for human use, particularly tourists. The TCH will remain open to traffic during construction; however, lanes may be shifted to facilitate the work.

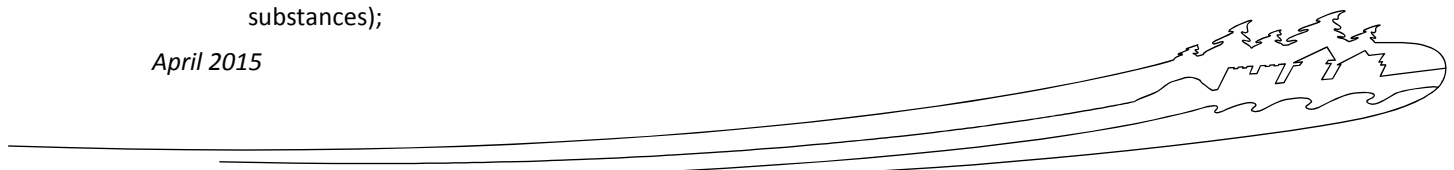
The rock slope stabilization program has been timed to occur and be completed prior to the heaviest tourism season. Nonetheless, traffic delays are expected to occur in order to safely complete the work.

Valued Components:

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

- SARA-listed or provincially listed species –Caribou, Western Toad, Northern Myotis, Olive-sided Flycatcher, Coeur d'Alene Salamander; Whitebark Pine, Sutherland's larkspur, least moonwort;
- Treed areas on the rock slopes;
- Aquatic wildlife (amphibians) potentially making use of ponds within TCH catchments for breeding and high occurrences of mountain goats along the highway at Laing's and Lauretta's corners;
- Aquatic components – Illecillewaet River water quality (at risk from the introduction of deleterious substances);

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- Fish species identified within the Illecillewaet River; and,
- Park visitors and travelers along the TCH will have restricted access during lane closures over the short-term.

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 stabilization 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 the transportation right-of-ways (ROW) is well understood and is considered to be previously disturbed.

Vegetation:

1. Vegetation clearing is anticipated within each of the zones proposed for remediation, including roadside catchment areas. Where vegetation is established along cliff edges or close to edges of slopes, removal may be necessary as a safety consideration. It is unlikely that sensitive or rare species exist in these areas as they have been previously disturbed for highway development and use, and during previous rock slope stabilization programs.
2. Vegetation trampling may occur where construction crews are required to access the rock slopes.
3. Vegetation in the immediate vicinity of the proposed projects may be affected by dust accumulation resulting from rock slope activities.
4. Surrounding vegetation could be affected by an accidental spill of a harmful substance on site.
5. Whitebark Pine is not likely to occur at any of the sites, therefore effects to SARA listed vegetation are not anticipated.
6. Equipment not properly cleaned prior to coming to a site may contribute to colonization of non-native and/or invasive species.

Wildlife:

1. Avoidance behaviors from local wildlife may occur as a result of increased noise and human presence from project activities resulting in disruption or impediment to wildlife movement.
2. Highway traffic and risk of collisions with wildlife on the TCH may negatively affect local wildlife, particularly bears and/or goats.
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. Vegetation used by migratory birds for nesting or used by small mammals may be removed, potentially disrupting breeding for one season.

Aquatics:

1. Increased human and vehicle traffic adjacent to the Illecillewaet River, its tributaries and drainage pathways could result in increased river bank erosion and sedimentation to fish bearing waters.
2. Riparian habitat may be affected through removal of streamside vegetation.
3. Deleterious substances (from equipment, construction materials, dust and worksite refuse) may enter waterbodies during construction affecting water quality and aquatic life at and downstream of each project site.
4. Aquatic life may be affected at and downstream of the project site should an accidental spill of harmful material enter Illecillewaet River.

Human Use:

1. Temporary effects to human use of the area will occur during the work. The TCH will remain open during stabilization works; however, the lane closures will be required to accommodate construction. This may result in increased traffic and delays through MRNP.

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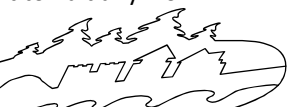
2. Dust generated from construction activities could potentially affect air quality in the immediate vicinity of each project site.
3. Construction equipment and activities could potentially affect visitor safety.
4. Noise generated by construction activities could result in a negative experience for Park visitors.
5. The visuals and aesthetics through MRNP could be affected temporarily by garbage, waste, spills or other construction related activities.

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.

11.1 Project Specific Mitigations

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 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. Identification key for rare plants that may exist on the rock faces (i.e. larkspur, Botrychium).
 - d. An erosion and sediment control plan to prevent/minimize sedimentation and erosion into watercourses within or adjacent to the Project area, and to 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 may include, but are not limited to fuels, lubricants, cement and/or resin based grouts, and asphalt cement.
 - f. An emergency response plan that outlines procedures to follow in the case of an emergency (wildlife encounter, equipment malfunction/failure, fire).
 - 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, Jasper dispatch and the Fire Duty Officer must be notified immediately.
2. It is expected that all staff and contractors 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 Environmental Surveillance Officer (ESO) through the Departmental Representative.
3. It is the responsibility of the Project Manager to ensure that all Project works are conducted in accordance with all applicable regulations and approvals including the *Fisheries Act*, *Species at Risk Act* and *Canada National Parks Act*.
4. It is the responsibility of the proponent to obtain all necessary permits prior to the commencement of Project activities.
5. An on-site Environmental Surveillance Officer (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 rehabilitation works such that criteria in PCA Approvals and the EPP are being adhered to.

6. It is the responsibility of the Project Manager to provide Parks Canada staff with advance notifications of Project activities and ensure that this information is included in local media.
7. All site staff are required to wear appropriate Personal Protective Equipment (PPE) and be trained to standards that comply with Worksafe BC.
8. Generally, personal vehicles shall be parked at least 10 m from any watercourse.
9. Firearms and pets are prohibited on site.
10. Fishing on site by Project crew is prohibited.
11. Park campgrounds will not be used for staff accommodation.
12. The Contractor assumes any risk to public safety as a result of Project activities.

11.2 Vegetation/Soils

1. A rare plant survey (RPS) may be undertaken at each rock slope stabilization location prior to any physical works to determine the presence of any rare plants in the Project area if timing is appropriate and can be completed prior to works. If the RPS cannot be conducted within the optimal timing for identification of rare plants, or timing does not allow for one prior to works additional mitigation must be implemented. Pre-work meetings can be done at the beginning of each shift to discuss communications and positive identification of rare plants. Should a rare plant be identified, the location should be noted for the FU records and the FU must be notified. Where practical, the rare plant, its root system and shallow soils should be transplanted according to the direction of the FU.
2. Vegetation clearing should not occur without prior notification to the Environmental Assessment Coordinator and/or responsible biologist. Further, no clearing is to take place within the MRG Bird Nesting Window of April 1 through August 31. Any variance for vegetation removal must be obtained from the FU Superintendent in advance of works (Parks Canada 2012d).
3. During tree felling and vegetation removal, the Contractor shall consult with the EIA Coordinator (or site representative) to select the best woody debris disposal method, which will depend on specific project details. Options include any one, or combination of the following:
 - a. Leave woody debris scattered in-situ;
 - b. Buck/split appropriate sized trees for re-use (for firewood: 15" to 20" long and 8" maximum diameter);
 - c. Chip and leave in-situ; or
 - d. Debris may be brought to a designated area for disposal as a last option.
4. Minimize disturbance (trampling) of potential rare plants/riparian vegetation by maintaining a single path into and out of work areas.
5. 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.
6. Should effects to vegetation occur as a result of the proposed project activities, efforts will be made to re-vegetate the disturbed area with vegetation native to the area according to MRG planting criteria in collaboration with PCA.
7. Prior to accessing the site, all construction equipment will be pressure washed or steam cleaned to prevent the transport of invasive plant parts, including seeds, to the work site where there is disturbed soil that may be easily invaded. In, particular tire treads, wheel wells and bumper areas shall be clear of dirt and plant debris from former work sites.
8. If non-native species are identified on-site and are suspected to have colonized due to construction activities, Parks Canada staff should be notified immediately to determine appropriate measures of treatment.

11.3 Wildlife

1. The Contractor shall be aware of sensitive wildlife windows (e.g. bird breeding) within Mount Revelstoke National Park. The Nesting Bird Window is April 1 to August 31. During that period, any trees larger than 15 cm diameter at approximately 1.3 m from ground, should be surveyed by an appropriately qualified professional. Surveys should occur early in the morning for activity or calls indicative of nesting.





2. Works shall be scheduled outside sensitive wildlife periods as much as possible (rutting, breeding etc.). Where works are required to occur within sensitive wildlife periods, care will be taken to prevent the disturbance or harm during construction activities.
3. All observations of or encounters with wildlife and species at risk must be immediately reported to Parks Canada Wildlife personnel. Species groups of particular interest include: bears, mountain goats, amphibians, birds (especially attempting to build nests), and fish. Observations of road kills should also be reported.
4. For general wildlife occurrences, prior to blasting and periodically during scaling, the Contractor shall conduct a visual sweep of the work area with binoculars from a vantage point affording a view of the top of the bluff being blasted 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 an appropriately qualified biologist.
5. Specific to mountain goats, prior to blasting and periodically during scaling, the Contractor shall conduct a visual sweep of the work area with binoculars from a vantage point affording a view of the top of the bluff being blasted and maintain a continuous watch for mountain goats. If goats are present, Parks Canada Resource Conservation Staff shall be notified and work shall be halted until the wildlife have passed through the area and/or have been hazed out of the area by the Parks Canada Resource Conservation staff.
6. Inspections shall be undertaken for breeding amphibians where there is to be pre-work clearing along the TCH or waste rock and debris removal from catchment ditches below or adjacent to Project locations identified in Table 1 which contain water. EBA employs appropriately qualified biologists and can undertake pre-work inspections. 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 by PCA 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. A single trail should be used for all crew into and out of the riparian areas to limit disturbance and concentrate any trampling that is unavoidable.
8. All efforts to prevent wildlife from obtaining 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.
9. 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. Nuisance wildlife will be immediately reported to the Parks Canada personnel and any incidents involving wildlife getting into garbage or attractants should be immediately reported.
10. Should blasting or construction works take place within the calving window of late May early June, any caribou presence or signs should be reported immediately to PCA and work shall be halted until approval is issued.
11. 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 Jasper Dispatch.
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 mountain goats and bears which can both be aggressive towards humans.

11.4 Aquatics/Water Quality

1. No in-stream works are to occur as per the scope of this Project. Best Management Practices for working in and around water will be applied when working near water courses,

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particularly at km 22.4 to 25.109. Considerations for working near water, such as erosion and sediment control measures, are to be incorporated into the project EPP.

2. The Contractor is responsible for ensuring that the Project avoids causing 'serious harm to fish' as per the *Fisheries Act*. While the Project does not require input from DFO, 'measures to avoid causing harm to fish and fish habitat' are to be employed as appropriate. Advice within these Measures replaces former Operational Statements produced by DFO:
 - a. Project Planning
 - i. Timing - avoid in-stream works as per above and schedule work to avoid wet, windy, rainy periods that may increase erosion and sedimentation;
 - ii. Containment and Spill Management – rehabilitation works shall occur such that sediment, concrete materials, fuels, hydraulic fluids etc. do not enter any watercourse. A response plan shall be developed by the Contractor and shall be implemented immediately in the event of a sediment release or spill of deleterious substance. Appropriately sized spill kits will be kept on site containing materials specific to the types of products and chemicals being used. The release of deleterious substances to fish habitat is prohibited under Section 36(3) of the *Fisheries Act*.
 - b. Erosion and Sediment Control - The Contractor shall develop and implement an Erosion and Sediment Control (ESC) Plan for the Project that minimizes the risk of sedimentation of a watercourse during all phases of the work. ESC measures shall be maintained until all disturbed ground has been permanently stabilized. The ESC plan should include:
 - i. The installation of effective ESC measures prior to rehabilitation works to prevent sediment from entering a nearby waterbody.
 - ii. Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, construction of a settling basin or other filtration system.
 - iii. Measures for containing and stabilizing waste material (e.g., excavation spoils, construction waste and materials, accumulated debris) to prevent entry into nearby waterbodies.
 - iv. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of remediation.
 - v. Repairs to erosion and sediment control measures and structures if damage occurs.
 - vi. Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
 - c. Re-vegetation and stabilization – clearing of riparian vegetation will not be required as part of this Project.
3. 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.
4. Dust generated by Project activities will be controlled as necessary by covering and/or dust control for onsite work by methods approved by the Departmental Representative.
5. No water is to be extracted from a local stream, river or other water body within a National Park.
6. The Contractor shall ensure that works are completely contained such that deleterious substances (e.g. cement-based products, blast media, epoxies, wash water etc.) will not be released into the environment.
7. Prior to use on site, equipment will be inspected and found to be free of fluid leaks of any kind. 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.
8. The Contractor shall have a spill response and cleanup plan prepared as part of the EPP. Appropriately sized and stocked spill kits shall be on site capable of dealing with 110% of the largest potential spill. All staff must be aware of its location on site and must be trained on spill response procedures.





9. In the event of any fluid spills or leaks exceeding 5 litres or any spill quantity to water, Parks Canada Dispatch and the ESO should be notified immediately. Any absorbent materials used in the clean-up or soils contaminated by the spill should be disposed of in the appropriate facilities.
10. All refueling should take place on hardened, impermeable surfaces at least 30 m from the high water mark of any waterbody.
11. Where damage to the TCH occurs and requires being repaired, all re-paving and asphalt work shall comply with the following:
 - a. Trucks for hauling asphalt mixture shall have tight, clean, smooth metal beds that have been sprayed with a minimum amount of fuel oil to prevent the mixture from adhering and causing waste asphalt. The vehicle covers shall be securely fastened. Excess truck box lubricants such as light oil, detergent or lime solutions shall not be allowed to contaminate the mix, and shall be disposed of in an environmentally acceptable manner. Truck box lubricant application shall be carried out within adequate containment (i.e. bermed).
 - b. Asphalt plant operation must comply with all environmental pollution control regulations applicable in the plant area.
 - c. The Contractor shall be responsible for the purchase and the safe delivery/storage/handling of asphalt cement and emulsions to the asphalt plant site. Excess hot mix or reject asphalt shall be temporarily stored as directed by the Departmental Representative, and removed from the Park, prior to completion of the contract a later date. All costs for removal and disposal shall be the responsibility of the Contractor and no separate payment shall be made.
 - d. Ground asphalt material shall be removed, recycled, or properly stored at a location approved by the Departmental Representative or the ESO.
 - e. The Contractor shall ensure that there is enough room between the stockpiles and the asphalt plant for a loader in the event of a spill at the asphalt plant. A containment berm with an associated liner made of occlusive material (e.g. plastic of a thickness approved by the Departmental Representative) and covered with absorbent sand or clay shall be installed under the asphalt storage tank to ensure containment of 110% of the tank's capacity.
 - f. The Contractor may wish to protect containment/catchment areas and drip trays at the asphalt plant from rainfall since, if contaminated, all of the collected water will have to be disposed of at the expense of the Contractor at an approved disposal facility outside the park.
 - g. Sites from which materials have been removed shall be restored to a neat and presentable condition upon the completion of the work.

11.5 Human Use/Visitor Experience

1. A Traffic Management Plan will be developed and implemented by the Contractor. Informative signs will be placed strategically in locations around the project site, Information Centers and kiosks around the Park, providing information regarding the construction activities, work periods and timelines.
2. To reduce noise and air pollution, construction equipment will be turned off when not in use. Daily start and end times for remediation works shall be determined in consultation with PCA.
3. Impacts to cultural or historical resources are not anticipated. However, in the unlikely event that a cultural or historical artifact is observed during works, it will be left undisturbed and reported to Parks Canada personnel immediately.

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

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

☒ No

☐ Yes

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

☒ No

☐ Yes





13. EFFECT SIGNIFICANCE

Temporary Effects

Temporary effects resulting from the proposed project activities include:

- Park visitors being inconvenienced by construction activities and reduced lane capacity at rock slope remediation locations within MRNP.
- Possible avoidance behavior in local wildlife due to increased noise and human presence at the project sites.
- 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 roadside vegetation and in stream habitat due to construction activities.

Residual Effects

It is anticipated that there will be no adverse residual environmental effects as a result of the proposed project activities, provided that all mitigation measures discussed in this report are followed. Furthermore, no significant adverse effects are anticipated for identified valued components.

14. SITE INSPECTION

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

- ☒ 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 stabilization 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 slope remediation along the TCH 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

Include Parks Canada experts. Add as many entries as necessary for the project.

| | |
|---|--|
| Department/Agency/Institution: Tetra Tech EBA Inc. | Date of Request: Through planning stage December 2014 to March 2015 |
| Expert's Name: Aaron Nickoli | Title: Rock Work Specialist |
| Contact Information: Direct: 778-945-5715; Cell: 604-202-2671 Email: Aaron.Nickoli@tetrattech.com Suite 1000, 10 th floor, 885 Dunsmuir St. Vancouver, BC V6C 1N5 | |
| Expertise Requested: Specific details with respect to the scope of stabilization measures, equipment required to complete the work, timing of the work. | |
| Response: Details are provided in Sections 3 and 8. | |
| | |

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| | |
|--|--|
| Department/Agency/Institution: Tetra Tech EBA Inc. | Date of Request: Through planning stage December 2014 to March 2015 |
| Expert's Name: Anders Frappell, P.Eng. | Title: Rock Engineering Team Lead |
| Contact Information: Direct: 778-945-5833; Cell: 778-828-7275 Email: Anders.Frappell@tetratech.com Suite 1000, 10 th floor, 885 Dunsmuir St. Vancouver, BC V6C 1N5 | |
| Expertise Requested: Specific details with respect to the scope of stabilization measures, equipment required to complete the work, timing of the work. | |
| Response: Details are provided in Sections 3 and 8. | |
| | |
| Department/Agency/Institution: Parks Canada Agency | Date of Request: March 11, 2015 |
| Expert's Name: Trevor Kinley | Title: Environmental Assessment Specialist III |
| Contact Information: Highway Service Centre, Radium Hot Springs, BC 250-347-6634, trevor.kinley@pc.gc.ca | |
| Expertise Requested: Review of draft BIA | |
| Response: Provision of specific data from MRG FU for wildlife and vegetation | |
| | |
| Department/Agency/Institution: Parks Canada Agency | Date of Request: March 11, 2015 |
| Expert's Name: Danielle Backman | Title: Resource Conservation Officer II |
| Contact Information: Mount Revelstoke and Glacier National Parks 350 301 W. 3 rd Street, Revelstoke, BC. Phone: 250-837-7511; Cell: 250-814-4713; danielle.backman@pc.gc.ca | |
| Expertise Requested: Review of draft BIA | |
| Response: Provision of specific data from MRG FU for species of management concern and mitigation measures | |

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.

NOTE: If the project is identified as likely to cause significant adverse effects, CEAA 2012 prohibits approval of the project unless the Governor in Council (Cabinet) determines that the effects are justified in the circumstances. A finding of significant effects therefore means that the project CANNOT go ahead.

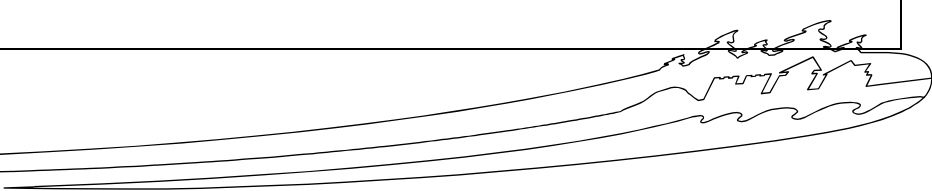
19. SIGNATURES AND APPROVAL**EA Author**

| | |
|---|------------------|
| Name: Lucas Hennecker, R.B.Tech. | Date: 2015-03-27 |
| Position: Environmental Specialist | |
| Signature:  | |


EA Author

| | |
|---|------------------|
| Name: Cameron Kulak, B.Sc., Dipl.T., R.P.Bio. | Date: 2015-03-27 |
| Position: Biologist | |
| Signature:  | |

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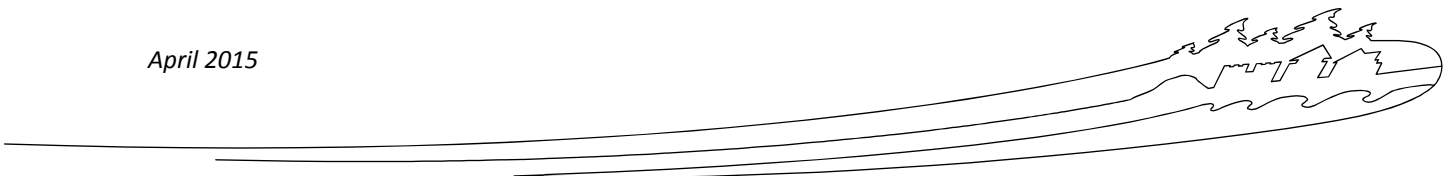
**EA Review**

| | |
|---|------------------|
| Name: David Morantz, M.Sc., R.P.Bio. | Date: 2015-03-27 |
| Position: Senior Biologist | |
| Signature:  | |

Decision Approval

| | |
|--|------------------|
| Name: | Date: YYYY-MM-DD |
| Position: <i>(Field Unit Superintendent, or Designate)</i> | |
| Signature: | |

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20. REFERENCE LIST

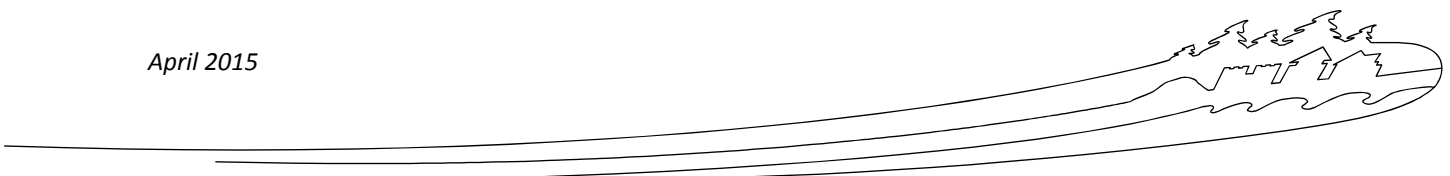
- BC Conservation Data Centre (BC CDC). 2013a. Conservation Data Centre Internet Mapping Service (iMapBC). Victoria, British Columbia, Canada. Available: <http://webmaps.gov.bc.ca/imfx/imf.jsp?site=imapbc> (Accessed Jan 29, 2015).
- BC Conservation Data Centre (BC CDC). 2013b. BC Species and Ecosystems Explorer. BC Minist. of Environ. Victoria, BC. Available: <http://a100.gov.bc.ca/pub/eswp/> (Accessed Jan 29, 2015).
- BC Ministry of Environment MOE): Habitat Wizard. 2013. Available: <http://www.env.gov.bc.ca/habwiz/> (Accessed Jan 29, 2015).
- Braumandl, T.F. and M.P. Curran. 2002. A Field Guide for Site Identification and Interpretation for the Nelson Forest Region. Land Management Handbook, 0229-1622; no.20.
- British Columbia Ministry of Forest and Range. 2011. Biogeoclimatic Ecosystem Classification Program. Available: <http://www.for.gov.bc.ca/hre/becweb/> (Accessed Jan 29, 2015)
- E-Flora. 2013. E-Flora BC: Electronic Atlas of the Plants of British Columbia. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. Available: <http://www.geog.ubc.ca/biodiversity/eflora/> (Accessed Jan 29, 2015)
- Environment Canada. 2015. Species at Risk Public Registry. Available: http://www.sararegistry.gc.ca/default_e.cfm (Accessed Jan 29, 2015).
- Meidinger, D. and J. Pojar. 1991. Ecosystems of British Columbia. BC Ministry of Forests. Victoria, BC.
- Parks Canada. 2013. Biotics Web Explorer. Available: http://www.pc.gc.ca/apps/bos/BOSMain_e.asp (Accessed Feb 4, 2015).
- Parks Canada. 2014. Glacier National Park, Species at Risk. Available: <http://www.pc.gc.ca/eng/pn-np/bc/glacier/natcul/EEP-SAR.aspx>. (Accessed Jan 29, 2015).
- Parks Canada. 2012. Mount Revelstoke National Park of Canada. Available: <http://www.pc.gc.ca/eng/pn-np/bc/revelstoke/natcul/hist.aspx>. (Accessed Jan 29, 2015).
- Thomas, D.C. and D.R. Gray. 2002. COSEWIC Assessment and Update Status Report on the Woodland Caribou, *Rangifer tarandus caribou*, in Canada. Pages 1-98 in COSEWIC Committee on the Status of Endangered Wildlife in Canada. Environment Canada, Ottawa, Ontario, Canada.

21. ATTACHMENTS LIST

1. Figure 1 – Project Location
2. Figure 2 – BC CDC Species at Risk and Biogeoclimatic Zones of BC

22. ADDITIONAL CONSIDERATIONS / COMMENTS

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Appendix 1 Environmental Impact Analysis Tools: Effects Identification Matrix

| Effects Identification Matrix | | | | | | | | | | | | | |
|-------------------------------|-----------------------------------|--------------------------------------|--|-------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| | | | Components potentially directly affected by the proposed project | | | | | | | | | | |
| | | | Natural Resources | | | | | Cultural Resources | Visitor Experience | | | | |
| | | | Air | Soil & landforms | Water (Illecillewaet River and tributaries) | Flora (Whitebark Pine) | Fauna (birds, mammals, fish) | MISP sites | Insert heritage values | Visitor access & services | Recreational/Accomm. opportunities | Views and soundscapes | Visitor Safety |
| Phase | Examples of Associated Activities | | | | | | | | | | | | |
| Project Components | Preparation / construction | Supply and storage of materials | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | | Clearing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Disposal of waste | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Scaling | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Trim Blasting | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Excavation of catchments | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Use of machinery | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | Transport of materials/equipment | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | | Use of Chemicals, i.e. grouts, fuels | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | Other... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

SAR- species at risk





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.

☐ **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******

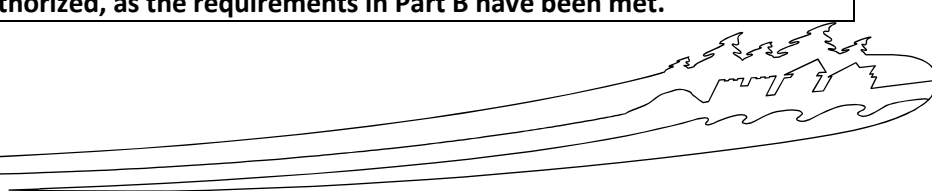
3. Does the activity fall into one of the following three categories? Check the appropriate box and continue to Question 4. If the proposed activity DOES NOT fit in any of the three categories below, the activity CANNOT be authorized and you should continue to Part C to summarize your decision.

- ☐ 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? | |
| <input type="checkbox"/> No | The activity CANNOT be authorized as alternatives have not been/cannot be considered. <i>Continue to Part C to summarize your decision.</i> |
| <input type="checkbox"/> Yes | The activity MAY be authorized. <i>Provide explanation and continue to Question 5.</i> <ul style="list-style-type: none">• <i>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.</i> |
| 5. Will all feasible measures be taken to minimize the impact of the activity? | |
| <input type="checkbox"/> No | The activity CANNOT be authorized. <i>If it is <u>not possible</u> to implement all feasible measures, continue to Part C to summarize your decision.</i> |
| <input type="checkbox"/> Yes | The activity MAY be authorized. <ul style="list-style-type: none">• <i>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.</i>• <i>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.</i> |
| 6. Will the activity jeopardize the survival or recovery of the species? | |
| <input type="checkbox"/> Yes | The activity CANNOT be authorized. <i>If the survival or recovery of the species <u>will</u> be jeopardized, continue to Part C to summarize your decision.</i> |
| <input type="checkbox"/> No | The activity MAY be authorized. <i>Provide explanation and continue to Part C.</i> <ul style="list-style-type: none">• <i>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).</i>• <i>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).</i>• <i>Indicate whether the project will increase mortality, decrease fertility/recruitment, affect a key life stage/cycle.</i>• <i>Make reference to known effects of similar activities based on existing literature.</i> |
| Part C – Summary - Will the SARA authorization be issued? | |
| 7. Will the SARA Authorization be issued? | |
| <input type="checkbox"/> No <i>(indicate selection)</i> | The activity WILL NOT be authorized because: <ul style="list-style-type: none">a. The activity does not fit into one of the three required categories <i>(see response to Question 3).</i>b. Alternatives have not been considered <i>(see response to Question 4).</i>c. All feasible measures cannot be taken to minimize impacts <i>(see response to Question 5).</i>d. The activity will jeopardize the survival or recovery of the species <i>(see response to question 6).</i> |
| <input type="checkbox"/> Yes | The activity WILL be authorized, as the requirements in Part B have been met. |



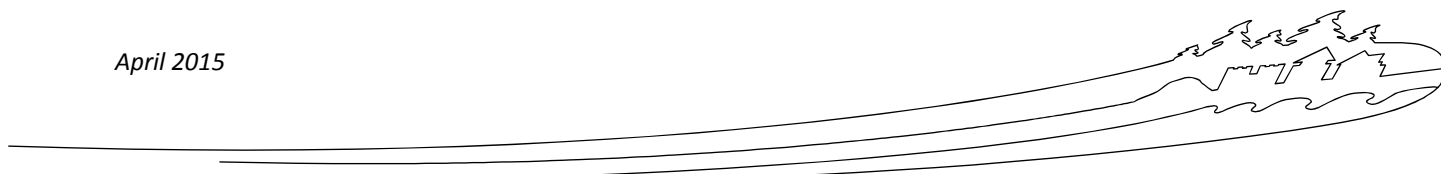


Part D - How will the SARA authorization be issued?

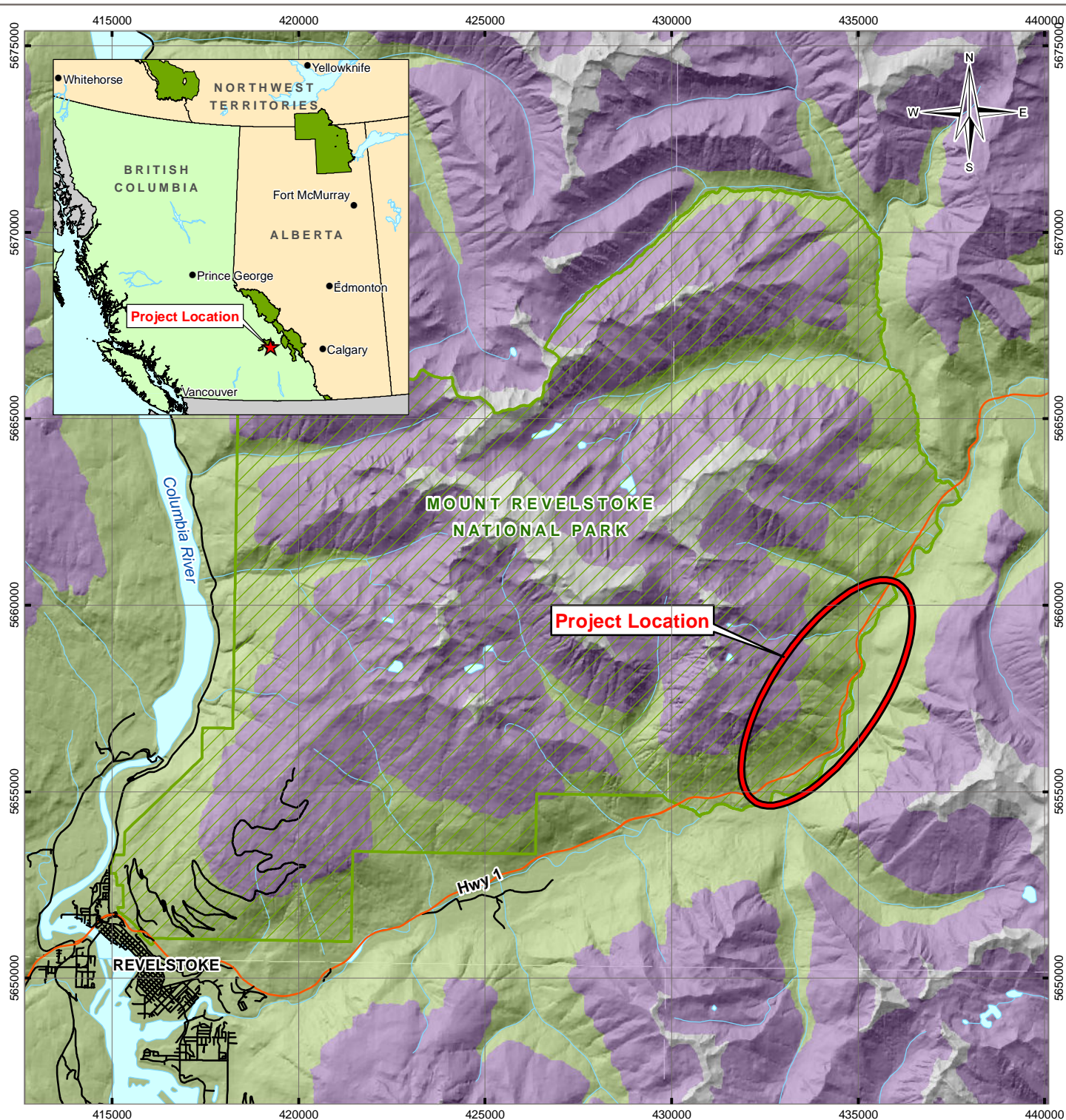
8. Which process will be used?

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.

| | |
|---|---|
| <input type="checkbox"/> SARA permit (s.73) | <ul style="list-style-type: none">• 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. |
| <input type="checkbox"/> An existing PCA process (and SARA s.74) | <ul style="list-style-type: none">• 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. |



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LEGEND

Biogeoclimatic Zones of BC¹

- Interior Mountain-heather Alpine (IMA)
- Engelmann Spruce - Subalpine Fir (ESSF)
- Interior Cedar - Hemlock (ICH)

- Trans-Canada Highway
- Minor Road
- Watercourse
- Waterbody
- National Park

NOTES

1. BEC data from DataBC (Version 9, May 2014).
Base data source: CanVec 1:50,000; NTS 1:250,000; GeoBase DEM.

STATUS
ISSUED FOR REVIEW

ENVIRONMENTAL IMPACT ANALYSIS FOR ROCK SLOPE REMEDIATION MOUNT REVELSTOKE NATIONAL PARK

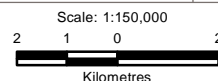
Project Location

PROJECTION
UTM Zone 11

DATUM
NAD83

CLIENT

Parks Canada Parcs Canada



TETRA TECH EBA

FILE NO.
V13403090-01_MRNP_Figure01_Overview.mxd

PROJECT NO.
V13403090-01

DWN
SL

CKD
MEZ

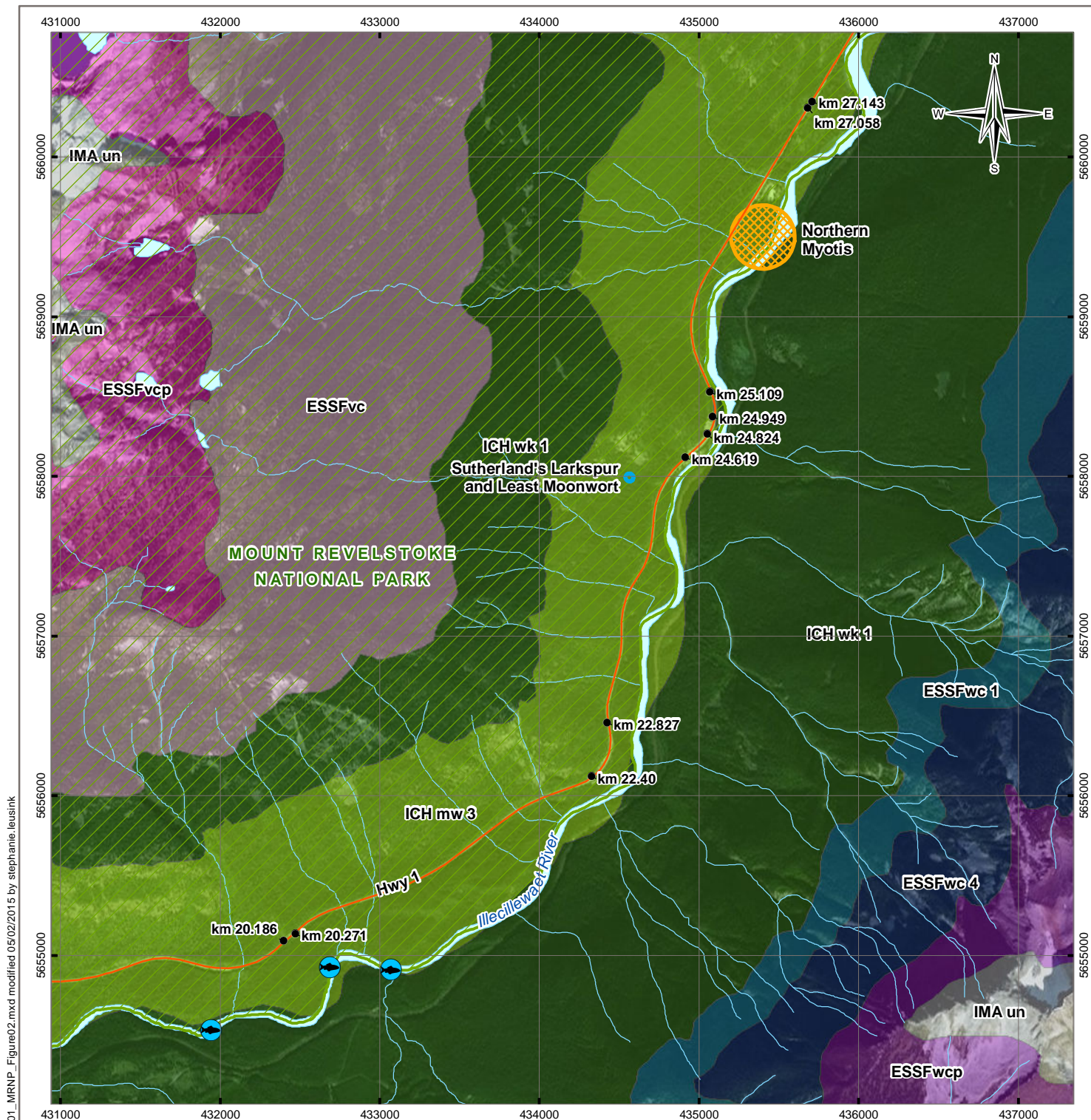
APVD
LH

REV
0

OFFICE
Tl EBA-VANC

DATE
February 4, 2015

Figure 1



LEGEND

Species at Risk as Mapped by CDC (includes BC Listing)¹

- Vertebrate Animal (Blue)
- Vascular Plant (Blue Listed)

Biogeoclimatic Zones of BC²

Interior Cedar - Hemlock

- Moist Warm (ICH mw 3)
- Wet Cool (ICH wk 1)

Interior Mountain-heather Alpine

- Undifferentiated (IMA un)

Engelmann Spruce - Subalpine Fir

- Very Wet Cold Parkland (ESSFvcp)
- Very Wet Cold (ESSFvc)
- Wet Cold Parkland (ESSFwcp)
- Wet Cold (ESSFwc 1)
- Wet Cold (ESSFwc 4)

- Fish Location

- Trans-Canada Highway

- Watercourse

- Waterbody

- National Park

NOTES

1. Species at risk data was collected and mapped by the BC Conservation Data Centre (CDC) and downloaded on January 26, 2015.
 2. BEC data from DataBC (Version 9, May 2014).
- Base data source: CanVec 1:50,000; Imagery Source: ESRI Basemaps for ArcGIS.

STATUS
ISSUED FOR REVIEW

ENVIRONMENTAL IMPACT ANALYSIS FOR ROCK SLOPE REMEDIATION MOUNT REVELSTOKE NATIONAL PARK

BC CDC Species at Risk and Biogeoclimatic Zones of BC

PROJECTION

UTM Zone 11

DATUM

NAD83

CLIENT

Parks Canada

Scale: 1:35,000

500 250 0 500

Metres

FILE NO.

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PROJECT NO.

V13403090-01

DWN

SL

CKD

MEZ

APVD

LH

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February 5, 2015

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Figure 2