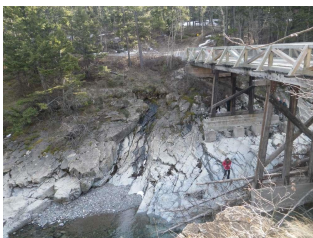


REPORT

Parks Canada

Waterton Lakes National Park Canyon Church Camp Bridge Replacement Environmental Assessment



April 2015

CONFIDENTIALITY AND © COPYRIGHT

This document is for the sole use of the addressee and Summit Environmental Consultants Inc. The document contains proprietary and confidential information that shall not be reproduced in any manner or disclosed to or discussed with any other parties without the express written permission of Summit Environmental Consultants Inc. Information in this document is to be considered the intellectual property of Summit Environmental Consultants Inc. in accordance with Canadian copyright law.

This report was prepared by Summit Environmental Consultants Inc. for the account of Parks Canada. The material in it reflects Summit Environmental Consultants Inc.'s best judgement, in the light of the information available to it, at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Summit Environmental Consultants Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Table of Contents

SECTION	PAGE NO.
Table of Contents	i
List of Tables	iii
List of Figures	iv
1 Introduction	1
2 Methods	3
2.1 Desktop	3
2.2 Site Assessment	3
2.3 Limitations	3
3 Environmental Assessment Results	3
3.1 Blakiston Creek and Riparian Areas	4
3.2 Soils	4
3.3 Vegetation	5
3.4 Wildlife	6
3.5 Historical and Cultural Resources	7
4 Applicable Regulatory Legislation	7
4.1 Water Act	7
4.2 Navigation Protection Act	7
4.3 Fisheries Act	8
4.4 Migratory Bird Convention Act	8
4.5 Species at Risk Act	8
4.6 <i>National Parks Act</i> and Regulations	8
5 Potential Environmental Impacts	9
5.1 Blakiston Creek and Riparian Areas	9
5.2 Soils	9
5.3 Vegetation	9
5.4 Wildlife	10
5.5 Historical and Cultural Resources	10
6 Mitigation Measures	10
6.1 General	10
6.2 Blakiston Creek	15

6.3	Soils	15
6.4	Vegetation	16
6.5	Wildlife	17
6.6	Historical and Cultural Resources	17
7	Closing	18
References		
Appendix A - Photographs		

List of Tables

	PAGE NO.
Table 3-1: Fish species documented in Waterton River and their conservation statuses	4
Table 3-2: Plant species in the vicinity of the project area and their conservation status.	5
Table 3-3: Terrestrial wildlife species within 1 km of the project area and their conservation status.	6

List of Figures

	PAGE NO.
Figure 1-1 Project Location	2

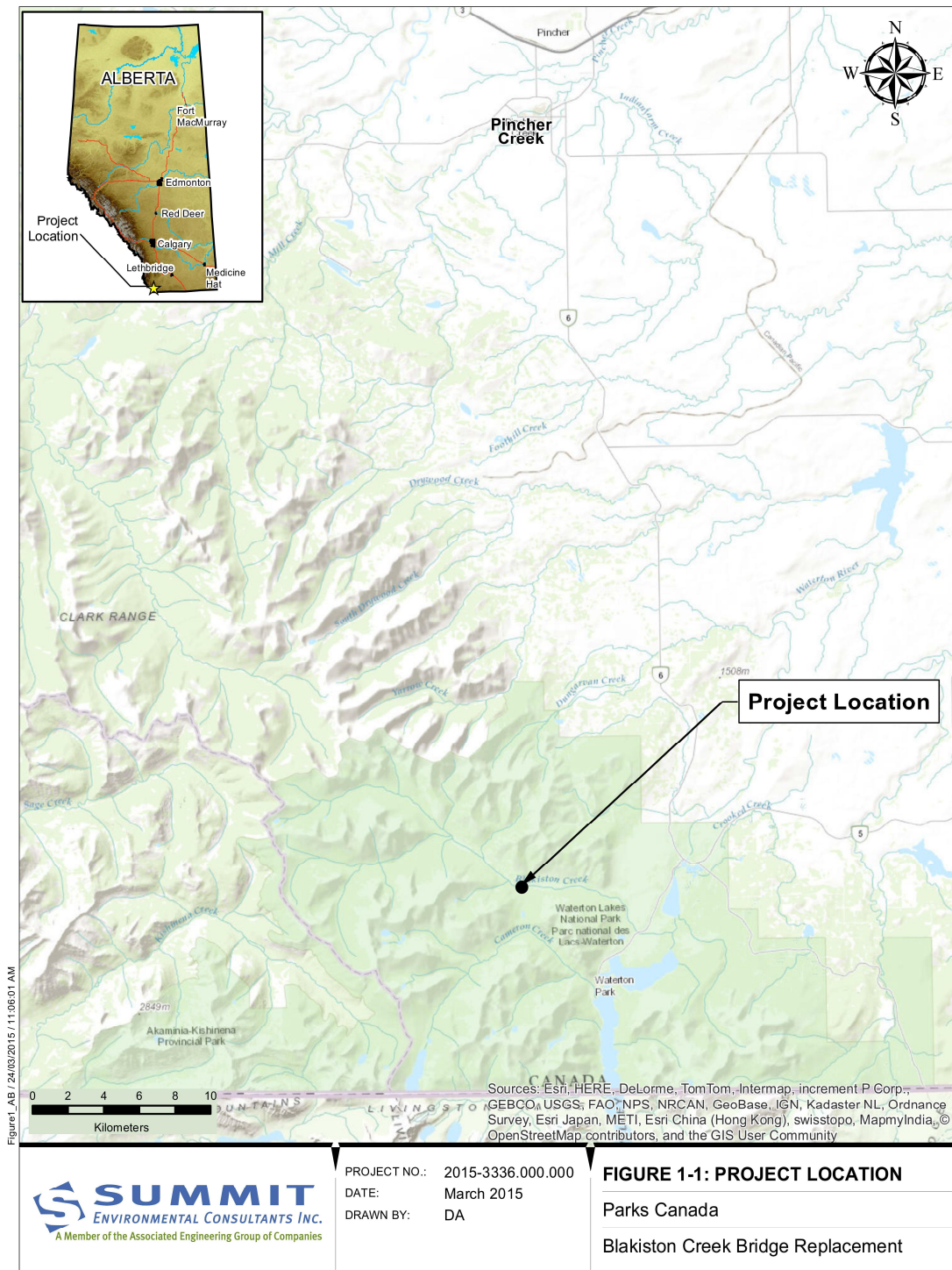
1 Introduction

Associated Engineering was retained by Parks Canada to design and manage the Canyon Church Camp Bridge replacement project in Waterton Lakes National Park (Figure 1-1). The existing three-span wooden bridge has suffered recent flood damage and is no longer safe for vehicle use. The bridge provides the main access to the Canyon Church Camp as well as the Crandell Lake Trailhead, and serves as secondary access to the Crandell Campground located on the south side of Blakiston creek. The main access to the Crandell Mountain Campground is located further downstream of the bridge site. There is another bailey bridge crossing at this location which provides access to the South side of the project site.

The existing bridge will be removed and replaced by a single span steel plate girder bridge. An environmental assessment (EA) was required to identify the environmental sensitivities at and adjacent to the Blakiston Creek watercourse crossing. The EA report (this document) outlines the potential risks to the environment which may result during the proposed bridge replacement construction activities and provides recommendations and mitigation measures to be incorporated into the construction plans to prevent, avoid and minimize those potential impacts.

Summit Environmental Consultants Inc. (Summit), the environmental division of Associated Engineering, completed the EA for the project to comply with the *National Parks Act* and Regulations (GoC 2000). The objectives of the assessment were as follows:

- Conduct a desktop assessment of the site to identify potential environmental sensitivities at and adjacent to the Blakiston Creek watercourse crossing;
- Conduct a site assessment of the construction area and identify site specific sensitivities at the crossing site and at all potential locations required for construction activities; and,
- To prepare the EA report which outlines mitigation measures and best management practices to minimize the impacts to sensitive features.



2 Methods

2.1 DESKTOP

Background environmental information for the Blakiston Creek crossing was compiled by reviewing available reports and conducting searches of online provincial and federal databases. The databases reviewed included:

- Alberta Environment and Sustainable Resource Development (AESRD) Fish and Wildlife Management Information System (FWMIS) for inventoried (identified) fish and wildlife (within a 1 km radius of the bridge location), and sensitive habitat ranges (GoA 2015b);
- Alberta Parks Conservation Information Management System (ACIMS) to identify any rare species or species of special concern (GoA 2015a);
- Committee on the Status of Endangered Wildlife in Canada wildlife species search (COSWEIC); and,
- Alberta wild species general status listing (GoA 2010).

2.2 SITE ASSESSMENT

A site assessment was completed by Summit Biologist, Justin Hick, BIT, on March 12, 2015. The Blakiston Creek crossing location, access roads, and potential equipment and material laydown areas were assessed. Environmental sensitivities identified included: Blakiston Creek watercourse and riparian areas, soil sensitivities, vegetation at and adjacent to the proposed construction and laydown areas, wildlife habitat potential, and park infrastructure including the vehicles access roads and trail system.

2.3 LIMITATIONS

The on-site assessment occurred during a time of the year when herbaceous vegetation is not easily determined. Vegetation observed on-site was primarily decaying vegetation from the previous year's growing season. The best way to detect rare or listed plants is to conduct vegetation assessments at two points in the growing season: 1) in early summer, and 2) in the fall. Therefore, the presence of rare and sensitive plant species at this location is unknown.

3 Environmental Assessment Results

The following information outlines the environmental sensitivities identified on-site at the proposed project locations and the associated potential impacts to the environment that may result from construction activities.

3.1 BLAKISTON CREEK AND RIPARIAN AREAS

Parks Canada staff indicated that bull trout (*Salvelinus confluentus*), brook trout (*Salvelinus fontinalis*) and rainbow trout (*Oncorhynchus mykiss*) are present in Blakiston Creek (Pers. Comm., 2015). In addition to this information, results of the FWMIS database identified 5 fish species present in the Waterton River watershed which have the potential to be present in Blakiston Creek. The results of the FWMIS search are outlined in Table 3-1.

Table 3-1: Fish species documented in Waterton River and their conservation statuses

Common Name	Scientific Name	S-ranking	Alberta Wild Species Status	COSEWIC Status	SARA Status
Brook trout	<i>Salvelinus fontinalis</i>	SNA	Exotic	N/A	N/A
Brown trout	<i>Salmo trutta</i>	SNA	Exotic	N/A	N/A
Bull trout	<i>Salvelinus confluentus</i>	S3	Sensitive/Threatened ^a	Special Concern	Not listed
Mountain whitefish	<i>Prosopium williamsoni</i>	S5	Secure	Not listed	Not listed
Rainbow trout	<i>Oncorhynchus mykiss</i>	S1	Secure	Not listed	Not listed

^a – While bull trout are listed as sensitive under the Wild Species Status, they are classified as threatened under Alberta's Wildlife Act; protective regulations under this Act that apply to fish species are under development.

* Above FWMIS Inventory data may not be inclusive of all species that may be found in the project area; S Rank: Species rank in accordance with Alberta Wild Species General Status Listing (GoA 2010a), FWMIS: Fish and Wildlife Management Information System; COSEWIC: Committee on the Status of Endangered Wildlife in Canada; SARA: species at Risk Act.

3.2 SOILS

The project area is located in a Lookout Butte 2 ecosite zone (LB2) as determined by Parks Canada (Achuff et al. 2002). This classification system is based on ecological land classification methodology previously developed and used for national parks in Western Canada. Classification is based on vegetation and soil types. The LB2 ecosite soils are generally well developed, moderately acidic to neutral, medium to fine textured and well drained Orthic and Dark Gray Luvisols formed on Cordilleran till.

The banks of Blakiston Creek at the crossing location are primarily bedrock and the watercourse is largely confined within a narrow canyon. Earthen and organic material is present along the top of the watercourse banks. During the site assessment, erosion gullies were observed at the existing bridge abutments and approaches on the south side of the bridge. Erosion has resulted in removal of soils down to bedrock around the existing bridge abutment.

3.3 VEGETATION

The vegetation typically found in LB2 ecosites includes mixed conifer and aspen forests. The project area is located in the montane natural subregion. The dominant vegetation found in the montane subregion varies significantly geographically. In the Waterton Park area, the montane subregion supports open pure and mixed forests dominated by lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), trembling aspen (*Populus tremuloides*), and white spruce (*Picea glauca*) and fescue (*Festuca spp.*) dominated grasslands (Natural Regions Committee 2006).

A search of the ACIMS database identified 13 rare plant species that have been documented within the vicinity of the project (GoA 2015a; GoA 2015b). These include whitebark pine (*Pinus albicaulis*) and limber pine (*Pinus flexilis*) which are listed as endangered under SARA.

Whitebark and limber pine were not identified in the project area during the on-site assessment. The results of the ACIMS database search are outlined in Table 3-2.

Table 3-2: Plant species in the vicinity of the project area and their conservation status.

Common Name	Scientific Name	S-ranking	Alberta Wild Species Status	COSEWIC Status	SARA Status
Geyer's onion	<i>Allium geyeri</i>	S2	May be at risk	Not listed	Not listed
Lance-leaved grape fern	<i>Botrychium lanceolatum</i>	S2	Sensitive	Not listed	Not listed
Moss	<i>Brachythecium reflexum</i>	S2	Secure	Not listed	Not listed
Green shield moss	<i>Buxbaumia viridis</i>	S1	May be at risk	Not listed	Not listed
Sheridan's Green Hairstreak	<i>Callophrys sheridanii</i>	S1	Sensitive	Not listed	Not listed
Jelly flakes	<i>Collema undulatum</i> var. <i>granulosum</i>	S2S3	Sensitive	Not listed	Not listed
Slender hair grass	<i>Deschampsia elongata</i>	S1	May be at risk	Not listed	Not listed
Nodding scorzonella	<i>Microseris nutans</i>	S2	May be at risk	Not listed	Not listed
Whitebark pine	<i>Pinus albicaulis</i>	S2	May be at risk	Endangered	Endangered
Limber pine	<i>Pinus flexilis</i>	S2	May be at risk	Endangered	Not listed

Common Name	Scientific Name	S-ranking	Alberta Wild Species Status	COSEWIC Status	SARA Status
Icarioides blue	<i>Plebejus icarioides</i>	S2S3	Sensitive	Not listed	Not listed
Hooker's cinquefoil	<i>Potentilla hookeriana</i>	S2	Undetermined	Not listed	Not listed
Emery rock tripe	<i>Umbilicaria phaea</i>	S2	May be at risk	Not listed	Not listed

* Above FWMIS Inventory data may not be inclusive of all species that may be found in the project area; S Rank: Species rank in accordance with Alberta Wild Species General Status Listing (GoA 2010a), FWMIS: Fish and Wildlife Management Information System; COSEWIC: Committee on the Status of Endangered Wildlife in Canada; SARA: species at Risk Act.

3.4 WILDLIFE

A search of the FWMIS database identified 4 terrestrial wildlife species that have been documented within 1 km of the project location (GoA 2015b). Grizzly bear (*Ursus arctos*) prairie population is listed as extirpated under SARA; however, other populations such as those in Waterton Lakes National Park are not listed. Provincially, grizzly bears are considered At Risk under the Alberta Wild Species Status and have an S2 ACIMS S-rank (GoA 2010; GoA 2015a). The results of the FWMIS search are outlined in Table 3-3.

Table 3-3: Terrestrial wildlife species within 1 km of the project area and their conservation status.

Common Name	Scientific Name	S-ranking	Alberta Wild Species Status	COSEWIC Status	SARA Status
Grizzly bear	<i>Ursus arctos</i>	S2	At risk	Special concern	No status
Hoary bat	<i>Lasiurus cinereus</i>	S2	Sensitive	Not listed	Not listed
Long-toed salamander	<i>Ambystoma macrodactylum</i>	S3	Sensitive	Not at risk	Not listed
Water vole	<i>Microtus richardsoni</i>	S3	Sensitive	Not listed	Not listed

* Above FWMIS Inventory data may not be inclusive of all species that may be found in the project area; S Rank: Species rank in accordance with Alberta Wild Species General Status Listing (GoA 2010a), FWMIS: Fish and Wildlife Management Information System; COSEWIC: Committee on the Status of Endangered Wildlife in Canada; SARA: species at Risk Act.

Parks Canada has surveyed wildlife across Waterton Park (Wallis et al. 2002). The survey identified numerous birds and small mammal species throughout the park. For the LB2 ecosite region, 51 different bird species were observed, no amphibian species were observed, and six small mammals were observed. Some amphibians and reptile species have been identified in the park; however, these are typically uncommon and localized to those areas with suitable habitat (i.e. wetlands). A small depression was identified on the northwest side of the crossing location adjacent to the access road. Aquatic vegetation

was identified in this area which indicates it is a permanent feature and may provide habitat for amphibians. This location should be considered a wetland.

3.5 HISTORICAL AND CULTURAL RESOURCES

Waterton Lakes National Park was established in 1895 as a Dominion Forest Park and has since expanded and grown. The Prince of Wales hotel and western Canada's first oil well located within the park are designated as National Historic Sites. The park provides numerous camping and outdoor recreational activities for the public. Secondary access to the project location will be required along the Crandell Campground access roads off of the Red Rock Parkway (Parks Canada 2014) to bring equipment and material to and from the bridge crossing site. The campground is approximately 200 m from the south end of the Canyon Church Camp bridge over Blakiston Creek.

The existing bridge crossing is part of the Crandell Lake (Red Rock Parkway) trail designated for use by hikers and cyclists. The trail approaches the north end of the bridge from the northeast, and continues to the southwest on the south side of Blakiston Creek. Concrete footings from previous crossing bridge piers were identified on-site. These structures represent part of the parks history and should be considered a historical resource for the park (E. Knox, personal communication, 2015).

A search of the Alberta Culture and Tourism Historical Resource Act Listing was completed for the proposed project footprint. No historical resources were identified for the proposed project location.

4 Applicable Regulatory Legislation

4.1 WATER ACT

Any project activities which involve work in or near a water body are subject to the *Water Act* and are regulated by the *Code of Practice for Watercourse Crossings (COP)* (GoA 2000a). The COP identifies restricted activity periods (RAP) for water bodies, outlines when works should be avoided, and states the conditions required for complying with the *Act*. The proposed project is located within a national park which is governed by the federal legislation outlined in this section; however, the provincial *Water Act* and the Guide to the Code of Practice for Watercourse Crossings under the *Water Act*, was used to develop the recommended mitigation measures provided in this report. The Waterton River, the downstream receiving watercourse for Blakiston Creek is governed by the provincial Water Act. Impacts or release of deleterious substances to Blakiston Creek also have the potential to impact the aquatic environment outside of the national park boundaries.

4.2 NAVIGATION PROTECTION ACT

Under Transport Canada's revised *Navigation Protection Act*, Blakiston Creek is not listed as one of the Scheduled Waters in which a submission and review of project activities is required; therefore, application for approval under the *Navigation Protection Act* is not required (GoC 1985b).

4.3 FISHERIES ACT

The *Fisheries Act* governs fish species and their habitat (GoC 1985a). According to the *Act* (last amended November 25, 2013), “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.” Fisheries and Oceans Canada (DFO) is the federal regulatory authority responsible for the *Fisheries Act*.

Fisheries and Oceans Canada (DFO) has developed the Projects Near Water self-assessment criteria, which allow proponents to determine whether their proposed projects require review by DFO. No instream activities or activities below the high water mark are proposed for this project. Therefore, the proposed project meets the requirements and criteria and does not require review by DFO.

4.4 MIGRATORY BIRD CONVENTION ACT

The *Migratory Bird Convention Act* (GoC 1994) provides protection for migratory birds and their nests by requiring that works be conducted outside of the migratory bird nesting period to prevent disturbance of the animals. Different species and regions have varying nesting periods based on habitat type. The proposed project is located in the B3 nesting zone and has a nesting period from April 2 to August 30 (GoC 2014). Other bird species protected under the *Act* may nest outside of this window. If work cannot be conducted outside of the timing windows, a qualified environmental professional should conduct pre-construction surveys so that migratory bird activity can be identified and avoided.

4.5 SPECIES AT RISK ACT

The *Species at Risk Act* (SARA) is federal legislation that provides legal protection to “at risk” wildlife and their habitats. At-risk wildlife and plants protected under the *Act* are listed in Schedule 1 of SARA (GoC 2002). Results of the desktop study identified three species that are listed under SARA that may occur in the project area (Tables 3-1 to 3-3).

4.6 NATIONAL PARKS ACT AND REGULATIONS

All work inside National Parks and Protected Areas must be performed in accordance with the laws and regulations set out in the National Parks Act and Regulations. National Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations. Construction activities within National Parks require that contractor and sub-contractors obtain business licences from Waterton Lakes National Parks administration office.

5 Potential Environmental Impacts

5.1 BLAKISTON CREEK AND RIPARIAN AREAS

Bridge replacement activities including removal of the existing wooden piers, bridge deck spans, and abutments have the potential to impact the watercourse. Potential impacts to Blakiston Creek and riparian areas may include the following:

- deposition of dirt and debris during removal of the existing bridge;
- loss of riparian vegetation if clearing is required;
- erosion of the watercourse banks;
- sedimentation of the watercourse during precipitation events;
- potential release of hydrocarbons or other deleterious substances during equipment failure or malfunction; and
- release or deposition of material and debris entering the watercourse during bridge installation.

5.2 SOILS

A small amount of clearing and topsoil stripping is expected during construction activities. Clearing and stripping may be required at the bridge approaches and equipment laydown areas. Clearing and stripping will be limited to only those areas necessary to complete the construction activity. Therefore, minimal impacts to soils are expected. Compaction and or loss of topsoil and subsoil may occur in those areas where clearing, stripping and soil stockpiles are required.

Erosion of exposed soils may occur where vegetation and or topsoil is removed and along existing non-vegetated areas including the park trail systems and Canyon Church Camp access roads. Rutting of the laydown areas and access roads may occur if equipment and vehicles are operated during periods of heavy precipitation.

5.3 VEGETATION

Bridge removal and replacement, and the equipment and material laydown areas have the potential to impact the vegetation. Clearing will be limited to only those areas necessary to complete construction activities and to allow for equipment access and material storage. Potential impacts to vegetation during construction activities may include the following:

- Clearing and removal of vegetation at the bridge abutment locations to allow for bridge removal and replacement activities;
- Clearing and removal of rare or sensitive species that were not identified during the on-site assessment due to seasonal conditions;
- Compaction and rutting on equipment and material storage areas;
- Damage to branches and vegetation overhanging the access roads; and,
- Potential for the introduction and spread of non-native plant species, and or noxious and invasive weed species through unclean equipment and materials hauled from other locations.

5.4 WILDLIFE

Construction activities and equipment and vehicle use have the potential to impact wildlife species present in the project area. Potential impacts to vegetation during construction activities may include the following:

- Animal and vehicle and crew encounters may occur during construction activities;
- Disturbance of habitat during clearing and excavation activities;
- Disturbance of animals through excessive dust and noise;
- Potential for animals to be attracted to materials and food waste during construction activities.

5.5 HISTORICAL AND CULTURAL RESOURCES

Construction activities have the potential to impact potential historical and cultural resource present in the project area. Potential impacts to these resources during construction activities may include the following:

- Excavation or exposure of historical or cultural resource in areas where clearing and excavation may be required;
- Damage to historical bridge crossing structures such as the concrete pier footings; and,
- Disturbance of the existing park trail system during bridge removal and replacement activities.

5.5.1 Air Quality

Impacts to air quality may occur during construction activities through the production of excessive dust along access roads and cleared areas during periods of excessive winds or dry conditions. Additionally, malfunctioning or damaged equipment may result in the release of excessive exhaust.

6 Mitigation Measures

6.1 GENERAL

General measures to mitigate construction effects will be implemented throughout all stages of construction. Additional mitigation measures may be required based on site-specific and seasonal conditions encountered. The recommendations and mitigation measures outlined below should be reviewed by the contractor for preparation of the construction Environmental Protection Plan (EPP), which must include a Spill Response Plan and an Erosion and Sediment Control Plan. The requirements and recommendations outlined below are based on the anticipated and potential impacts to the environment identified during the desktop review and on-site field assessment. The recommendations provided should be incorporated into the construction methods and adhered to throughout construction.

6.1.1 Project Construction Site

As part of the Contractor's EPP, a construction site layout sketch showing the proposed project footprint and locations for all anticipated construction activities must be prepared. The site layout must delineate all equipment and material storage, buildings or site trailers, first aid stations and muster points, vehicle and

equipment parking boundary locations. These areas must be delineated on-site and clearly marked to prevent the unnecessary disturbance of the adjacent environment.

6.1.2 Scheduling

Works should be scheduled to avoid periods of heavy precipitation and during periods of extensive snowmelt. The EPP should include procedures and contingency measures for dealing with construction activity shutdown during periods of excessive precipitation and wind.

The proposed project is located in the B3 nesting zone and has a nesting period from April 2 to August 30 (GoC 2014). Other bird species protected under the *Act* may nest outside of this window. Parks Canada will conduct a survey prior to construction to identify the presence of migratory breeding birds or active bird nests in the project vicinity. Additional mitigation measures may be required depending on the results of the survey.

6.1.3 Equipment and Machinery

Equipment and machinery has the potential to impact the environment through the introduction of invasive vegetation or weed species, and may result in the release of potentially deleterious substances, such as hydrocarbons and other chemicals, to the environment. The following mitigation measures for the use of equipment and machinery are as follows:

- It is recommended equipment and machinery brought to and used on-site to use biodegradable hydraulic fluid and lubricants where possible.
- All machinery and equipment must arrive on site clean and free of dirt, debris, weeds and grease or fluid leaks. Parks Canada staff, and engineering or environmental inspectors and monitors will prevent the use or deny access to dirty or malfunctioning equipment, vehicles and material on-site.
- Equipment and machinery arriving on site must be inspected by Parks Canada staff prior to unloading or putting the equipment into service.
- If Parks Canada staff deems the equipment or vehicle is not free of dirt, debris or weeds or has grease or fluid leaks, it must be removed from the Park immediately until it is sufficiently cleaned.
- Machinery and equipment will be limited to the project footprint and to only those areas delineated as part of the project construction site.
- All equipment parked and machinery stored on-site must be equipped with drip pans and secondary containment structures to prevent the potential release of deleterious substances.

6.1.4 Fuel Storage, Refuelling, and Spill Management

There are a number of measures that can be implemented to prevent spills and impacts from spills as a result of refuelling and poor fuel storage. In the event of a spill, a Spill Management Plan is essential for quick spill recovery. The following refuelling and fuel storage practices will be followed:

- Stored fuel will be marked and barricaded to prevent impacts by construction equipment and vehicles.

- Machinery and equipment must be washed, refuelled, and serviced a minimum of 100 m back from the watercourse banks to prevent the release of potentially deleterious substances into the watercourse.
- A Spill Response Plan will be prepared by the contractor prior to the start of construction. The spill response plan will outline procedures for:
 - Containment,
 - Elimination of source,
 - Contacting necessary parties,
 - Clean up and disposal,
 - Reporting, and
 - Incident review.
- All crew members on site will be trained in the location and use of the spill prevention and clean-up materials and procedures.
- Spill kit and clean-up materials will be readily available and of sufficient quantity to deal with 110% of the largest spill.
- Spill kits must be present in all equipment and machinery used on site.
- All spills will be cleaned up immediately and reported to the construction supervisor, project engineer, and Parks Canada representative. The government publication entitled, A Guide to Release Reporting (GoA 2011a) will be followed in the event of a spill or release.

6.1.5 Waste Management

General and activity specific construction waste expected during the project will likely include, but not be limited to:

- Debris from bridge removal;
- Used materials from vehicle and machinery maintenance;
- Lunch and container garbage, including food;
- Scrap construction material.

The following mitigation measures are recommended for containment and management of waste materials:

- All construction debris from bridge removal and construction activities will be temporarily stockpiled in predetermined locations for pick-up and removal from site.
- All waste removed from site will be hauled to an appropriate waste disposal location.
- General food and construction site waste should be stored in appropriate, bear proof waste containers at the project laydown location in sealed containers prior to removal from site. Waste will be properly segregated.
- Any toxic or hazardous waste material will be stored in a waste container that has secondary containment to prevent potential release to the environment.

6.1.6 Erosion and Sediment Control

Temporary and permanent ESC measures will be implemented prior to, during, and after construction activities. ESC measures will be modified during construction based on changing conditions, construction

activities and the construction schedule. The contractor will be responsible for implementation and maintenance of all ESC measures on-site including those implemented in reclaimed areas. The ESC measures recommended have been developed following the best management practices (BMPs) detailed in Alberta Transportation's Erosion and Sediment Control Manual¹ (GoA 2011b). This document is available online

<http://www.transportation.alberta.ca/Content/docType372/Production/ErosionControlManual.pdf>

Alberta Transportation's ESC Manual should be used as a guide for implementation and limitations of the ESC measures and BMP's recommended. The ESC measures recommended for the proposed project include, but are not limited to, the following:

- Loss of sediment from the disturbed areas (i.e. stripped or cleared areas) and the flow of sediment laden runoff from the construction site must be prevented. Silt fencing can be used to allow sediment to settle out prior to runoff leaving the project site. Silt fencing can be erected along the perimeter of the disturbed areas where sheet flow, runoff and low flow volumes occur, and should be installed around soil stockpiles to conserve soil material (BMP #1). Silt fence must be erected in areas where runoff will flow into vegetated areas or a riparian buffer adjacent to Blakiston Creek.
- Riparian zone preservation will be implemented to allow for trees and vegetation adjacent to the watercourse to limit erosion adjacent to water bodies and to act as natural filtration for sediment-laden runoff (BMP #30).
- Reclaim riparian areas adjacent to the watercourse immediately after completion of construction activities to minimize the erosion and sedimentation potential. Re-grade the areas to pre-construction conditions and replace stockpiled topsoil, if required (BMP #25). Also, apply an approved seed mix (BMP #22) and plant appropriate native vegetation species approved by Parks Canada vegetation biologist. The approved seed mix is outlined in the tender document under Part 2, Section 2.1 of the Environmental Procedures. Hydro-mulching/seeding (BMP #24a-b) will be used to apply the approved seed mix to all disturbed areas to prevent dislodgment or predation of seeds by wildlife.
- Topsoil replacement and seeding will be completed following consultation with Parks Canada vegetation biologists. Reclaimed areas will be covered with Rolled Erosion Control Products (RECP) (BMP #13), mulching (BMP #23) and/or hydro-mulching/seeding (BMP #24a-b) measures to facilitate vegetation growth and to aid in stabilizing reclaimed areas prior to establishment of vegetation. The application of the stabilization measures will depend on steepness of slope, potential for erosion to cause sedimentation, and the length of time expected for natural regeneration to establish.
- For ditchlines and other channelized erosion zones, rock check dams can be used to slow flow and prevent erosion (BMP #7). Alternatively, biodegradable Rolled Erosion Control Products (BMP #13) can be used in channelized areas to protect exposed soils and seeds applied to reclaimed areas.
- Coir and fibre rolls (BMP #38) can be used on the replacement bridge abutment fill slopes to break up slope length and reduce erosion potential. Coir rolls will promote deposition of sediments and

¹ BMP# - Refers to the relevant best management practice in Alberta Transportation Erosion and Sediment Control Manual

can retain seeds dislodged during precipitation. Biodegradable RECP (BMP #13) can also be used on the fill slopes to prevent erosion and promote seed germination and vegetation growth.

All ESC measures implemented will be inspected daily prior to the start of construction activities. All deficiencies should be documented and repaired immediately. Alternative ESC measures may be required if the measures implemented are not functioning as intended. Alterations and amendments to ESC measures should be reviewed and approved by the Departmental Representative and Parks Canada staff prior to implementation.

6.1.7 Reclamation and Restoration

All disturbed areas will need to be reclaimed and restored to pre-construction conditions following construction completion. The following recommendations for restoration and reclamation will be incorporated into the construction plans:

- Construction materials (gravel and aggregate fill) source pits will be inspected by a Parks Canada Environmental Officer before being approved and or transported to the project site;
- All disturbed areas will be reclaimed as soon as possible during construction activities. This may involve phased reclamation where an area is reclaimed prior to the completion of other construction activities.
- The seed mix approved by Parks Canada vegetation biologist is outlined in the tender document under Part 2, Section 2.1 of the Environmental Procedures. Native species and an approved seed mix will be used to reclaim all disturbed areas. The seed mix certificates need to be approved by Parks Canada staff prior to use on the project site to prevent the spread of non-native and weed species.
- Seeding should be completed later in the fall to limit seed germination and damage from frost thaw cycles or in early spring to allow for a full growing season to establish vegetation. However, there will be no access to the site after August 31. If seeding occurs outside of the recommended times, the likelihood for additional seeding could increase.
- Temporary ESC measures must be implemented, maintained and remain in place on reclaimed areas until vegetation has established and disturbed areas are stabilized.

6.1.8 Air Quality

Air quality was not assessed during the on-site assessment; however, the following mitigation measures will be used to prevent impacts to air quality during construction activities:

- To minimize air emissions, equipment and vehicles will not idle longer than five consecutive minutes where possible.
- Transportation routes will likely be the greatest source of dust. The contractor should prepare a watering or 'wet-down' plan to prevent the production of excessive dust.
- Speed limits along access roads will be reduced if dry and windy conditions persist.
- Soil stockpiles will be located in areas least prone to impacts from prevailing winds. ESC measures should be applied to soil stockpiles to prevent wind erosion.

- Dust generating construction activities should be suspended during periods of extreme wind if dust control measures are not functioning as intended.

6.2 BLAKISTON CREEK

While no in-stream construction activities will occur as part of the bridge removal and replacement, efforts will be made to prevent the deposition or release of materials during construction. The following mitigation measures will be used to prevent impacts to Blakiston Creek:

- Netting or other containment measures must be used beneath the existing bridge during removal of piers and bridge railings, deck material and girders. Containment measures implemented must be durable enough to catch large, heavy material in addition to loose nails and debris that may come loose during removal, yet still allow rain to pass through. Containment system to be approved by the Departmental Representative.
- Temporary ESC measures must be implemented prior to removal of the existing bridge. ESC measures must remain in place until final reclamation is complete and permanent ESC measures can be implemented.
- Measures must be taken by the contractor to avoid any debris entering the watercourse during the removal of existing concrete bridge abutments. The contractor should consider using sturdy rigid barriers beneath the bridge abutments on the north and south banks to collect and prevent debris from entering the watercourse. The barrier can be erected on the upslope side of the existing concrete pier footing to catch any falling debris. Debris caught against these barriers should be removed by hand if possible or using a loader bucket with thumb to prevent additional disturbance of the watercourse banks.

6.3 SOILS

Topsoil and subsoils will be salvaged in areas where clearing and excavation is required. The following construction methods and mitigation measures will be implemented to preserve soils:

- All topsoil must be stockpiled separately from excavated subsoils, and admixing prevented (recommend a minimum of 1 m spacing between stockpiles).
- Topsoil from riparian areas and approaches will be removed and stockpiled separately.
- Stockpiles must be located 15 m from the watercourse banks, excavations or slopes breaks.
- Contractor must retain soil and prevent sediment laden runoff. This can be achieved by installing silt fencing 2-4 m from the stockpile toe.
- ESC measures should be implemented on all exposed soils and topsoil stockpiles immediately to prevent wind erosion. RECP (BMP #13) can be used to cover soil stockpiles and prevent rain and wind erosion.
- All disturbed areas will be reclaimed immediately following completion with seeding and planting of native species, and temporary and permanent ESC measures implemented as required. The seed mix approved by Parks Canada vegetation biologist is outlined in the tender document under Part 2, Section 2.1 of the Environmental Procedures.

6.4 VEGETATION

Vegetation management is essential for: managing invasive species and weeds; restoring a natural visitor experience; and, protecting water, soil, and land resources. To mitigate for potential impacts, the contractor will:

- Where possible, vegetation will be pruned or topped to retain root systems and maintain bank stabilization;
- Vegetation will be felled away from the watercourse. All vegetation or woody debris that enters the watercourse during clearing activities should be removed immediately by hand, if possible;
- ESC measures will be implemented immediately in all areas where vegetation has been removed; and,
- Where possible, the sod layer will be removed separately to preserve native seeds. This will facilitate vegetation restoration during reclamation activities post construction.

6.4.1 Weed Management

Weed prevention is the ideal method for managing weeds on a construction site. The contractor will:

- Ensure all equipment, materials, and vehicles are free of weed seeds and plant parts prior to arriving on site, which includes removing dried mud or soil from undercarriages and tires;
- Construction materials (gravel and aggregate fill) source pits will be inspected by a Parks Canada Environmental Officer before being approved and or transported to the project site;
- Reclamation activities will occur early to minimize exposed soil where weeds can invade;
- The approved seed mix will require a certificate be approved by Parks Canada staff prior to use on the project site to prevent the spread of non-native and weed species;
- Areas where weeds are identified by Parks Canada must be avoided by the contractor;
- All crews on-site will be educated on the importance of weed prevention and control; and,
- Ensure construction materials (e.g. gravel, rip rap, soil) do not contain weed plant parts or seeds and have not been stored in a weed-infested area (this will require an inspection of the material sourcing location by Parks Canada).

Weed control involves destroying the weed or inhibiting its growth or spread. Weed destruction involves killing all growing parts of a weed or rendering its reproducing mechanisms non-viable. The approaches necessary to control or destroy weeds varies across species. The management approach will be catered to the specific weed species identified. If weeds are identified on site the Departmental Representative will flag the infested areas and restrict vehicle, equipment and construction crew access through the area. The Parks Canada Departmental Representative will be responsible for managing weeds identified on-site during project activities.

6.5 WILDLIFE

A number of different wildlife species have been identified for the project location. Interactions with wildlife will be avoided to ensure the safety of workers and wildlife. Some best management practices for working in areas that contain wildlife are:

- Activities that attract or disturb wildlife will be avoided and stopped;
- No pets are allowed on-site or in any of the laydown areas;
- If wildlife display aggressive behaviour or persistent intrusion, the location will be avoided and Parks Canada staff informed;
- Banff Dispatch will be contacted at (403) 762-1473 immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site. Other wildlife-related encounters are to be reported within 24 hours. Notify the Departmental Representative following reporting to Banff Dispatch.
- If vegetation clearing is required during breeding bird restricted activity periods, Parks Canada staff will conduct a breeding bird survey prior to clearing (April 2 to August 30);
- Based on preliminary design, the low wet area on the north side of Blakiston Creek will not be disturbed during construction activities. If any activities are proposed in this location a wildlife survey for amphibians will be completed prior to construction activities by Parks Canada staff.
- The work space will be kept clean and free of garbage to avoid interactions with the wildlife present in the project area.

6.6 HISTORICAL AND CULTURAL RESOURCES

Historical and cultural resources may be encountered during construction activities. The following mitigation measures should be followed if historical or cultural resources are found during construction activities:

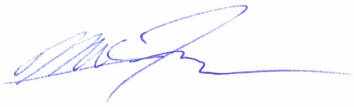
- Construction activities and equipment will avoid working on or causing disturbance to Crandell Lake trailhead;
- Equipment and vehicle access will be restricted to the existing access roads and those areas required for construction activities. Delineation of the project construction site will help prevent unnecessary disturbance to the park campgrounds and trail system.
- All historical or cultural resources identified during construction, including archeological or paleontological artifacts are the property of Parks Canada. Parks Canada must be informed of all discoveries and construction must immediately be stopped until approval to continue is provided by Parks Canada.

7 Closing

This report summarizes the environmental sensitivities identified during the desktop review and on-site field assessment for the Blakiston Creek bridge replacement project area. Environmental sensitivities identified and the potential impacts that may occur from construction activities are based on the results of the environmental assessment and the preliminary engineered drawings. Additional mitigation measures may be required based on the final design and as a result of the site specific conditions encountered on-site. Incorporation of the recommendations and mitigation measures in this report should be considered in preparation of the contractors EPP and should be adhered to on-site to ensure that impacts to the environment are avoided, prevented and minimized. All requirements and recommendations that the applicable regulatory agencies set out in the required approvals and authorizations for this project must be incorporated into the construction methods and adhered during and post- construction. A copy of this report and all regulatory approvals, permits or authorizations should be kept on site and be readily available.

Please contact the undersigned if you have any questions or if you require additional information at 403-538-4763 or mtf@summit-environmental.com.

Prepared by:



Matt Freeman, P.Biol.
Biologist
Summit Environmental Consultants Inc.

Reviewed by:



Erin Rooney, P.Biol.
Regional Manager/Senior Biologist
Summit Environmental Consultants Inc.

References

- Achuff, P.L., McNeil, M.L., Coleman, C., Wallis, C. and C. Wershler. 2002. Ecological land classification of Waterton Lakes National Park, Alberta. Vol. I: integrated resource description. Parks Canada, Waterton Park, AB.
- Government of Alberta (GoA). 2000a. Water Act. Alberta Queen's Printer, Edmonton, Alberta.
- Government of Alberta (GoA). 2000b. Wildlife Act. Alberta Queen's Printer, Edmonton, Alberta.
- Government of Alberta (GoA). 2008. Weed Control Act.
- Government of Alberta (GoA). 2010. Alberta Wild Species General Status Listing.
<http://esrd.alberta.ca/fish-wildlife/species-at-risk/albertas-species-at-risk-strategy/general-status-of-alberta-wild-species-2010/documents/SAR-2010WildSpeciesGeneralStatusList-Jan2012.pdf>.
(Accessed March 19, 2015).
- Government of Alberta (GoA). 2011a. A Guide to Release Reporting. Alberta Queen's Printer, Edmonton, Alberta.
- Government of Alberta (GoA). 2011b. Erosion and Sediment Control Manual. Edmonton, Alberta.
- Government of Alberta (GoA). 2015a. Alberta Conservation Information Management System (ACIMS).
[http://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-\(acims\).aspx](http://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-(acims).aspx). (Accessed March 19, 2015).
- Government of Alberta (GoA). 2015b. Fisheries and Wildlife Information Management System (FWMIS).
<http://esrd.alberta.ca/fish-wildlife/species-at-risk/wild-species-status-search.aspx>. (Accessed March 19, 2015).
- Government of Canada (GoC). 1985a. Fisheries Act.
- Government of Canada (GoC). 1985b. Navigation Protection Act.
- Government of Canada (GoC). 1994. Migratory Bird Convention Act.
- Government of Canada (GoC). 2000. Canada National Parks Act.
- Government of Canada (GoC). 2002. Species at Risk Act.
- Government of Canada (GoC). 2013. Measures to Avoid Causing Harm to Fish and Fish Habitat.

- Government of Canada (GoC). 2014. General Nesting Periods of Migratory Birds in Canada.
<http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1>. (Accessed March 16, 2015)
- Government of Canada 2015. Committee on the Status of Endangered Wildlife in Canada. Wildlife Species Search. Query conducted March 27, 2015.
- Natural Regions Committee 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W> Pettapiece. Government of Alberta. Pub. No. T/852
- Personnel communication with Waterton National Park staff Edwin Knox and Scott Stevenson. Meeting held January 26, 2015.
- Parks Canada 2014. Map of Waterton Lakes National Park. Accessed online at
<http://www.pc.gc.ca/eng/pn-np/ab/waterton/visit/visit1/d.aspx>
- Wallis, C., Wershler C. and R. Riddell. 2002. Ecological land classification of Waterton Lakes National Park, Alberta. Vol. II: wildlife resources. Parks Canada, Waterton Park, AB.

Appendix A - Photographs



Photo 1: View south of the Canyon Church Camp Bridge over Blakiston Creek (January 27, 2015)



Photo 2: View of the existing bridge crossing and the downstream right bank of Blakiston Creek (January 27, 2015).



Photo 3: View downstream of the Canyon Church Camp Bridge crossing and flood debris jam on the instream pier (January 27, 2015)



Photo 4: View of the steep left bank of Blakiston Creek at the watercourse crossing (January 27, 2015).



Photo 5: View southeast of the south bridge approach and access road (January 27, 2015)



Photo 6: View of the north bridge approach. The Crandell Lake Trail system is shown on the right side of the image (January 27, 2015).



Photo 7: View west of the proposed laydown and material storage location on the north side of the bridge crossing (January 27, 2015). Accessed off of the Canyon Church Camp access road.



Photo 8: View of the concrete pier footing on the right (south) bank of the watercourse. This pier footing can be used to assist the debris collection measures proposed (January 27, 2015)



Photo 9: View downstream of the right bank of the watercourse and the existing bridge piers (March 12, 2015).



Photo 10: View of the low wet area adjacent to the Canyon Church Camp access road on the north side of the bridge (March 12, 2015).



Photo 11: View of the low wet area adjacent to the Canyon Church Camp access road on the north side of the bridge (March 12, 2015).



Photo 12: View of an erosion gully at south downstream approach to the existing bridge (January 27, 2015).

