TECHNICAL MEMORANDUM

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Parks Canada Agency, Highway Engineering Services

CC Elizabeth Vincer, Sarah Boyle

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GLACIER BEAVER VALLEY PONDING PHASE II – POST-FINALIZED BIA LISTED PLANT SURVEY AND SLUG SURVEYS

1.0 INTRODUCTION

Parks Canada Agency (PCA), Highway Engineering Services (HES), is developing a segment of land adjacent to the Trans-Canada Highway (TCH), between km 5.9 and km 7.1 south of the East Gate of Glacier National Park in the Beaver Valley, Columbia Mountains, British Columbia. The Ponding Phase II would allow for construction of a traffic holding area (i.e., traffic ponding) that would provide a safe and adequately large area for vehicles to accumulate during scheduled avalanche control operations. The TCH Ponding Phase II project (the Project) will require the lateral extension of the highway footprint towards the Beaver River Valley and associated wetland areas. The '*Glacier National Park – Trans-Canada Highway Phase II - Beaver Valley Ponding BIA*' was completed in summer 2017 and has been approved by the Mount Revelstoke and Glacier National Park (MRG) Field Unit (MRG2015-46). The BIA identified listed plant species and a federally-listed slug species with the potential to occur in the general area where the Project is located.

Two BC CDC blue-listed rare plant species (*Dryopteris cristata* and *Eleocharis elliptica*), not listed through the Committee on the Status of Endangered Wildlife In Canada (COSEWIC) or the *Species At Risk Act* (SARA), but listed provincially, have been historically identified within the vicinity of the Project footprint. Additionally, two BC CDC yellow-listed species (*Muhlenbergia glomerata* and *Galium trifidum ssp. trifidum)* have also been identified within the vicinity of the Project footprint.

The Magnum Mantleslug (*Magnipelta mycophaga*) (COSEWIC 'Special Concern") is scheduled to be up listed to SARA, Schedule 1 as 'Special Concern'. This species is the sole member of the genus *Mahnipelta* and is regionally endemic to the northern Columbia basin in western North America. About half of the species' global range extends into southeastern British Columbia. It occurs in a number of widely separated habitat patches and is confined to cool, moist places in coniferous forests (ICH and ESSF biogeoclimatic zones) and mid- to high elevations. Hundreds of sites in British Columbia have been searched, however, as of 2013 only 12 sites have been confirmed in southeastern British Columbia (COSEWIC 2012, BC CDC 2013). This species has been documented in one location within Mount Revelstoke National Park, and one site was searched in GNP, however, this species has not been confirmed in GNP to date (COSEWIC 2012).

Mitigation outlined in the approved BIA for potential effects to listed plant and slug species, included preconstruction surveys during appropriate times of the year and in suitable habitat, prior to vegetation clearing planned for fall 2017.

The objectives of the vegetation and slug field program were to meet this mitigation requirement and to identify whether listed plants or Magnum Mantleslug were present within the Phase II Project footprint, and, if identified, to develop appropriate mitigation measures following consultation with Mount Revelstoke Glacier (MRG) Field Unit staff.

2.0 METHODS

2.1 Listed Plant Surveys

Listed plant surveys were conducted according to the Alberta Native Plant Council (ANPC) Rare Plant Survey Guidelines (ANPC 2012), Protocols for Rare Vascular Plant Surveys (Penny and Klinkenberg 2010) and Occupancy Survey Guidelines for Prairie Plant Species at Risk (Henderson 2010).

On July 26, 2017, a Golder Associates (Golder) field crew spent between 5 to 10 minutes meandering the Project site to get a general idea of the vegetation within the area. When high-potential habitats were encountered, a new plot was established, in which a formal inventory of all the plant species within the community were documented. At each plot, the crew recorded general site characteristics, dominant plant species, soil moisture and nutrient regime and took a global positioning system (GPS) location at survey sites. Representative photos were taken at each plot.

2.2 Magnum Mantleslug Surveys

The Golder field crew completed the deployment of Artificial Cover-Objects (ACOs) and initial visual surveys on July 27, 2017 to determine the presence or absence of Magnum Mantleslugs within and adjacent to the Project footprint. Surveys focused on areas that may be affected by Project construction and associated vegetation clearing. Only areas of suitable habitat (i.e., cool, moist locations with coarse woody debris) were surveyed and focused along the west boundary of the Project footprint along a transitional upland/riparian area where moist habitat was more suitable for Magnum Mantleslugs. A second round of surveys were completed on August 23rd 2017 to retrieve the ACOs and document any species findings.

To detect the presence of Magnum Mantleslugs, opportunistic visual point searches, intensive time-constrained survey of key habitat features and ACOs were used to assess local occurrence and relative abundance of Magnum Mantleslugs within the Project footprint. This method of assessment was based on the Resource Inventory Committee (RIC) Gastropod Best Management Practices Guidebook (BC Ministry of Environment 2007).

Two 100 m transects were established, each with 10 ACOs spaced 10 m apart within the transitional upland/riparian area. Crews measured 10 intervals, then adjusted placement of the ACO an east (upslope) or west (downslope) direction in order to optimize potential Magnum Mantleslug habitat and detection. Each ACO was labelled with a laminated card, marked with a GPS point and photographs were taken to help characterize and relocate each ACO.

Transect 1 was established between KP 6+275 and KP 6+375. Transect 2 was established between KP 6+725 and KP 6+825. One additional, single ACO was deployed immediately north of Transect 2 along a seepage area, which was deemed to be suitable habitat in the vicinity of the Project footprint.

An upland transect was not established as the presence of Magnum Mantleslugs was determined to be low based on site characteristics such as steep slopes and low moisture levels which limited suitable habitat (COSEWIC 2012). Riparian swamps were determined to be too wet and subject to water level fluctuations, which may also limit suitable habitat within these areas.

3.0 RESULTS

3.1 Listed Plant Surveys

The Phase II Project footprint includes relatively homogenous forested communities with sparse understory vegetation and few unique microhabitats. Generally, the rare plant potential was considered low. The crew focused on conducting rare plant searches at transitional areas between upland and riparian areas along the west boundary of the footprint to increase the likelihood detecting of rare plants.

Upland areas were characterized as having mixed stands of Englemann Spruce (*Picea engelmannii*), Engelmann x White Spruce (*Picea engelmannii* x *glauca*), White Spruce (*Picea glauca*), Douglas Fir (*Pseudotsuga menziesii*), Grand Fir (*Abies* grandis), Western Red Cedar (*Thuja plicata*) and Western White Pine (*Pinus monticola*). The understory had low diversity and included patches of False Solomon's Seal (*Maianthemum racemosum*), Blunt-Fruited Sweet Cicely (*Osmorhiza berteroi*), Corn Lily (*Clintonia uniflora*) and Clasping-leaved Twisted Stalk (*Streptopus amplexifolius*).

Species diversity was higher near transitional areas in lower topographic positions adjacent to riparian areas and drainages. The tree canopy was dominated by mixed stands of Engelmann x White Spruce, Balsam Poplar (*Populus balsamifera),* Douglas Fir, and Western Red Cedar. Dominant shrub species included Bracted Honeysuckle (*Lonicera involucrata*), Common Goatsbeard (*Aruncus dioicus*), Devil's Club (*Oplopanax horridus*), Douglas fir, Wild Red Raspberry (*Rubus idaeus*), River Alder (*Alnus incana* ssp. *tenuifolia*), and Willows (*Salix* spp.). Dominant forbs included Clasping-leaved Twisted Stalk, Dewberry (*Rubus pubescens*), False Solomon's Seal, Lady Fern (*Athyrium filix-femina*), Skunk Cabbage (*Lysichiton americanum*), Small Enchanter's Nightshade (*Circaea alpina*), Sweet-scented Bedstraw (*Galium trifloum*), and Thimbleberry (*Rubus parviflorus*).

No listed plant species or species of interest were observed during the field survey.

One weed species, Oxeye Daisy (*Leucanthemum vulgare*), was documented within the Phase II Project footprint. Many well-spaced, evenly distributed individuals were documented. Oxeye daisy is listed as moderate priority in Glacier National Park.

3.2 Magnum Mantleslug Surveys

Initial Magnum Mantleslug surveys and ACOs were deployed along transects on July 27 2017. Each ACO along Transect 1 and Transect 2 was re-visited on August 23 2017 to inspect for Magnum Mantleslugs or other gastropods under the ACO, and a visual search within 2 m^2 of each ACO was completed. Each ACO and surrounding area was visually examined for the presence of gastropods for a minimum of 10 minutes.

3.2.1 Transect 1

3.2.1.1 July Survey

The temperature ranged from 19^{O}C to 20^{O}C during ACO deployment, under partly cloudy skies and no observed precipitation. Canopy cover along Transect 1 was dominated by Engelmann x White spruce, and Douglas Fir with trace amounts of Birch (*Betula* spp.) and Western Red Cedar. Understory species consisted of Bracted Honeysuckle, Red-osier Dogwood (*Cornus stolonifera*), River Alder and Thimbleberry.

No Magnum Mantleslugs were found during July 27, 2017 visual inspections.

3.2.1.2 August Survey

During the August survey, the temperature ranged from 17-24^{O}C and conditions were partly cloudy with no precipitation. The Project area was smoky at the time of the survey due to the close proximity to wildfires in GNP.

No slugs were observed on ACO's deployed along Transect 1. The site conditions along Transect 1 were hot and dry, and deemed to be unsuitable habitat for Magnum Mantle Slugs.

3.2.2 Transect 2

3.2.2.1 July Survey

The July deployment survey was completed under partly cloudy skies with no precipitation, and the temperature was 23^{o}C. The canopy cover was dominated by Engelmann x White Spruce, Balsam Poplar and Fir. Understory species consisted of Lady Fern, Devil's Club and Skunk Cabbage. Transect 2 was characterized with cool and moist conditions, with patches of open water in the riparian area to the west. Habitat conditions for Magnum Mantleslug were more suitable as compared to Transect 1, however no individuals were detected during visual inspections.

3.2.2.2 August Survey

Gastropods were observed near four ACOs during the August survey along transect 2 (Table 1). Observations were considered to be incidental if a species was observed outside of 2 m^2 visual search area of each ACO. Incidental observations of gastropods and amphibians were documented at an additional five locations, away from ACOs (Table 2). None of the species observed during visual inspections were determined to be the Magnum Mantleslug. Representative photos of each gastropod species described in Table 1 and Table 2 can be found in Attachment A.

Table 1: Gastropods Observed within Visual Search Area of an ACO

ACO Label	UTM Coordinates	Species Observed	# of Individuals	Description	Habitat
SET1C12	11 U 467387 5694948	Slug Species 1*	1	1 cm long, grey in colour.	Found within 1 m^2 of ACO on the surface of needles under Devil's club.
SET1C13	11 U 467388 5694950	Slug Species 1*	1	3 mm long, Possibly *Arion* genus.	Found within 1 m^2 of ACO on the surface of needles under ferns and Devil's club.
SET1C14	11 U 467385 5694961	Snail Shell (unknown species)	1	3 mm long	Found on the underside of the ACO
SET1C16	11 U 467364 5694967	Snail shell (unknown species)	1	3 mm long.	Found on the underside of the ACO

Notes: *Species does not have diagnostic characteristics of Magnum Mantleslug.

Slug species documented in the Project footprint and adjacent area could not be identified to species, but were determined to not have characteristics consistent with Magnum Mantleslug. Key characteristics for Magnum Mantleslug include:

- a robust, large slug up to 80 mm in length;
- pneumostome behind the midline of the mantle on the right side;
- mantle is smooth, without concentric folds or ridges, with an irregular black stripe on each side and elsewhere unevenly spotted with black;
- very large mantle, covering most of the dorsal surface of the animal; dorsal keel absent; and
- foot is lighter in colour than the mantle and contains black spotting (Forsyth 2003; Fosyth 2004; COSEWIC 2012).

Table 2: Incidental Observations of Gastropods and Amphibians near Artificial Cover Objects (ACO)

Associated ACO/Incidental Waypoint	UTM Coordinates	Species Observed	# of Individuals	Description	Habitat
SET1C13/FROG1	11U 467386 5694947	Columbia Spotted Frog (*Rana luteiventris*)	1	NA	Pool of water in adjacent riparian area.
SET1C16/BVMM016S	11U 467367 5694971	Slug Species 2*	1	Dark brown in colour. 1.5 cm long.	Underside of clasping twisted stalk leaf in adjacent riparian area with standing water.
		Slug Species 3*	3	Individuals 8 mm – 40 mm in length. Light tan/brown with a distinct mantle. Mantle covers ¼ of the body. Dark lines on either side of mantle.	Underside of clasping twisted stalk or American skunk cabbage leaves. Found in adjacent riparian area with standing water.
SET1C17/BVMM017S	11U 467345 5694976	Snail Shell (unknown species)	1	2 mm long	NA
		Slug Species 3*	4	Light tan/brown with a distinct mantle. Mantle covers ¼ of the body. Dark lines on either side of mantle.	Found in adjacent riparian area with standing water.
SET1C18/BVMM018S	11U 467341 5694982	Slug Species 3*	1	18 mm in length. Light tan/brown with a distinct mantle. Mantle covers ¼ of the body. Dark lines on either side of mantle.	Underside of American skunk cabbage leaf. Found in adjacent riparian area with standing water.
SET1C19/BVMM19S	11U 467342 5695007	Slug Species 2*	3	One individual up to 17 mm in length. Dark brown in colour. Mantle not as visible.	Underside of American skunk cabbage leaf. Found in adjacent riparian area with standing water.
		Slug Species 4* (juvenile)	1	5 mm long. Very small, difficult to identify.	Underside of American skunk cabbage leaf. Found in adjacent riparian area with standing water.

Notes: *Species does not have diagnostic characteristics of Magnum Mantleslug.

4.0 SUMMARY

The Phase II Project footprint includes relatively homogenous forested communities with sparse understory vegetation and few unique microhabitats. Generally, the rare plant potential was considered low and no listed plants were detected during surveys.

The Project site was generally determined to have limited potential habitat for Magnum Mantleslugs, because key characteristics associated with their habitat (COSEWIC 2012) were absent. Upland portions of the Project footprint are relatively dry with little understory cover, and wetland portions in and adjacent to the footprint are very wet with fluctuating water levels.

No Magnum Mantleslugs were detected during the July or August 2017 slug survey.

Based on the results of the surveys, no revisions to current mitigation in the approved BIA (Golder 2017) or additional mitigation are required.

5.0 CLOSURE

We trust that this memorandum describes the results of the 2017 field surveys to detect the presence of listed plant species and Magnum Mantleslugs for the Beaver Valley Ponding Phase II Project.

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Attachments: Attachment A – Slug Survey Photos
GPS (*.gpx/*.kml) trackfile for July 2017 Listed Plant survey, Slug survey and Incidental Observations (pointfile) and Field Survey Photos
June 2017 Marshbird and Amphibian occurrence locations (*.kml) and associated survey photos

6.0 REFERENCES

ANPC (Alberta Native Plant Council). 2012. Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update. Alberta Native Plant Council. Edmonton, AB. Available at http://anpc.ab.ca/wp-content/uploads/2015/01/Guidelines-For-Rare-Plant-Surveys-in-AB-2012-Update.pdf. Accessed: March 2015.

BC Conservation Data Centre (BC CDC). 2013. BC Species and Ecosystems Explorer. BC Ministry of Environment, Victoria BC. Available: http://a100.gov.bc.ca/pub/eswp/search.do?method=reset [accessed April 2017].

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ATTACHMENT A

Slug Survey Photos

Photo 1: Representative photo of slug species 1.

Photo 2: Representative photo of slug species 2.

Photo 3: Representative photo of slug species 3.

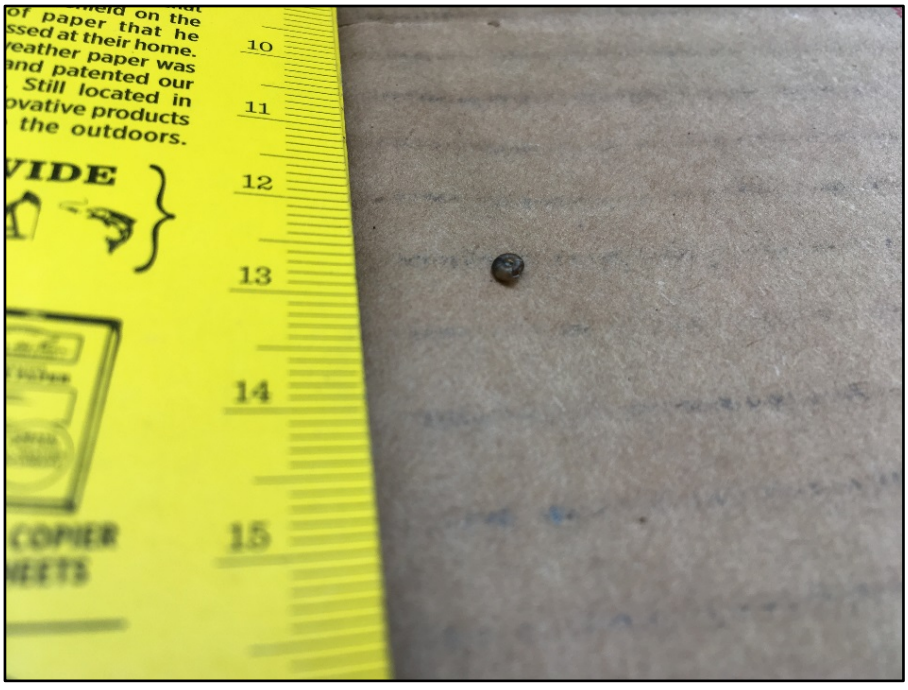

Photo 4: Representative photo of a snail shell found under an Artificial Cover Object (ACO).

Photo 5: Representative photo of an Artificial Cover Object (ACO) set-up.