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Canada Nature Fund: Community-Nominated Priority Places for Species at Risk

Kootenay Connect: Columbia Wetlands, Year 3 (2022)
Conservation Action for Species at Risk in the Columbia Wetlands

Final Report

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The Columbia Wetlands Stewardship Partners

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KCP Kootenay Conservation Program

Executive Summary

In the first year (2019-2020) of the Kootenay Connect (KC) - Columbia Wetlands Stewardship Partners (CWSP) project, a literature review for species at risk in the Columbia Valley was initiated and completed. Several conservation actions were subsequently implemented and the review is still being used to help guide conservation actions in the Columbia Valley.

In Year 2 (2020-2021) of KC-CWSP, the focus of conservation actions were on four at-risk species : western painted turtle (WPT), Lewis's woodpecker, osprey, and mountain goat; and one at-risk ecological community (alkali saltgrass-foxtail barley). The identification of biological conservation opportunities also began. Project details, including results and recommendations for each sub-project were provided in a final report.

Year 3 (2021-2022) of the KC-CWSP initiative focused on conservation actions regarding the following: Lewis's woodpecker, WPT, alkali saltgrass-foxtail barley ecological community (EC), osprey, and American badger. Outcomes regarding actions focused on these four species (and one EC) are outlined in this final report. Some of the project outcomes include:

- a WPT nesting bed was enhanced on private land (protected from predators using fencing materials);
- to enhance WPT habitat, 24 basking logs installed at three locations;
- inventory for Lewis's woodpecker (LEWO) was completed within critical habitat along a Forest Service Road, which aimed to increase the size of critical habitat and/or Wildlife Habitat Areas; however, no LEWO were identified;
- working with a partner group, WPT crossing signage is to be installed at areas identified to have road mortality;
- a Wildlife Habitat Area (WHA) application was revised and resubmitted to include an additional alkali saltgrass – foxtail barley ecological community that was previously thought to be on private land;
- osprey inventory was completed to help determine the population trend (if possible), and reasons for osprey mortality are given;
- an American badger project was initiated, it aims to provide public education and submission of an application for important badger habitat areas to be designated as WHAs or Wildlife Habitat Features (WHFs).
- collaboration with different interest groups on the development and implementation of these projects.

There are other components to the larger KC-CWSP project that are not discussed in this report, such as the progress on wildlife corridor identification and biodiversity conservation opportunities. The KC-CWSP project aims to raise awareness around species at risk in the Columbia Valley and to enhance, restore, and manage the large riparian and wetland complex (Columbia wetlands and valley) to support the recovery of focal species at risk.

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1.0 Introduction

The Kootenay Conservation Program (KCP) was initiated 20 years ago and under its coordination is a project known as Kootenay Connect (KC). "[KC] takes a large landscape, multi-ecosystem approach to sustaining biodiversity, species at risk, and ecological connectivity and function within the upper Columbia River Basin in the Kootenay region of B.C. The goal of this project is to sustain biodiversity across local landscapes by focusing on habitat connectivity within and between valley bottoms and mountain ranges to sustain exceptional places of biodiversity" (KCP, 2020). Kootenay Connect aims to enhance, restore, and manage large riparian and wetland complexes to support the recovery of numerous species at risk (SAR) of conservation concern (Proctor & Mahr, 2019).

Kootenay Connect is currently focusing on four key areas that have been identified according to where KCP partners have been active in conservation and stewardship in the past two decades. The Columbia Wetlands is one of the focal areas and the Columbia Wetlands Stewardship Partners (CWSP) is a key partner group working in this area. The CWSP was formed in 2006 and has been active in conservation and stewardship activities in the Columbia Valley. The CWSP is made up of more than 30 diverse groups of community interests, Indigenous groups and government agencies, created to develop effective stewardship and management practices for the Columbia Wetlands and the Upper Columbia River. The partnership works to engage the general public and works with all levels of governments to implement a shared stewardship model for the management of the Columbia river and wetlands.

In year one (2019-2020) of KC, a literature review identified 65 species at risk (SAR) and 21 at-risk ecological communities that are located within the study area (Darvill, 2020a). This review located all known spatial information on these species and communities and produced maps (Darvill, 2020a). The spatial information was used to identify biodiversity hotspots (or biodiversity conservation opportunities), linkage areas, and data gaps in our knowledge that would help satisfy the overarching goal of the four-year Kootenay Connect project. Year two (2020-2021) of the CWSP's KC project focused on SAR and had six sub-components or sub-projects, which were also described in a Final Report (Darvill, 2021). Additional aspects of the CWSP-KC were completed by other contractors and are described elsewhere.

The following report describes what conservation actions were accomplished in Year 3 (2021-2022), in regards to the species-at-risk component of the CWSP-KC project. The report is organized by sub-projects (Lewis's woodpecker, western painted turtle, alkali saltgrass- foxtail barley, osprey, American badger) and describes the conservation and stewardship actions that took place in the Columbia Valley study area.

2.0. Study Area

The Columbia Valley (UTM: 535767; 5649168) is nearly 55,000 hectares in size and situated in the Rocky Mountain Trench in southeastern British Columbia, Canada (figure 1). The study area is a diverse ecosystem comprised of a wide variety of habitat types including montane, subalpine, grasslands, riparian areas and wetlands, and freshwater rivers and lakes. The biogeoclimatic zones within the Columbia Valley study area are Engelmann spruce-subalpine fir, interior cedar-hemlock, interior Douglas-fir, montane spruce and interior mountain-heather alpine. The Columbia Valley is in the unceded traditional territory of the Ktunaxa Nation (including ?Aqam and Akisqnuk bands), Secwepemc Nation (including the Shuswap Indian Band) and Metis Nation Columbia River.

Situated in the valley bottom, the Columbia Wetlands are considered one of the largest contiguous wetland complexes in western North America, and the largest within the southern interior of BC (Hammond, 2007). The wetlands are an important refuge for species which rely on this habitat for critical life history stages. These wetlands have been identified as an essential habitat component of the Pacific Flyway, which in North America is the westernmost primary migratory bird corridor (Wilson, 2010). This ecosystem plays an important role as migration stopover habitat for birds (Kaiser, McKelvey & Smith, 1977), providing a refuge where birds can fuel up and rest during the necessary long migratory flights requiring substantial amounts of energy. The Columbia Wetlands and valley bottom also provides vital habitat for breeding birds and for a number of ungulate, mammal, amphibian, reptile, invertebrate, fish and plant species – many imperiled.

Figure 1. The study area depicted in the Columbia Valley within British Columbia, Canada.

3.0 Lewis's Woodpecker (LEWO)

3.1 Introduction

Lewis's woodpecker (LEWO) (*Melanerpes lewis*) is blue-listed in British Columbia, was listed as Threatened by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2010 and as Threatened on Schedule 1 of the Species at Risk Act (SARA) in 2012. Lewis's woodpecker is also a listed species under the B.C. Forest and Range Practices Act Identified Wildlife Management Strategy, meaning it requires special management attention by protecting its critical habitat with special management guidelines such as Wildlife Habitat Areas (WHA), General Wildlife Measures (GWM) and Higher-Level Plans. In 2010, under the Forest and Range Practices Act the B.C. Ministry of Environment established three WHAs for LEWO in the southern end of the study area near Canal Flats (Darvill, 2020a; Darvill, 2021; Environment Canada, 2014).

In Canada, the breeding range for LEWO is within six geographic regions of southern B.C., the most northerly breeding location is within the East Kootenay Trench (B.C. CDC, 2015). In 2017, under the 'Recovery Strategy for the Lewis's woodpecker,' three Critical Habitat areas were designated for LEWO within the study area and not on federal lands: Dutch Creek burn, Findlay Creek burn, and Wilmer area (Darvill, 2020a; Environment and Climate Change Canada, 2017). These Critical Habitat areas were selected based on habitat suitability models and nesting occurrence data (Environment and Climate Change Canada, 2017).

A survey conducted in the East Kootenay region (south of Brisco) in 1997-1998 found that up to one-fifth of the Canadian population was found to breed in that survey area (Cooper & Beauchesne, 2000). Inventory results included nine nests found in the Dutch Creek area (west of Windermere Lake and Fairmont Hot Springs) in 1997, and seven nests located in 1998 were in the same area (Cooper & Beauchesne, 2000). A subsequent LEWO inventory completed in 2007 found no nests at Dutch Creek, reportedly because nesting habitat in the Dutch Creek burn area had been reduced due to decay of fallen wildlife trees (Beauchesne & Cooper, 2007). In the Findlay Creek burn area (west of the south end of Columbia Lake and Canal Flats), three nests were found during an incomplete survey in 1997, 31 nests in 1998, and 26 in 2007 (Beauchesne & Cooper, 2007). In 2007, one nest was found at Fairmont, down from six in 1998 (Beauchesne & Cooper, 2007).

3.2 Methods

Conversations were had with private landowners in Fairmont in regards to their concerns over continued destruction of LEWO breeding habitat in a gated community. Neighborhood residents requested that a brochure and poster be developed for them to distribute in their neighborhood in regards to LEWO and their habitat. This was in response to unauthorized tree harvesting in LEWO habitat. The aim was that nesting habitat (cavity nesting trees) would cease to be removed by private land developers. Canva was used to design a brochure and poster, and the designs were printed locally in Invermere. Two Fairmont residents distributed brochures and posters around the Fairmont area.

On July 11, 2021 point counts for LEWO were conducted at nine locations along the Findlay Creek Forest Road (FSR) in order to locate potential nesting trees on crown land. If active nesting trees were identified along the Findlay Creek FSR, those area(s) could become WHFs, WHAs or Critical Habitat expansion areas.

3.3 Results and Outcomes

A brochure (appendix 1) and poster (appendix 2) were created and printed for distribution in the Fairmont area. Through these resources, public awareness and appreciation of LEWO in Fairmont was enhanced. We also conducted point counts for LEWO up the Findlay Creek FSR, since previous LEWO observations has been reported from that area and it is identified as Critical Habitat in the LEWO Recovery Strategy (Environment and Climate Change Canada, 2017). At each point count (n=9), specific elements were recorded (start time, end time, coordinates, etc.) (table 1) and LEWO searches occurred for 15 minutes. No LEWO were recorded at these point counts. All data was recorded on a field data sheet and subsequently transcribed into a Species Inventory (SPI) data form; this was then submitted to the Wildlife Data Submission website, a provincial database.

Table 1. Lewis's Woodpecker point count data from the Findlay Creek Forest Service Road (FSR).

Study Area Name	Date	Time	End Time	Surveyor	Count	UTM Zone	Easting	Northing	Elevation	Temperature in C	Beaufort Wind Scale	Cloud	Precipitation	Main Habitat (Ac Brn Py Other)	Adults - Unclassified Sex	Hatchlings	Comments
Findlay FSR	11-07-2021	10:23	10:38	RD	0	11	581601	5558596	1122	15	2	4	3	1,2	0	0	Noted, cavities in hydro pole # 5105
Findlay FSR	11-07-2021	10:48	11:02	RD	0	11	581137	5554349	967	15	1	3	1	2	0	0	Several cars on FSR.
Findlay FSR	11-07-2021	11:08	11:23	RD	0	11	579635	5554991	985	16.8	2	3	1	2	0	0	Several cars on FSR.
Findlay FSR	11-07-2021	12:00	12:15	RD	0	11	575218	5554483	1022	23.7	2	3	1	1	0	0	n/a
Findlay FSR	11-07-2021	13:40	13:55	RD	0	11	571786	5553539	1091	25.9	4	2	1	1,2	0	0	n/a
Findlay FSR	11-07-2021	14:13	14:28	RD	0	11	569338	5553317	1101	25.2	3	3	1	1,2	0	0	Lots of fir, ponderosa pine nearby within 100 m. Two 4-wheelers drove by.
Findlay FSR	11-07-2021	14:34	14:49	RD	0	11	570531	5553326	1080	27	4	2	1	2	0	0	Alkali-saltgrass just beyond 100 m.
Findlay FSR	11-07-2021	14:57	15:12	RD	0	11	574041	5554289	1078	28.4	3	2	1	2	0	0	Lots of cattle nearby.
Findlay FSR	11-07-2021	15:16	15:31	RD	0	11	574499	5554309	1066	31.6	3	2	1	1,2,3	0	0	Lots of vehicular traffic.

3.4 Discussion and Recommendations

The largest identified threat to Lewis's Woodpecker (LEWO) in the proposed recovery strategy is "habitat loss or degradation – urban and agricultural development" (Environment and Climate Change Canada, 2017). In 2022, a LEWO inventory of all probable and previously identified nesting locations should occur. The inventory data should be compared to results from previous years of survey effort (e.g., Cooper & Beauchesne, 2000; Beauchesne & Cooper, 2007; Darvill, 2021).

Assessing changes in habitat quality at previously identified nest locations can help locate suitable areas for fungal tree inoculation. Fungal inoculation treatment methods have been used to create wildlife tree habitat with the intent to restore and maintain habitat for LEWO and other wildlife tree dependent species (Manning & Manley, 2014; Manning, 2008; Manning, 2010). All inventory data should be submitted to relevant agencies [B.C. Conservation Data Center (CDC), Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD), Environment and Climate Change Canada (ECCC)] for potential WHA and/or critical habitat expansions. Ensuring designated Critical Habitat is in current nesting areas will help support the population (nest habitat locations can change over time).

Current inventory data can inform environmental assessments for development proposals within LEWO habitat. Inventory work has (and will continue to) inform where private land parcels should be acquired

by land conservation groups to aid in the conservation of LEWO habitat (e.g., property in Fairmont recently acquired by The Nature Trust). There are also a number of activities listed in the LEWO recovery strategy that are likely to result in the destruction of critical habitat for LEWO (e.g., "significant removal of potential nest trees can result in direct loss of nesting habitat because some of those trees may be currently used but not known and others have the potential to be used in the future") (Environment and Climate Change Canada, 2017). It is recommended to continue with LEWO public awareness and encourage the use of Best Management Practices.

4.0 Western Painted Turtle (WPT)

4.1 Introduction

The western painted turtle (WPT)- Intermountain - Rocky Mountain population (*Chrysemys picta* pop. 2) is B.C.'s only native freshwater turtle species. It's provincially blue-listed and a species of Special Concern federally according to both COSEWIC and SARA. Turtles need to obtain heat from their environment to thermoregulate. They need to actively seek out warm microhabitats and bask in the sun to elevate their body temperature, which is particularly important in spring and fall when ambient temperatures are low (Munshower, 2019). Basking can occur several times a day, usually for several hours beginning at sunrise (before feeding occurs) and sometimes again in the afternoon and evening. Turtles require basking features such as logs or other surfaces which they can easily climb onto and warm themselves (by thermoregulation) from their environment. Basking is a required part of a turtle's life history and the lack of woody debris poses a problem for turtles. An inventory was completed in 2020 to identify WPT habitat locations and also assess if there was a lack of basking features at these sites (Darvill, 2021). Specific sites were found to lack a sufficient number of basking features.

Through WPT inventory work that was done in the Columbia Valley in 2020 (Darvill, 2021), 18 nesting sites were also identified. Nest predation was noted at several of the nest sites, such as the Columbia National Wildlife Area – Wilmer Unit, Westside Road in Spillimacheen and the Zehnder Farm in Invermere. Road mortality was also reported on the road past Lake Enid outside of Wilmer and Westside Road in Spillimacheen (where it bisects the Columbia Wetlands). Recreational impacts (hiking/biking trail) were observed to go through two nesting sites for WPT (Columbia National Wildlife Area – Wilmer Unit, Armstrong Bay – Columbia Lake).

4.2 Methods and Results

4.2.1 Basking logs deployment and effectiveness monitoring

A deficiency of basking sites in certain areas of the Columbia Valley could force turtles to compete for sites with predators (e.g., skunks, dogs) that are more aggressive. In 2021 the Lake Windermere District Rod & Gun Club engaged in part of the WPT project. The main objectives were to enhance the turtles' habitat by designing and installing lightweight and natural-looking basking structures and to investigate turtle basking use on the installed logs (appendix 3). The ponds selected for basking log deployment in 2021 were Dorothy Lake in Invermere, the Radium Mill Pond (west of railway tracks along Horsethief Forestry Rd), and Armstrong Bay at Columbia Lake. Placement of logs took place during the times that would pose the least amount of disturbance to birds – early spring or late summer. Since there was some discrepancy in the literature regarding the placement preference for painted turtles, some logs were attached to the shoreline while others were left floating in shallow water (figures 2, 3, 4, 5). Eight basking logs were installed at each location. For additional details developed for basking log installation see appendix 3.

Using social media, email contacts, press release, and posters (appendix 5), the public was solicited to acquire volunteers who were interested in monitoring the basking logs at Dorothy Lake and Radium Mill Pond (logs at Armstrong Bay were not monitored in 2021 due to later deployment at this location). All volunteers signed waiver forms and were sent the WPT monitoring protocol, data form and a map of the basking logs at each location (figures 6 and 7).All of these forms were developed in 2021. Observations were recorded and sent to the coordinators of the WPT project.

Twenty-six people responded to the volunteer request and were coordinated to monitor the basking logs at Radium Mill Pond and Dorothy Lake. Basking logs at Radium Mill Pond were monitored by citizen-scientists 85 times from April 29th – October 16th, 2021. No turtles were observed at Radium Mill Pond, but other wildlife species were observed to use these basking logs: cinnamon teal, mallard, goldeneye species, other duck species.

The basking logs at Dorothy Lake were visited 226 times from May 5th – November 3rd, 2021. There were 1,233 WPTs seen using the logs at Dorothy Lake (table 2). Great blue heron, American wigeon, Canada goose, merganser species and other waterfowl species were seen using the basking logs. The majority of turtle use was seen at a log called 'Dorothy 1' (table 2), but that basking feature was installed during a previous initiative. However, all the logs deployed at Dorothy Lake in 2021 had some level of WPT use (table 2).

Table 2. Basking log observations at individual logs at Dorothy Lake.

	Basking Structures at Dorothy Lake								
Name of basking log	Dorothy 1 (previously deployed at this site)	Dorothy 2a	Dorothy 2b	Dorothy 3a	Dorothy 3b	Dorothy 4a	Dorothy 4b	Dorothy 5	*Other
Number of turtles observed on log	723	16	7	35	142	111	38	88	73

Note - basking structure names (Dorothy 1, 2a, etc.) correspond to the map in Figure 6.
*Other indicates WPT sightings on structures other than the named basking structures (e.g., along shoreline).

Figure 2. Basking log deployment at Radium Mill Pond using cement blocks as log anchors.

Figure 3. Securing a basking log near the shoreline using rebar pounded through the log and into the ground.

Figure 4. Photo of a basking log being installed near the shoreline at the Radium Mill Pond.

Figure 5. Photo of two basking logs that were installed at one site at Radium Mill Pond - one at shoreline, the other just offshore.

Figure 6. Satellite image of basking log locations (and log names) at Dorothy Lake.

Figure 7. Satellite image of basking log locations (and log names) at Radium Mill Pond.

4.2.2 Turtle nesting bed enhancement – fencing project

In 2020, a private landowner (Zehnder Farm) was identified to have as having a waterbody where a population of ten western painted turtles were living (Darvill, 2021). The eggs laid by turtles had reportedly (by landowner) been dug up by predators (potentially skunk, badger, Columbia ground squirrel, etc.) for multiple years. With the landowner's permission and assistance, we erected a fence around the main WPT nesting area with the goal of keeping the predators from depredating the nests.

We used approximately 30 upright T-rail fence posts (pounded into the ground with a rubber mallet, placed about 3 meters apart) and installed a 200-meter-long fence using galvanized 19-gauge 36" X 50' long with 1/2" squares. We also used another fencing material (galvanized 19-gauge 24" X 50' long 1/2" squares) and wired the two fence types together (using tie wire) at the ground to prevent predators from digging under fence (see figure 8). The ground fence had large rocks placed upon it to keep the fence on the ground. Gravel was to be brought to the site (by landowner), putting it on top of the ground fence. Each end of the upright fence was brought into the water so that a predator would need to swim to get into the fenced-in nesting encloser (most WPT predators do not like swimming) (figure 9). The fence ends were installed about 2 meters below the low water mark.

The landowner made ongoing observations and reports of the WPT and predator activity at this site. No signs of predators were observed in the enclosed nesting area. Several nests beyond the fenced nesting area were observed to be dug up by predators. This could provide evidence that the fence works to keep out predators.

4.2.3 Signage and trail re-routing to protect sensitive turtle habitat

During WPT inventory work in 2020 (Darvill, 2021), there were two nesting areas (at Armstrong Bay and the National Wildlife Area (NWA)– Wilmer Unit) that identified walking trails through nesting areas; this could disturb WPT is a sensitive area. Work with the Columbia Lake Stewardship Society was initiated to collaborate on mitigation measures regarding threats (walking area, dogs off leash that could dig up nests) previously observed at Armstrong Bay. An educational sign is currently being developed collaboratively. This signage will provide educational material on the WPT and the importance of not disturbing the nesting area as well as recommend that all dogs be on leash. Collaboration also occurred with Environment and Climate Change Canada on mitigation and enhancement strategies (e.g., signage, fencing in a nesting area) regarding a WPT nesting area in the NWA – Wilmer Unit.

According to 2020 WPT inventories (Darvill, 2021), there were two areas in the Columbia Valley identified with WPT road mortality issues. To help mitigate road mortality, the Ministry of Transportation Infrastructure (MoTI) agreed to put up WPT crossing area signage at the problem areas identified (the road beyond Lake Enid in the Wilmer area and Westside Road – where this road bisects the wetlands in Spillimacheen). This signage is scheduled to be designed, installed, and paid for by MoTI in 2022.

Figure 8. Fence installed around western painted turtle nesting bed to discourage predators from depredating turtle nests inside the fence.

Figure 9. Upright fencing brought into the water at both ends to further discourage predators from entering enclosure (main predators at this site do not like to swim).

4.3 Recommendations – Western Painted Turtle (WPT)

- Continue to collaborate with groups (Columbia Lake Stewardship Society, Environment and Climate Change Canada, Ministry of Transportation Infrastructure) in the above specified aspects of WPT conservation action (signage, fencing projects, monitoring) in the Columbia Valley.
- Continue to work with private landowners in Spillimacheen who are interested in having a WPT nesting area created and protected from predators on their private land. Currently the landowners have a number of WPT nests depredated annually on their property.
- Locate and coordinate volunteers to monitor the basking logs deployed in 2021 at Armstrong Bay (these have yet to be monitored for their effectiveness) and at Radium Mill Pond (these were not observed to be used by WPT in 2021).

5.0 Alkali saltgrass- foxtail barley ecological community

5.1 Introduction

Alkali saltgrass - foxtail barley (*Distichlis spicata - Hordeum jubatum*) is a blue-listed ecological community (EC) in the province of B.C. There are less than 20 known occurrences for this at-risk EC in B.C (Lea, 2004). It is also an EC at risk under the provincial Forests and Range Practices Act (FRPA) and the WHA designation applies to areas where this EC is found on crown land. There are four known locations in the Columbia Valley, one is on the Akisqnuk Indigenous Lands near Windermere, and three of the occurrences are on crown land near Canal Flats off the Findlay Creek Forest Service Road (B.C. CDC, 2012).

In 2020, the three known locations on crown land were visited to investigate whether this rare EC still existed at these locations, and what (if any) threats or disturbance(s) exist. The EC was still present at all three sites and a WHA proposal was developed and submitted to the provincial government's Ministry of Forest, Lands, Natural Resource Operations and Rural Development (MFLNRORD). This was to protect two of the three sites. At that time of WHA application submission in 2021, one of the locations was thought to be on private land (Darvill, 2021). However, land classifications were recently adjusted and the third site was subsequently determined to be on crown land, therefore WHA status could apply to the additional site.

5.2 Methods and Results

The WHA application submitted in spring 2021 was revised and submitted to the Ministry of Forest, Lands, Natural Resource Operations and Rural Development (MFLNRORD) in winter 2021. It included the third alkali saltgrass - foxtail barley EC near Canal Flats. Follow-up occurred with MFLNRORD to help the WHA request move forward. "The EC proposals [for WHAs] are still 'on-hold' for advancement (from a Branch perspective) – but I have heard they are updating the policy and I hope to hear soon on how/when we can move forward on these" (L. Anderson, personal communication, Feb 7, 2022). Follow up was also made with MFLNROD regarding the request to have cattle fencing installed around all alkali saltgrass – foxtail barley ECs near Canal Flats.

5.3 Discussion and Recommendations

- Continue to follow-up with MFLNRORD to help ensure the alkali saltgrass - foxtail barley EC moves forward with WHA status.

- Once WHA gets established, follow up with MFLNRORD to recommend that cattle fencing be installed around alkali saltgrass -foxtail barely ECs near Canal Flats.

6.0 Osprey

6.1 Introduction

Osprey (*Pandion haliaetus*) is not an at-risk species, but they were formally facing severe population declines. Osprey populations have rebounded since the Dichlorodiphenyltrichloroethane (DDT) (an insecticide used in agriculture) related population declines were seen during the mid-20 century (Winkler, Billerman & Lovette, 2020). Osprey are a culturally valued species and due to their proven sensitivity towards pollutants they have been used as an indicator species of environmental change (e.g., changes in water quality) (e.g., Henny et al., 2004).

Three osprey nest surveys were completed in the Columbia Valley in 2021 at 72 nest sites, most of which were also inventoried in 2019 (Darvill, 2020b) and 2020 (Darvill, 2021). The 2020 inventory was done to determine if any nests met WHF criteria (on crown land and natural nest feature; not on pole). No nests met this criteria. In 2021, the data was compared to see if it was possible to see any population trends (stable, increasing, decreasing) using the three years (2019-2021) of available data.

6.2 Methods

In 2021, the first of three nest observations were undertaken between May 6 and May 23; with the majority of nest observations occurring on May 6 and 7. The second round of nest observations were undertaken between July 25 and August 4, with the majority of observations conducted between July 26 and 27. The second round of observations was found to be the best time period to see early-hatched young preparing to leave the nest. Observations lasted at least five minutes at each nest. This is the amount of time between rest periods that chicks generally move in the nest, with detection of movement being the most useful parameter to determine nest occupancy (Moore & Arndt, 2016).

The last of three observations took place between August 6 and 26, with the majority of observations recorded on August 15 and 16. At each site the following parameters were recorded**:** observation date, UTMs, time of arrival, duration of visit at the nest, number of chicks in the nest (if known), other general observations at the nest (one adult at nest, one adult calling nearby, two chicks seen in nest). Comparison of nest numbers and nest success across the three years of monitoring was also done to determine how many nests were active each year and also to determine nest success each year (Table 3).

6.3 Results

In 2019, 59 osprey nests (including pole and tree nests) were identified, 43 were active during the first visit and on either the second or third visit, 43 nests were active with osprey chicks. Twenty-seven nests were thought to have been successful (during last visit, chicks still in nest or fledglings seen near a nest were presumed to have fledged) (table 3). In 2020, 65 nests were located and observed. Forty-three nests were active at the beginning of the breeding season and 19 nests were presumed to be successful (table 3). In 2021, 72 nests (or platforms) were observed, 39 were active near the beginning of the breeding season and 27 nests were successful (table 3).

Table 3. Summary data of osprey inventories from 2019-2021.

Year	# of osprey nests recorded	# of osprey nests active during beginning of season	# of osprey nests either presumed or known to have produced fledglings
2019	59	43	27
2020	65	43	19
2021	72	39	27

6.4 Discussion and Recommendations

Comparing the number of successful nests across three years (2019 = 27, 2020 = 19, 2021 = 27) is not sufficient to determine if osprey populations are increasing or decreasing in the Columbia Valley. Monitoring data for more subsequent years is required. The same number of nests were assumed successful in both 2019 and 2021, yet 13 more nests were observed in 2021 when compared to 2019 (table 3). Reasons for 2021 nest failures were noted (when possible): chick deaths during a heat wave, ravens seen depredating a nest, and human disturbance (construction, road building) nearby which could have led to nest abandonment or increased predation events.

Some of the nests did not see osprey use during the three years of monitoring, likely because nests were located too low to the ground when compared to the higher surrounding trees or there was vegetation close by. Nest poles or platforms for osprey should be installed "in an open area with no overhead canopy or interfering vegetation, within a mile of open water" (Cornell University, 2022).

- In order to determine if the Columbia Valley osprey population is increasing, remaining stable or decreasing over time, it is recommended that monitoring continue using volunteers when and where possible. It is also recommended to submit that data to the B.C. Conservation Data Center.

7.0 American badger

7.1 Introduction

American badger (*Taxidea taxus jeffersonii*, western population) is red-listed in the province of B.C. and has had a provincial ranking of S2 (or imperiled) since 2015. It is listed as an endangered species under COSEWIC (since 2012) and is on Schedule 1 of SARA (since 2018). The reason for the COSEWIC designation is as follows - "as few as 100 mature badgers live in the East Kootenay region where they are vulnerable to increasing threats from roadkill. The loss of open areas to forest succession and urban development is resulting in ongoing habitat decline" (COSEWIC, 2012).

Southeastern B.C. is at a northern extent of the American badger range (COSEWIC, 2012). Within B.C., most badger activity occurs at low elevations in dry areas with non-forested grasslands or shrubland

biomes, but they can be found from alpine areas to wetlands (COSEWIC, 2012). Badger densities are low where they are found, they have large home ranges with hundreds of different burrows within them (Newhouse, 2001). They often change locations daily and reuse burrows from year to year making it important to ensure that unoccupied burrows are not destroyed (Newhouse, 2001).

It has been shown that prey availability and soil type are the key defining features or requirements for badger habitat (COSEWIC, 2012). Additional habitat associations are also important for badgers: low elevations, shallow slopes, low forest crown exposure, and high solar radiation (Kinley, Whittington, Dibb & Newhouse, 2014). Their primary food source in the study area is the Columbian ground squirrel (*Urocitellus columbianus*) (Kinley & Newhouse, 2008). Badgers prefer coherent soils that do not collapse when tunnelled (COSEWIC, 2012), e.g., glaciolacustrine deposits.

The American badger is one of the most well-studied species in the study area. A number of studies have been conducted on badgers in the Columbia Valley, including habitat modelling (Apps & Newhouse, 2000), assessing habitat associations of American badgers in southeastern B.C. (Apps, Newhouse & Kinley, 2002), translocation of badgers to the Upper Columbia Valley (Newhouse & Kinley, 2003), assessing roadkill risk in relation to the presence of culverts and barriers (Kinley & Newhouse, 2009), and effectiveness monitoring of badger WHAs already established (Kinley, 2009). With the badger habitat model developed by Apps & Newhouse (2000) for the northern portion of the East Kootenay, in addition to the collection of radio-telemetry data (Kinley & Newhouse, 2008), a resource selection function (RSF) model was developed in 2014 for all badger range within the B.C. portion of the Rocky Mountain Trench (Kinley, Whittington, Dibb & Newhouse, 2014). Very little to no research has been done on badgers in the Columbia Valley in recent years.

The American badger was recognized as a species at risk under the Forests and Range Practices Act (FRPA). There are provisions under FRPA that can be used to help conserve important habitat for badgers, such as designating important habitat areas as Wildlife Habitat Areas (WHA), “e.g., concentration of burrows, abundant prey sources, and localized preferred friable soil types including moderately coarse-textured Brunisols originating from glaciofluvial and glaciolacustrine parent material” (Adams, I., & T.A. Kinley, 2004). Only one WHA has been established for badgers in the study area, located near Canal Flats.

A Wildlife Habitat Feature (WHF) can also be used for badger conservation. A burrow could be designated as a WHF if the burrow is “(1) currently occupied for denning, shelter, or foraging or (2) is habitually occupied and still capable of providing for denning, shelter, or foraging” (Ministry of Environment, 2018). Identifying potential WHFs or WHAs for badgers requires further research to identify current burrow sites. A WHF or WHA designation can protect a burrow from threats such as road development, logging, cattle impacts, etc. (B.C. Ministry of Environment and Climate Change Strategy Ecosystems Branch, 2019).

7.2 Methods

The American badger component of this project began late (February/March) in year three (2021-2022) of Kootenay Connect - CWSP. Progress on furthering conservation actions for the American badger is expected to occur in 2022-2023. In 2022, initial actions were accomplished including: using ArcGIS to create a map that indicates key area locations to target for field surveys in 2022, creation of communications (using Canva, social media, press release to newspapers, poster, emails) to solicit public sighting information for badgers and their burrows, liaison via email with other groups involved with

badger conservation in the area (provincial government, Indigenous groups), and database creation (using Google sheets) to record public sighting information.

7.3 Results

Using ArcGIS, a map was developed to overlay the high/very high American badger habitat (as illustrated on the American badger RSF model developed in 2014) with various land ownership (figure 10). Communications were developed to create public awareness about this project and also to request information from the public regarding their local sightings of badgers and/or their burrows: poster, social media posts (appendix 7), press release for email and newspaper articles (appendix 8). A database to collect public sightings was created. In order to inform the provincial government of this project, a meeting was had with a Carnivore Conservation Biologist from the Ecosystems Branch, Ministry of Environment and Climate Change Strategy. The Akisqnuk First Nations were sent an email outlining the project and ways we may be able to collaborate; they are also involved with badger conservation.

By March 20, 2022, fifty-two sightings had been reported, many of which included photo submissions. It is currently unknown how many of these sightings are crown land. Depending upon age of features and where they are located, some sites could be designated as Wildlife Habitat Areas or Wildlife Habitat Features – allowing some form of protection from certain types of development.

7.4. Discussion and Recommendations

An unknown number of American badgers live in the Columbia Valley. The number is undoubtedly low as the animals are seldom seen and reportedly as few as 100 mature badgers live in the entire East Kootenay region (COSEWIC, 2012). This is an endangered species that requires immediate conservation action. In just over one month, over 50 observations had been reported from the public. It is important to determine how many of those observations occur on crown land and they need to be ground-truthed to determine if reports can be confirmed as American badger burrow(s). There are badger sites and dens on crown land within the study area (pers. comm., R. Klafki, March 24, 2020).

The following actions are recommended:

- Continue to solicit sighting information from the public (posters, social media requests) to determine where American badgers are using habitat in the Columbia Valley.
- Create a map that overlays crown land with the American badger resource selection function (RSF) model, and all public sightings reported.
- Ground-truth all areas where public observations overlap with crown land and high/very high-quality habitat (according the RSF).
- During field reconnaissance, record data at pre-identified sites including a threat assessment. Suggest potential improvements (mitigations) to improve the badger habitat.
- Ensure that municipalities with badgers within them address the threat of housing & urban areas by incorporating badger habitat (particularly movement corridors) into official community plans as a Development Permit Area under the provincial Land Act. Significant badger habitat has been identified on private land within Regional District East Kootenay (RDEK) Area's F & G.
- In the study area, provide educational materials to the public about badgers.
- Based upon ground-truthing, work to establish badger WHAs/WHFs in potential candidate areas. Create and submit a badger WHA and/or WHF application(s) in the winter of 2022-23.

- Create all data, including location data, in SPI format and submit to the provincial database for B.C. Conservation Data Centre (CDC) inclusion.
- Share the data with the Recovery Team that developed the proposed Recovery Strategy for the American badger. The Recovery Plan states "additional critical habitat may be added in the future if additional research supports the inclusion of areas beyond those currently identified" (Environment and Climate Change Canada, 2021).

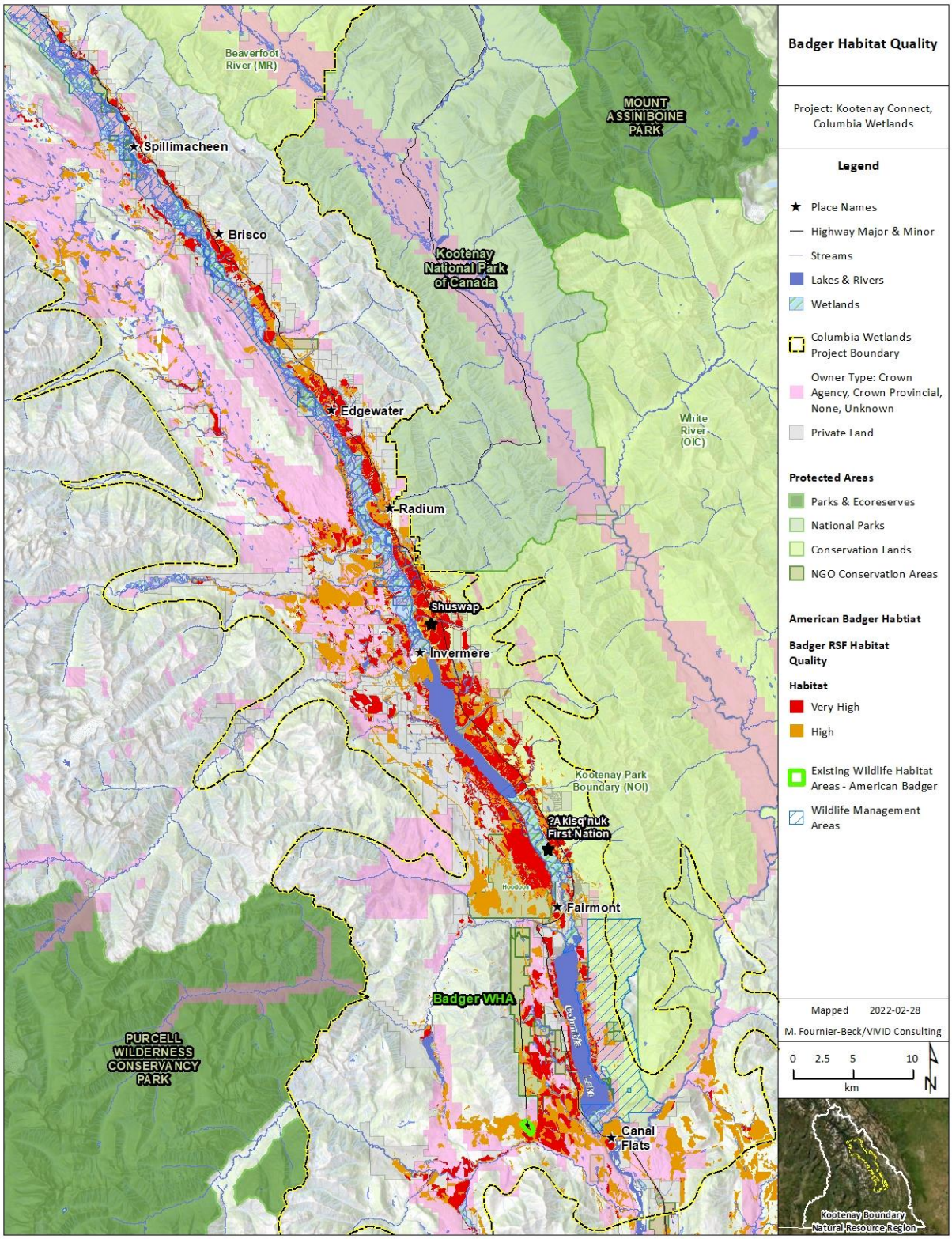

Figure 10. Map indicating how (and where) high and very high quality habitat overlaps with various land jurisdictions in the study area.

8.0 Acknowledgements

I would like to acknowledge that this work has occurred on the traditional and unceded territory of the Ktunaxa Nation, Secwepemc First Nation, and Metis Nation Columbia River. Gratitude is extended to the vast number of individuals that contributed their time and submitted observations. Public sighting contributions have been of immense value to conservation actions for species at risk in the study area.

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The cover photos for this report feature the installation of basking logs for western painted turtle, and a nesting bed enhancement project using fencing materials. All photos were taken by Rachel Darvill.

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9.0 Appendices

Appendix 1. Brochure regarding Lewis's woodpeckers and their important habitat in the Fairmont area; brochure was developed for the Fairmont community members.

Appendix 2. Lewis's woodpecker poster developed for the Fairmont neighborhood.

HAVE YOU SEEN THIS BIRD?

I am a species-at-risk. Please preserve my nesting habitat in Fairmont!

THE LEWIS'S WOODPECKER IS A THREATENED SPECIES. THERE IS HABITAT FOR THIS SPECIES IN THE FAIRMONT COMMUNITY AND WE NEED YOUR HELP IN PROTECTING IT. THE OFFICIAL COMMUNITY PLAN ALSO HAS REGULATIONS (SUCH AS A DEVELOPMENT PERMIT APPLICATION PROCESS) TO PROTECT THIS BREEDING HABITAT.

This information is provided to you by the Columbia Wetlands Stewardship Partners. If you want more information, please contact us at cvpaintedturtle@gmail.com

Kootenay Connect

Columbia Basin trust

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Regional District of East Kootenay

Columbia Valley Local Conservation Fund

The Columbia Wetlands Stewardship Partners

All photographs - Rachel Darvill

Appendix 3. Western painted turtle basking log installation and location placement guide.

Locations for installing basking structures in the Columbia Valley in 2021:

-Armstrong Bay
-Dorothy Lake
-Radium Mill Pond (on the northeast or southeast sides where there is little to no human/dog activity).

1. **Things to note when deploying structures at select sites:**

-basking structures should be south facing (located on the north side of wetland/lake).

-structures should be easy for turtles to climb, ensure there is a slope allowing the turtles easy access to the board from the water (Umprey et a., 2012).

- natural surface should closely resemble a fallen log; a product imitating a natural log which would be manoeuvrable by people (Umprey et a., 2012).

-deploy in areas with little forest canopy nearby that would shade the area. Too much canopy coverage would be less efficient at providing heat to a basking turtle by blocking out much of the sun's rays (Munshower, 2019). One study reported that turtles were never observed basking in locations that had canopy coverage greater than 35% covered (Munshower, 2019). Some nearby canopy coverage can be advantageous as it may provide some protection from avian predators, but painted turtles need ample sunlight to thermoregulate (Munshower, 2019).

- basking structures should be placed close to the shoreline. Umphrey et al. (2012) showed that usage of on-shore basking structures was significantly higher than usage of off-shore structures.

- basking structures should be placed in shallow water, depth should be less than 1 meter (Munshower, 2019). Painted turtles do not go into deep water, they prefer shallow water (Rowe, 2003).

-If possible, place structures in areas with turbid water as turtles seem to prefer to bask at sites with murkier water (Munshower, 2019). "Other studies have noted that turtles of various species may select basking sites with high presence of submerged vegetation and water turbidity. These traits may be better for predator avoidance, or, as suggested by Vignoli et al. (2015), aquatic vegetation has an influence on water temperature and this may be an important variable for basking site selection. Many turtles bask in small coves along shoreline of rivers and ponds.

-Emergent tree trunks could be considered for installation if feasible. These have been selected by turtles over other substrates such as rocks or floating logs (li; Lindeman, 1999)" (from Munshower, 2019)

- a durable design is required with low maintenance requirements (Umprey et a., 2012).

- the basking structure should have a surface stable and large enough for basking and perching by multiple species and one that can accommodate numerous turtles at once (Umprey et a., 2012).

1. Timing for installation for basking logs

-Late March (or as soon as area is ice free) is advised for deployment, ahead of turtles' emergence from hibernation (Umprey et a., 2012).

-Avoid putting basking logs out during turtle and bird nesting season; mid- May to mid-July. Since basking site enhancement will necessitate some disturbance near the shoreline, it is important to be aware of other species that may be using the area, particularly for reproductive purposes. It is advisable to delay basking log installation to avoid disturbing shoreline vegetation and shallow waters used for egg-laying in spring by native amphibians and by waterbirds.

2. Basking structure design

-do not put any non-wood products into the water, e.g., Styrofoam.

-Natural logs are recommended as they are long lasting, provide basking opportunities for many turtles on each log, and require little or no maintenance once in place.

-Mill-end slabs are cheaper and easier to carry and install, but are less durable and need more frequent replacement. Natural logs should be used where possible and, if secured properly, will become ingrained in the surrounding ecosystem, making them a more sustainable and aesthetically natural solution.

-For basking structures, use two types and have them at different depths (at shoreline and just off shore, so that both can be seen with one camera). Some groups have alternated what type of structure is closest to shore. The two types of basking structure were as follows:

1. Boards and available logs or sections of logs from newly felled trees nearby the site, or brought in from elsewhere. Ensure that it is not too thick or hard to get on (e.g., Figure 1). Cedar has longevity.
2. Mill-end slabs from trees that had been processed for lumber often became the preferred source for basking logs in other turtle projects; the slabs are relatively easy to handle, can be obtained economically in large quantities (often free), and could be anchored to the shore or emergent vegetation with ease. The slabs should have bark one side, while the other side was flat and milled. The slabs used in a previous project ranged from 2.5 m to 3.8 m in length and were, on the average, 31 cm wide and 7 cm deep at the end jutting out into the water.

-Basking structures should have a diameter over 30 cm, and a length of at least 3 m.

Figure 1. This tree with small root end is used by WPT and has been for at least a few years.

3. Drilling pole for camera mount

Figure 2. This shows a camera mount used in a project in the Okanagan.

3. Anchoring

-Basking structures can be anchored in place by drilling a hole through the structure on the end facing the shore and placing a 1.5 m (or slightly longer) rebar or other metal rod through the hole. An eyelet with chain should be welded to one end, or fastened and secured in some way (Figure 3 and 4). The other end of the chain (long enough for high water fluctuations) should be secured to cinder blocks or a 'brake drum' off a logging truck. One project in the Okanagan used old brake drums off logging trucks (D.Derosa, personal communication, Jan 2021). These were scrap metal and were washed before being used to weight down the basking logs, ~80lbs each (D.Derosa, personal communication, Jan 2021).

-"*You want to have a sense of the depth of the water body when it's at high water so the chain can reflect that with a buffer. The reason you want the chain to be slightly longer than the depth at high water is so the log can still move without all the force of it trying to lift the cinder blocks off the bottom if it starts to float on its own; this just helps to prevent a constant pull on the chain. It will still get pulled from wind but if it's not constantly trying to lift the cinder blocks off the bottom it's likely to stay anchored longer. You also want to select what side of the log you want to be facing up, so if it's an oblong shaped log and you want the flatter surface facing up so it's easy for turtles to climb on and wider for them to bask on then fix the chain and spikes opposite of this side*" (Thomas Hill, personal communication, Jan 18 2020).

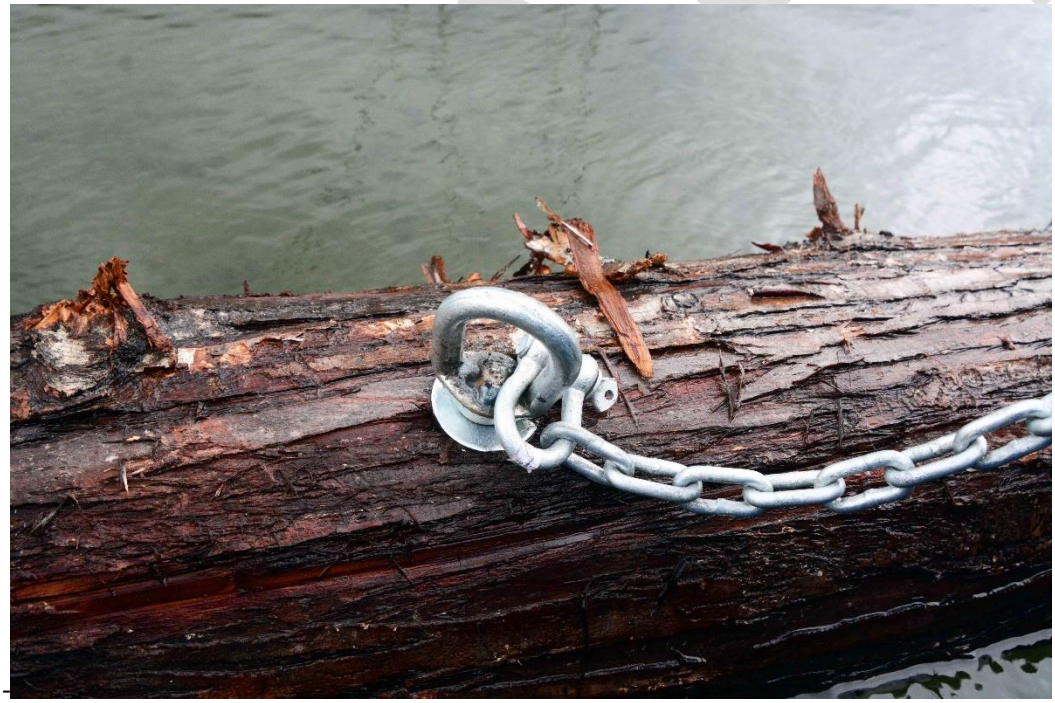

Figure 3. Eyelet with chain that is welded on.

Figure 4. Other side of eyelet for chain and anchor attachment.

Transportation and Installation

-Logs can be transported by truck and/or boat trailer (figure 5) and released at deployment sites. Logs can be installed from the shore, although movement and placement may be difficult depending on substrate. A small boat may be required, but more likely waders will be sufficient as we want them in water less than 1 meter.

-install two logs fairly close together (see Figure 6, 7, 8, for examples), one onshore and the other slightly offshore. CWSP may want to monitor these structures with trail cameras (1 camera to monitor two logs).

-Care should be taken to ensure the logs are firmly in place, but that they do not provide hazards for other lake activities (boating). Water level fluctuations and seasonal weather need to be accounted for (longer chain for high water). Placement should be hard to access and away from potential disturbances, but ideally in visible areas where visitors and volunteer monitors can easily observe turtles.

-It is recommended that basking structures be installed in quiet, sun-exposed areas adjacent to the shoreline, located away from trails and land access points. Structures should be secured or anchored to the shore and slope downwards into the water to accommodate water level fluctuations and turtle access (Engelstoft & Ovaska, 2011).

IMPORTANT TO NOTE BEFORE AND DURING INSTALLATION:

Please do the following for all basking structures (record on data form):

1. Assign a number to each structure for ease of identification.
2. Measure the length and diameter of all deployed structures.
3. Record the type of basking structure (e.g., cedar log, platform made with plywood).
4. Take UTMs at all locations of deployed basking structures.

5. If possible, take photos of the structures, label and send back to project coordinator.
6. Record the water depth at the structure, if possible.
7. Types of plants within the deployment area (if possible), e.g., Floating plants (lily pads, duckweed), algae, submersed, emergent, or terrestrial.
8. Record the date of deployment.

Figure 5. A boat trailer is a good way to transport logs.

Figure 6. Two basking structures (one onshore and another offshore) should be placed in such as way so that two can be monitored with one trail camera.

Figure 7. Two basking structures (one onshore and another offshore) should be placed in such as way so that two can be monitored with one trail camera.

Figure 8. Two basking structures (one onshore and another offshore) should be placed in such as way so that two can be monitored with one trail camera.

Appendix 4. Basking log installation information for western painted turtle project.

CWSP WPT Basking Log Installation
Date: April 21, 2021 Site name: Dorothy Lake Log name: Dor1 Name(s) of installer: Lake Windermere Dist. Rod & Gun Club Type of material used as basking structure: untreated cedar hydro pole Easting: 11U 0569189 Northing: 5594626 Depth (m) of log - each end: Shore log & other end anchored in 25 cm water Notes: Log length – 4.57 m (15 ft)
CWSP WPT Basking Log Installation
Date: April 21, 2021 Site name: Dorothy Lake Log name: Dor2 Name(s) of installer: Lake Windermere Dist. Rod & Gun Club Type of material used as basking structure: untreated cedar hydro pole Easting: 11U 0569189 Northing: 5594626 Depth (m) of log - each end: Floating log both ends anchored in 1 m. water Notes: Log length – 2.44 m (8 ft)
CWSP WPT Basking Log Installation
Date: April 21,2021 Site name: Dorothy Lake Log name: Dor3 Name(s) of installer: Lake Windermere Dist. Rod & Gun Club Type of material used as basking structure: untreated cedar hydro pole Easting: 11U 0569093 Northing: 5594594 Depth (m) of log - each end: Shore log other end anchored in 1 m. water Notes: Length – 3.05 m (10 ft)
CWSP WPT Basking Log Installation
Date: April 21,2021 Site name: Dorothy Lake Log name: Dor4 Name(s) of installer: Lake Windermere Dist. Rod & Gun Club Type of material used as basking structure: untreated cedar hydro pole Easting: 11U 0569116 Northing: 5594631 Depth (m) of log - each end: Floating log – one end anchored in 60 cm & other end 1 m. water Notes: Log length – 2.44 m (8 ft)

CWSP WPT Basking Log Installation

Date: April 07, 2021
Site name: Radium Mill Pond Log Name: Rad1
Name(s) of installer: Lk. Windermere Dist. Rod & Gun
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 564090
Northing: 5608223
Depth (m) of log - each end: Shore log – one end on land other end anchored in 30 cm water
Notes: Log length – 3.05 m (10 ft) Located just north of old bird blind.

CWSP WPT Basking Log Installation

Date: April 07, 2021
Site name: Radium Mill Pond Log Name: Rad2
Name(s) of installer: Lk. Windermere Dist. Rod & Gun
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 564090
Northing: 5608223
Depth (m) of log - each end: Float log both ends anchored in 1 m water
Notes: Log length – 2.74 m (9 ft) Located just north of old bird blind.

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond Log Name: Rad7
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 563579
Northing: 5608116
Depth (m) of log - each end: single log end on land (cattails) anchored in 60 cm water
Notes: Site is near 1 km along Horsethief Forestry Rd, at pull in spot on north side
Log length – 3.66 m (12 ft)

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond along Horsethief Forestry Rd. Log Name: Rad8
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 563579
Northing: 5608116
Depth (m) of log - each end: floating log in cattails anchored in 1 m water.
Notes: site is near 1 km along Horsethief Forestry Road by pull in spot on north side
Log length – 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond just west of osprey pole nest along Horsethief FSR.
Log Name: Rad5
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole.
Easting: 11U 563692
Northing: 5608129
Depth (m) of log - each end: shore log with one end anchored in 45 cm water
Notes: Look for hydro pole # 29 along Horsethief Rd and a trail beside it into the site.
Log length – 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond – just west of Osprey pole nest along Horsethief FSR.
Log Name: Rad6
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 563692
Northing: 5608129
Depth (m) of log - each end: float log in 50 cm water in cattails.
Notes: Look for hydro pole #29 approx. 1 km along Horsethief Forestry Road and trail
Beside the pole into the site. Log length – 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond Log Name: Rad3
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 564088
Northing: 5608187
Depth (m) of log - each end: shore log with other end anchored in 1 m water
Notes: Easy to see from old bird blind just west of CPR tracks. Log length–3.05 m (10ft)

CWSP WPT Basking Log Installation

Date: April 16, 2021
Site name: Radium Mill Pond Log Name: Rad4
Name(s) of installer: LWD Rod & Gun and CWSP
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 564088
Northing: 5608187
Depth (m) of log - each end: Floating log anchored in 1 m water.
Notes: Easy to access at old bird blind just west of CPR tracks. Log length –2.44 m (8ft).

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay – Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun Club
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 581925
Northing:5567350
Depth (m) of log - land log with other end in 0.5 m water
Notes: Log length 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay, Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 581925
Northing: 5567350
Depth (m) of log - each end: floating log with both ends anchored in 0.7 m water
Notes: log length 2.75 m (9 ft)

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay, Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun Club
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 582025
Northing: 5567424
Depth (m) of log - each end: land log with other end anchored in 0.5 m water
Notes: Log length 2.75 m (9 ft)

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay, Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun Club
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 582025
Northing: 5567424
Depth (m) of log - each end: floating log with both ends anchored in 0.7 m water
Notes: Log length 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay, Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun Club
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 580716
Northing: 5565399
Depth (m) of log - each end: land log with other end anchored in 0.5 m water
Notes: Log length 3.05 m (10 ft)

CWSP WPT Basking Log Installation

Date: August 11, 2021
Site name: Armstrong Bay, Columbia Lake
Name(s) of installer: Lake Windermere Dist. Rod & Gun Club
Type of material used as basking structure: untreated cedar hydro pole
Easting: 11U 580716
Northing: 5565399
Depth (m) of log - each end: floating log with both ends anchored in 1 m water
Notes: Log length 3.05 m (10 ft)

Appendix 5. Poster soliciting volunteers to monitor the western painted turtle basking logs.

Appendix 6. Nest occupancy and nest success data from 2021 monitoring at osprey nests.

Nest No.	Location	Easting	Northing	Observation Date	Time	Nest occupancy	Nest successful
1	Old Mill in Donald	487568	5704145	2021-07-27	n/a	N	N
1	Old Mill in Donald	487568	5704145	2021-08-24	n/a	N	N
1	Old Mill in Donald	487568	5704145	2021-08-24	n/a	N	N
2	Bottom of Hartley Road, top of cell tower	498238	5692706	2021-07-27	n/a	N	N
3	Golden - LP Mill north end	501285	5684941	2021-07-01	n/a	N	N
4	Golden - LP Mill south end	501264	5684484	2021-07-01	n/a	N	N
5	13th Street S and 7th Ave in Town of Golden	502028	5682396	2021-05-13	1128	Y	Y
5	13th Street S and 7th Ave in Town of Golden	502028	5682396	2021-07-23	1907	N	N
5	13th Street S and 7th Ave in Town of Golden	502028	5682396	2021-08-23	1223	N	N
6	Hwy 95 S, at CP Railway Pond across from Day Road	504896	5679931	2021-05-12	1111	Y	Y
6	Hwy 95 S, at CP Railway Pond across from Day Road	504896	5679931	2021-07-23	2123	Y	Y
6	Hwy 95 S, at CP Railway Pond across from Day Road	504896	5679931	2021-08-23	1223	Y	Y
7	Hwy 95 S, Champagne Road off Hwy 95S	505039	5679727	2021-05-12	1112	N	N
7	Hwy 95 S, Champagne Road off Hwy 95S	505039	5679727	2021-07-23	1858	N	N
7	Hwy 95 S, Champagne Road off Hwy 95S	505039	5679727	2021-08-23	1123	N	N
8	Hwy 95 S, near Lou's Feed Store	506900	5676032	2021-05-12	1115	Y	Y
8	Hwy 95 S, near Lou's Feed Store	506900	5676032	2021-06-25	n/a	Y	Y
8	Hwy 95 S, near Lou's Feed Store	506900	5676032	2021-08-24	n/a	Y	Y
9	Hwy 95 S at Horse Creek North end, Austin Rd	507395	5673513	2021-05-12	1117	N	N
9	Hwy 95 S at Horse Creek North end, Austin Rd	507395	5673513	2021-07-23	1858	N	N
9	Hwy 95 S at Horse Creek North end, Austin Rd	507395	5673513	2021-08-23	1216	N	N
10	Horse Creek rock quarry site	507213	5673280	2021-05-12	1118	N	N
10	Horse Creek rock quarry site	507213	5673280	2021-07-23	1856	N	N
10	Horse Creek rock quarry site	507213	5673280	2021-08-23	1214	N	N
11	Hwy 95 S at Horse Creek South end	508317	5672306	2021-05-12	1120	Y	Y
11	Hwy 95 S at Horse Creek South end	508317	5672306	2021-07-23	1854	Y	Y
11	Hwy 95 S at Horse Creek South end	508317	5672306	2021-08-23	1210	Y	Y
12	Hwy 95 S, South of Nine Mile Slough	509511	5671022	2021-05-12	1123	Y	Y
12	Hwy 95 S, South of Nine Mile Slough	509511	5671022	2021-07-23	1853	N	N
12	Hwy 95 S, South of Nine Mile Slough	509511	5671022	2021-08-23	1207	N	N
13	Hwy 95 S; Hydro pole near VGSW colony at about 16kms	510210	5670318	2021-05-12	1125	Y	Y
13	Hwy 95 S Hydro pole near VGSW colony at about 16kms	510210	5670318	2021-07-23	1842	N	N
13	Hwy 95 S Hydro pole near VGSW colony at about 16kms	510210	5670318	2021-08-23	1156	N	N
14	Dickson Downs Rd at JMs home	510846	5669517	2021-05-12	1127	N	N
14	Dickson Downs Rd at JMs home	510846	5669517	2021-07-23	1839	N	N
14	Dickson Downs Rd at JMs home	510846	5669517	2021-08-23	1155	N	N
15	Hwy 95 S tree nest in Columbia Wetlands near Birchlands Creek	512774	5667948	2021-05-12	1133	U	U
15	Hwy 95 S tree nest in Columbia Wetlands near Birchlands Creek	512774	5667948	2021-07-23	1837	N	N
15	Hwy 95 S tree nest in Columbia Wetlands near Birchlands Creek	512774	5667948	2021-08-23	1150	N	N
16	Canadian Timberframers	513969	5667201	2021-05-12	1138	N	N
16	Canadian Timberframers	513969	5667201	2021-07-23	1836	N	N
16	Canadian Timberframers	513969	5667201	2021-08-23	1149	N	N
17	Hwy 95 S at McMurdo Slough	515333	5666384	2021-05-12	939	Y	Y
17	Hwy 95 S at McMurdo Slough	515333	5666384	2021-07-23	1830	N	N
17	Hwy 95 S at McMurdo Slough	515333	5666384	2021-08-23	1134	N	N
18	Hwy 95 S, on east side of McMurdo Slough	515360	5666382	2021-05-12	938	N	N
18	Hwy 95 S, on east side of McMurdo Slough	515360	5666382	2021-07-23	1830	N	N

18	Hwy 95 S, on east side of McMurdo Slough	515360	5666382	2021-08-23	1134	N	N
19	Columbia Valley B&B	515760	5665939	2021-05-12	938	N	N
19	Columbia Valley B&B	515760	5665939	2021-07-23	1829	N	N
19	Columbia Valley B&B	515760	5665939	2021-08-23	1132	N	N
20	Hwy 95 S, 1km south of Mons Road (25kms south of Golden)	517394	5664998	2021-05-12	935	Y	Y
20	Hwy 95 S, 1km south of Mons Road (25kms south of Golden)	517394	5664998	2021-07-23	1828	N	N
20	Hwy 95 S, 1km south of Mons Road (25kms south of Golden)	517394	5664998	2021-08-23	1130	N	N
21	Hwy 95S, ~26kms south of Golden (2677 Hwy95)	518702	5663866	2021-05-13	1651	Y	Y
21	Hwy 95S, ~26kms south of Golden (2677 Hwy95)	518702	5663866	2021-05-12	n/a	Y	Y
21	Hwy 95S, ~26kms south of Golden (2677 Hwy95)	518702	5663866	2021-08-24	1055	N	N
22	Hwy 95 S, ~28kms south of Golden	520568	5661842	2021-05-13	1656	Y	Y
22	Hwy 95 S, ~28kms south of Golden	520568	5661842	2021-07-22	1016	Y	Y
22	Hwy 95 S, ~28kms south of Golden	520568	5661842	2021-08-24	1115	U	Y
23	Hwy 95 S, just north of Parson Store	522450	5659924	2021-05-13	1700	Y	Y
23	Hwy 95 S, just north of Parson Store	522450	5659924	2021-08-02	945	Y	Y
23	Hwy 95 S, just north of Parson Store	522450	5659924	2021-08-24	1125	U	Y
24	Hwy 95 S, Timber Inn, Parson (MRC Lodge)	524531	5658477	2021-05-13	1705	Y	Y
24	Hwy 95 S, Timber Inn, Parson (MRC Lodge)	524531	5658477	2021-07-22	1553	Y	Y
24	Hwy 95 S, Timber Inn, Parson (MRC Lodge)	524531	5658477	2021-08-24	1132	U	Y
25	Hwy 95 S, south of Timber Inn	524988	5658171	2021-05-13	1707	Y	Y
25	Hwy 95 S, south of Timber Inn	524988	5658171	2021-07-22	1030	Y	Y
25	Hwy 95 S, south of Timber Inn	524988	5658171	2021-08-24	1138	U	Y
26	Hwy 95 S, South of Parson School	526207	5657242	2021-05-13	1711	Y	Y
26	Hwy 95 S, South of Parson School	526207	5657242	2021-07-22	1032	Y	Y
26	Hwy 95 S, South of Parson School	526207	5657242	2021-08-24	1144	U	U
27	Hwy 95 S near HGs house, about 250m above Hwy in field.	527816	5655758	2021-05-13	1715	N	N
27	Hwy 95 S near HGs house, about 250m above Hwy in field.	527816	5655758	2021-07-22	1035	N	N
27	Hwy 95 S near HGs house, about 250m above Hwy in field.	527816	5655758	2021-08-24	1153	N	N
28	Hwy 95 - south end of cattle pasture	530818	5653701	2021-08-24	n/a	N	N
29	Hwy 95 S - 1	530941	5653663	2021-05-13	1719	N	N
29	Hwy 95 S - 1	530941	5653663	2021-07-22	1534	N	N
29	Hwy 95 S - 1	530941	5653663	2021-08-24	1158	N	N
30	Hwy 95 S, Quinn Creek Campground	531948	5653113	2021-05-13	1722	Y	Y
30	Hwy 95 S, Quinn Creek Campground	531948	5653113	2021-07-22	1333	Y	Y
30	Hwy 95 S, Quinn Creek Campground	531948	5653113	2021-08-24	1207	Y	Y
31	Hwy 95 S, McKeeman's	534149	5651579	2021-05-13	1726	Y	Y
31	Hwy 95 S, McKeeman's	534149	5651579	2021-07-22	1325	Y	Y
31	Hwy 95 S, McKeeman's	534149	5651579	2021-08-24	1214	U	Y
32	Hwy 95 S - 2	536073	5650604	2021-05-13	1730	Y	Y
32	Hwy 95 S - 2	536073	5650604	2021-07-22	1048	N	N
32	Hwy 95 S - 2	536073	5650604	2021-08-24	1218	N	N
33	Hwy 95 S, Ben Hynes Loop Rd	537904	5648337	2021-05-13	1735	Y	Y
33	Hwy 95 S, Ben Hynes Loop Rd	537904	5648337	2021-07-22	1054	Y	Y
33	Hwy 95 S, Ben Hynes Loop Rd	537904	5648337	2021-08-24	1225	Y	Y
34	Near Westside Rd xing in Spilli - up hill off Hwy 95 S ~400m	544800	5639788	2021-05-13	1749	Y	Y
34	Near Westside Rd xing in Spilli - up hill off Hwy 95 S ~400m	544800	5639788	2021-07-22	1108	N	N
34	Near Westside Rd xing in Spilli - up hill off Hwy 95 S ~400m	544800	5639788	2021-08-24	1250	N	N
35	Spill xing east end	544566	5639534	2021-05-13	1755	N	N
35	Spill xing east end	544566	5639534	2021-07-22	1108	N	N

35	Spill xing east end	544566	5639534	2021-08-24	1300	N	N
36	Brisco Pole Treatment Facility	550969	5630693	2021-05-13	1807	Y	Y
36	Brisco Pole Treatment Facility	550969	5630693	2021-07-22	1123	Y	Y
36	Brisco Pole Treatment Facility	550969	5630693	2021-08-24	1315	N	U
37	Trescher's field near barn	549912	5630945	2021-05-13	1815	Y	Y
37	Trescher's field near barn	549912	5630945	2021-07-22	1125	Y	Y
37	Trescher's field near barn	549912	5630945	2021-08-24	1326	N	U
38	Trescher's field west, on hydro line	549749	5630689	2021-05-13	1818	Y	Y
38	Trescher's field west, on hydro line	549749	5630689	2021-07-18	1127	Y	Y
38	Trescher's field west, on hydro line	549749	5630689	2021-08-24	1326	N	N
39	Edgewater	561204	5615921	2021-07-22	1148	N	N
40	Radium xing	563761	5608098	2021-05-13	1846	N	N
40	Radium xing	563761	5608098	2021-07-22	1155	N	N
41	Athalmer - Pete's marina	569469	5596354	2021-05-13	1905	N	N
41	Athalmer - Pete's marina	569469	5596354	2021-07-22	1217	N	N
41	Athalmer - Pete's marina	569469	5596354	2021-08-24	1621	N	N
42	James Chabot Provincial Park	569268	5596096	2021-05-13	1901	Y	Y
42	James Chabot Provincial Park	569268	5596096	2021-07-22	1211	Y	Y
42	James Chabot Provincial Park	569268	5596096	2021-08-24	1623	N	N
43	Between Rona and wetlands	569192	5596455	2021-08-24	1630	N	N
44	Near Rona in Invermere - off 7th Ave	568847	5596040	2021-05-13	1912	Y	Y
44	Near Rona in Invermere - off 7th Ave	568847	5596040	2021-07-22	1222	Y	Y
44	Near Rona in Invermere - off 7th Ave	568847	5596040	2021-08-24	1628	Y	Y
45	Nest pole near LWA office/prov gov't offices	568907	5595772	2021-08-24	1630	N	N
46	Nest pole south of LWA office/prov gov't offices	569014	5595633	2021-08-24	1808	N	N
47	Downtown Invermere, behind arena	569141	5595225	2021-05-13	1918	Y	Y
47	Downtown Invermere, behind arena	569141	5595225	2021-07-22	1238	N	N
47	Downtown Invermere, behind arena	569141	5595225	2021-08-24	1641	N	N
48	Dorothy Lake	569084	5594499	2021-05-13	1923	Y	Y
48	Dorothy Lake	569084	5594499	2021-07-22	1231	Y	Y
48	Dorothy Lake	569084	5594499	2021-08-24	1651	Y	Y
49	Dorothy Lake - NE end	569135	5594673	2021-08-24	1651	N	N
50	RDEK offices - Windermere Loop Rd	572650	5593879	2021-05-13	1949	Y	Y
50	RDEK offices - Windermere Loop Rd	572650	5593879	2021-07-22	1249	Y	Y
50	RDEK offices - Windermere Loop Rd	572650	5593879	2021-08-24	1534	Y	U
51	North of Winderbury Nursery	572182	5591459	2021-05-13	1955	Y	N
51	North of Winderbury Nursery	572182	5591459	2021-07-22	1257	N	N
51	North of Winderbury Nursery	572182	5591459	2021-08-24	1540	N	N
52	Behind Winderbury Nursery	572223	5590766	2021-05-13	1958	N	N
52	Behind Winderbury Nursery	572223	5590766	2021-07-22	1300	N	N
52	Behind Winderbury Nursery	572223	5590766	2021-08-24	1545	N	N
53	Akisqnuk Offices - across the street	573056	5590459	2021-05-13	2021	Y	Y
53	Akisqnuk Offices - across the street	573056	5590459	2021-07-22	1315	Y	Y
53	Akisqnuk Offices - across the street	573056	5590459	2021-08-24	1612	Y	Y
54	1858 Victoria Avenue	572131	5589834	2021-05-13	2004	N	N
54	1858 Victoria Avenue	572131	5589834	2021-07-22	1313	N	N
54	1858 Victoria Avenue	572131	5589834	2021-08-24	1600	N	N
55	Wilmai Place	572387	5589995	2021-05-13	2016	Y	Y
55	Wilmai Place	572387	5589995	2021-07-22	1314	Y	Y
55	Wilmai Place	572387	5589995	2021-08-24	1604	N	N
56	Windermere Creek mouth	571559	5589936	2021-05-13	2006	N	N
56	Windermere Creek mouth	571559	5589936	2021-07-22	1314	N	N
56	Windermere Creek mouth	571559	5589936	2021-08-24	n/a	N	N
57	Akisqnuk Lakeshore Resort	575280	5587220	2021-05-13	n/a	Y	Y
57	Akisqnuk Lakeshore Resort	575280	5587220	2021-07-22	1322	n/a	n/a
57	Akisqnuk Lakeshore Resort	575280	5587220	2021-08-25	n/a	n/a	n/a

58	Old tree nest, west side of Hwy	576455	5586835	2021-05-13	2036	Y	Y
58	Old tree nest, west side of Hwy	576455	5586835	2021-07-22	1419	N	N
58	Old tree nest, west side of Hwy	576455	5586835	2021-08-25	1049	N	N
59	~400m N of #3 Rd, on Hwy 95	576820	5586340	2021-05-13	2042	N	N
59	~400m N of #3 Rd, on Hwy 95	576820	5586340	2021-07-22	1324	N	N
59	~400m N of #3 Rd, on Hwy 95	576820	5586340	2021-08-25	1101	N	N
60	#3 Rd on east side of Hwy 95 - Akisqnuk lands	577147	5585838	2021-05-13	2051	Y	Y
60	#3 Rd on east side of Hwy 95 - Akisqnuk lands	577147	5585838	2021-07-22	1330	Y	Y
60	#3 Rd on east side of Hwy 95 - Akisqnuk lands	577147	5585838	2021-08-25	1109	Y	Y
61	North of Funtasia, west side of Hwy 95	578167	5583967	2021-05-13	2054	Y	Y
61	North of Funtasia, west side of Hwy 95	578167	5583967	2021-07-22	1409	Y	Y
61	North of Funtasia, west side of Hwy 95	578167	5583967	2021-08-25	1115	Y	Y
62	Funtasia mini golf course	581331	5577284	2021-05-13	2103	Y	Y
62	Funtasia mini golf course	581331	5577284	2021-07-22	1344	Y	Y
62	Funtasia mini golf course	581331	5577284	2021-08-25	1127	Y	Y
63	Fairmont Airport 1	580121	5574869	2021-05-13	2112	N	N
63	Fairmont Airport 1	580121	5574869	2021-07-22	1352	N	N
63	Fairmont Airport 1	580121	5574869	2021-08-25	1133	N	N
64	Fairmont Airport 2	580100	5575164	2021-05-13	2112	Y	Y
64	Fairmont Airport 2	580100	5575164	2021-07-22	1352	Y	Y
64	Fairmont Airport 2	580100	5575164	2021-08-25	1133	N	Y
65	Columere marina - Columbia Lake	580325	5571480	2021-07-25	n/a	N	N
66	Lot 48 Nest 2	581933	5570426	2021-07-25	n/a	Y	Y
66	Lot 48 Nest 2	581933	5570426	2021-08-25	n/a	Y	Y
67	Lot 48 Nest 1	582017	5570120	2021-07-25	n/a	N	N
68	Private property - SW end Columbia Lk - boat access only for viewing	581153	5563175	2021-06-29	n/a	N	N
68	Private property - SW end Columbia Lk - boat access only for viewing	581153	5563175	2021-07-25	n/a	Y	Y
68	Private property - SW end Columbia Lk - boat access only for viewing	581153	5563175	2021-08-25	1225	N	N
69	Pole 53-02 Hydro Line above west side of Columbia Lk	580828	5565189	2021-07-25	n/a	N	U
70	Pole 54-04 Hydro Line above west side of Columbia Lk	580912	5559630	2021-07-25	n/a	Y	Y
70	Pole 54-04 Hydro Line above west side of Columbia Lk	580912	5559630	2021-08-25	n/a	N	N
71	Pole 53-04 Hydro Line above west side of Columbia Lk	580941	5557777	2021-07-30	n/a	N	N
71	Pole 53-04 Hydro Line above west side of Columbia Lk	580941	5557777	2021-08-25	1230	N	N
72	Canal Flats	585723	5555701	2021-07-25	n/a	Y	Y
72	Canal Flats	585723	5555701	2021-08-25	1156	N	N

Appendix 7. Soliciting American badger sighting information using this post on social media.

American badger sightings wanted for the Columbia Valley

Submitted by Rachel Darvill

Did you know that there are American badgers living in the Columbia Valley? Southeastern British Columbia is the northern extent of where American badgers live. Unfortunately, the American badger is an endangered species and needs our help!

Badgers have stocky and flattened bodies with short, powerful legs. As few as one hundred mature badgers live in the East Kootenay region. Here they are vulnerable to being wiped out from increasing threats like roadkill, the loss of open habitat needed, and urban development. But, together we can work to keep them living here for generations to come. There is a new project supported by the Columbia Wetlands Stewardship Partners (CWSP) that is currently taking observational reports from the public - recording all badger roadkill sites, dens, burrows, and dead or alive sightings.

Leading project biologist Rachel Darvill states, "We are interested in knowing where American badgers are using dens in the Columbia Valley, especially where areas of high suitable badger habitat overlap with public crown land. These areas can be conserved through various regulations, but first we need to identify where those important areas are."

Badgers have large home ranges with hundreds of different burrows per individual. The burrows have an entrance that resembles a large elliptical hole, often with a mound of dirt at the entrance. Badgers often change locations daily and reuse burrows from year to year, making it important to ensure that unoccupied burrows are not destroyed. Badgers use dens for denning, foraging, resting and as a source of shelter.

American badger wanders alongside riverbank.
Submitted photo

"We are also interested if any badger denning and burrow sites are found in areas that we have already designated as wildlife corridors (through Kootenay Connect) that are important to other large ranging species like grizzly bear and elk," says Darvill.

"It has been shown that soil and prey availability are the key defining features or requirements for badger habitat," says Darvill. Their primary food source in our region are Columbian ground squirrels (which are often locally referred to as gophers). "Like badgers, Columbian ground squirrels also live in burrows, and at first glance it can be confusing to distinguish these holes from the ones badgers make," says Darvill.

Do you know where a badger lives, where a badger hole exists, or have you seen a badger in the Columbia Valley before? If so, please let us know by contacting the CWSP with your observations at badgersightings@gmail.com. This project is a partnership with Kootenay Connect and is financially supported by Environment and Climate Change Canada (ECCC) through the Canada Nature Fund with equal matching funding from local partners.

Appendix 8. Newspaper article to solicit public sighting information on American badgers, appearing in the Columbia Valley Pioneer on March 3, 20