Elk Valley Wetland Creation and Restoration - Hosmer

FWCP Project No. COL-F18-2379

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Fish and Wildlife Compensation Program - Columbia
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Executive Summary

The purpose of the Elk Valley Wetland Creation and Restoration - Hosmer agreement (FWCP Project No. COL-F18-W-2379) is to provide resources to enable the Nature Conservancy of Canada (NCC) to continue restoring and enhancing wetland and riparian habitat on conservation properties in the Columbia Basin.

The wetland creation and restoration project took place from April 11, 2017 to March 31, 2018 on the Elk River Heritage Conservation Area north of Hosmer in the Elk Valley. Funding in the amount of $55,733.50 was designated to conduct wetland creation and restoration activities, specifically in areas of an inactive gravel quarry near Hosmer BC. These areas are being restored to provide riparian and wetland ecosystems that support a diversity of waterfowl, shorebird species, reptiles and amphibians. Restoration techniques improve habitat for the rare badger, grizzly bear, Townsend's big-eared bat, western painted turtle, and western toad. The heavy equipment construction began on October 23, 2017 and was completed on November 7, 2017. Four-large wetlands were built from the previously mined area as part of the restoration project. Restored wetlands and associated riparian and upland areas totaled 4.9 ha in size. The restored sites were seeded with a native riparian grass mix above the high water mark and planted with live cottonwood stakes between October 31st and November 7, 2017.

A component of the project is to work with partners (Elk River Alliance) to implement an educational interpretive program on the importance of riparian and wetland ecosystems in the Elk Valley and their critical role, particularly in attenuating floods and providing wildlife habitat. Community engagement included Elk River Alliance (ERA) staff assisting with surveying and measuring features during the wetland design stage and coordinating volunteer events. The ERA also delivered a BC Wildlife Federation "Wetlandkeeper Course" in Fernie from October 12-14, 2018, developed and submitted articles themed "Wild about Wetlands" to local media, and are coordinating a spring 2018 volunteer event with College of the Rockies, Mountain Adventure Skills Training Program students. An interpretive kiosk, bench and short trail leading to the restored wetland is in the process of being installed once weather permits.

Nature Conservancy of Canada

The Nature Conservancy of Canada is a private non-profit organization working for the direct protection of natural habitats and wild spaces across this country. Since 1962, NCC and our partners have protected over 2.8 million acres of ecologically significant land and water for its intrinsic value and for future generations. Almost 1 million of these protected acres are located in British Columbia. It is the goal of NCC to protect, manage, and where appropriate, restore natural areas so they can sustain the ecosystems and species that define them.

Within the Columbia Basin, NCC provides protection for over 190,000 acres of land, including landscapes such as: at-risk grasslands, unusual geological formations, montane regions and precious valley bottom habitat. NCC's properties in the Basin conserve vital habitat for several species at risk (e.g. Badger, Grizzly Gear, Mountain Caribou, Bull Trout and Rocky Mountain Bighorn Sheep).

Table of Contents

List of Figures

Elk Valley Wetland Creation and Restoration - Hosmer

Introduction

Wetland and stream restoration projects are proposed to help compensate for similar habitats that were inundated by reservoirs constructed along the Columbia River in the Kootenay Region. The project aligns with the Columbia Riparian and Wetlands Action Plan. The priority action in the Plan is to restore and create wetland and riparian area habitat in this focal area, where feasible to address impacted, degraded or lost habitat (including but not limited to gravel pits where they exist on the floodplain, oxbows and side channels).

A wetland restoration project was identified on the Elk Valley Heritage conservation area north of Hosmer. In 2015, the Nature Conservancy of Canada (NCC) worked with Tom Biebighauser (wetland specialist) and Robin Annschild (wetland restoration project manager) to design wetland restoration projects at the Wilson Lake gravel site near Hosmer, British Columbia. NCC and project partners completed the project to restore portions of the existing gravel quarry that are not being actively mined on the NCC's Elk Valley Heritage Conservation Area.

Goals & Objectives

Summary report of wetland creation prescription and recommendations provided by wetland specialist.

Objectives	Status	Comments
Identified wetland restoration projects at Elk Valley – Hosmer site on NCC'S Elk Valley Heritage Conservation Area;	Complete	In 2015, four wetland projects were designed; Two ephemeral and two emergent wetlands.
Implement wetland creation and restoration projects at depleted gravel quarry north of Hosmer;	Complete	Construction of wetlands and riparian uplands took place between 23 October and 07 November, 2017.
Provide habitat for a diversity of waterfowl and shorebird species;	Complete	Soil mounds, large boulders, and coarse woody debris were installed to provide basking and loafing sites. Topsoil was spread into the wetlands to provide a substrate for aquatic plants to flourish hat waterfowl can forage on. The ephemeral nature of two sites will allow mud flats for shorebirds to forage on invertebrates.
Increase habitat for rare species;	Complete	Stockpiled topsoil was spread over the entire wetland restoration site and then loosened in the upland areas to provide burrowing sites for small mammals, the prey of the endangered badger; Ephemeral wetlands, coarse woody debris, and rock piles provide habitat for the Western toad.
Naturally appearing and functioning wetlands and streams would be restored to control erosion, recharge groundwater, and reduce flooding.	Complete	Long term monitoring will occur to determine effectiveness of wetland restoration prescription and techniques.

Study Area

The Hosmer wetland project site is located within a gravel quarry complex east of Highway 3 between the communities of Sparwood and Fernie and 6 km north of the settlement of Hosmer in the East Kootenay region of BC (Figure 1).

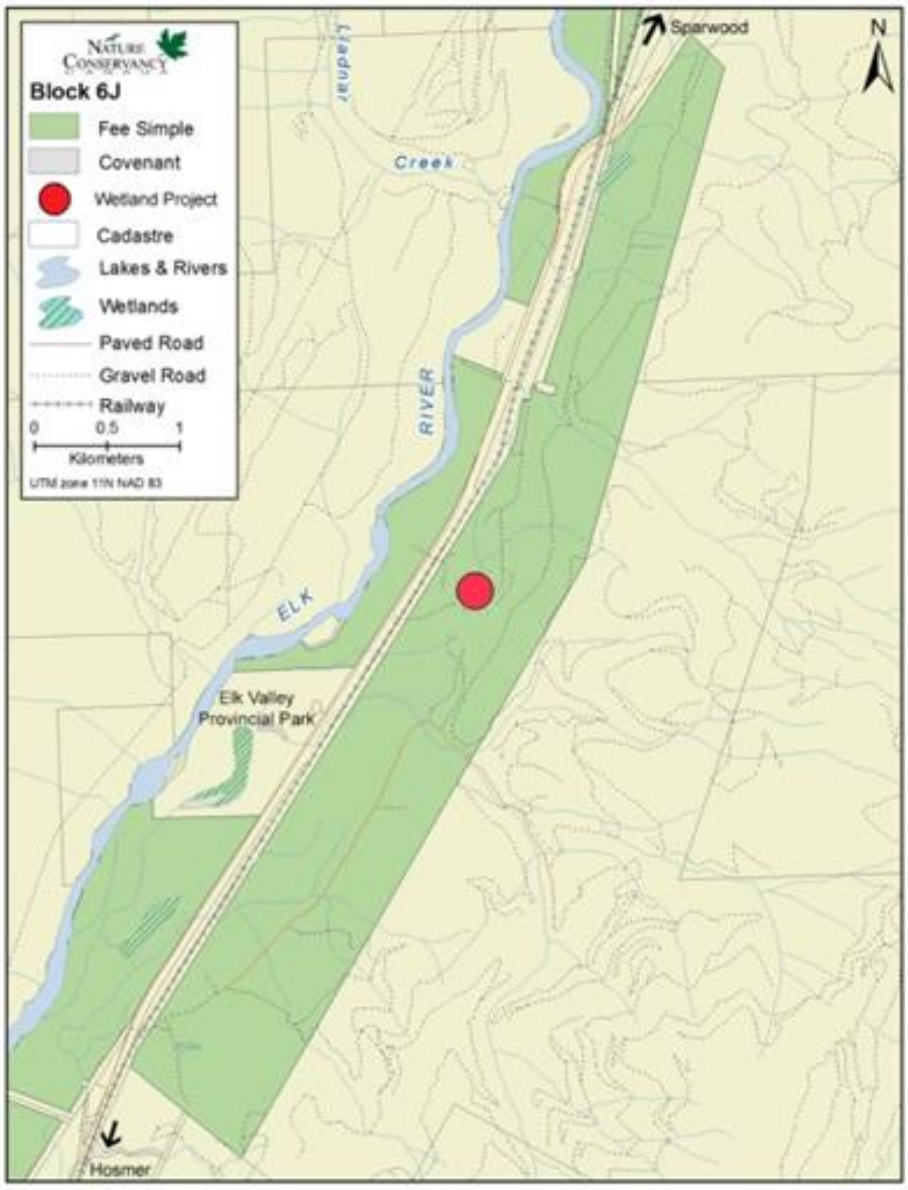

Figure 1. Hosmer wetland creation and restoration project location on Nature Conservancy of Canada's Elk Valley Heritage Conservation Area north of Hosmer BC.

Methods

The project consists of two main goals; 1) to create and restore wetlands and riparian ecosystems in portions of an inactive gravel pit on the Elk Valley floodplain, and 2) to provide education and interpretive programs about the importance of wetland and riparian ecosystems to local residents.

Wetland creation and restoration:

An overview report prepared by wetland specialists in 2015 is available for review. In addition, several detailed wetland restoration design plans were developed for this project by qualified professionals and are available upon request. Wetland specialists were employed to oversee heavy equipment operators to achieve the desired restoration objective for each wetland sub-project (4 in total) in the larger project area. The wetlands were made shallow, and have gradual, sloping sides. The wetlands will be supplied naturally with rainfall, or surface runoff. No dams, pumps, pipes, or aerators were used. The wetlands were built so they do not block streams, flood trails, roads, forests, or adjacent private property. For a more detailed description of Methods see *Fiorentino Gravel Pit Wetland Restoration Project* report (Biebighauser 2015).

Areas around the wetland restoration site were surveyed and treated for invasive plants before construction began. Follow up surveys by East Kootenay Invasive Species Council contractors will be conducted and treatments will be used where necessary in 2018.

Education and Interpretation:

A component of the project is to work with partners, Elk River Alliance (ERA) to implement an educational interpretive program on the importance of riparian and wetland ecosystems in the Elk Valley and their critical role, particularly in attenuating floods and providing wildlife habitat.

Objectives for the educational component include:

1. Community citizens can define the characteristics of a healthy, functioning wetland.

2. Appreciate and understand the cumulative effect of wetlands disappearing on the resilience and health of the watershed.

3. Learn skills to help enhance and restore wetlands in the Elk River Valley watershed.

4. Add beauty to the landscape and increase opportunities for recreation and education.

Results

Wetland creation and restoration:

The gravel pit was bordered by large piles of stockpiled topsoil, up to 9-meters high. These piles were spread over the entire restored landscape and topsoil was spread in the wetlands to promote the growth of aquatic plants used by waterfowl for food. The uplands were shaped into naturally appearing hills and valleys where shrubs and trees were planted. One of the key steps to restoring the mined area involved loosening these compacted soils. The need was identified when the project was being designed. The burrows of Columbian ground squirrels and badgers were found only in one small location adjacent to the restoration site where several loads of soil had been dumped and not spread and compacted with heavy equipment. The amount of compaction was tested in the piles by a penetrometer, finding less than 50 lbs square inch of compaction. Soils were then tested over the planned restoration area, and it was found that compaction averaged over 300 lbs/inch^2. Columbian ground squirrels were not found burrowing into these compacted soils. The compacted soils were

loosened as part of the project to improve habitat for the Columbian ground squirrel, and the badger. The loosened soils would also absorb runoff, and provide ideal growing conditions for trees, shrubs, and forbs.

Four-large wetlands were built from the mined area as part of the restoration project totaling 4.9 hectares. The wetlands were given irregular shapes so they would appear to have been formed by natural processes. Mounds of soil were placed in the wetlands to appear like muskrat houses and beaver lodges. Logs were placed in the wetlands in all depths of water. It is anticipated that the mounds and logs will be used as basking and loafing sites for waterfowl and reptiles. A number of dead trees were placed vertically in and around the wetlands providing perching and resting sites that will eventually become coarse woody debris around the perimeter of the wetlands. Piles of large boulders were placed in the restored hillsides and wetlands so that Western toads would have places for cover.

The overflow from the entire restoration project was restored to flow into two natural streams. The elevation of the two outlets was set to be 35-cm lower than the elevation of the staging and loading area on the adjacent active quarry.

All upland sites above the high water mark were seeded with a native riparian grass seed blend. All other disturbed areas were seeded with winter wheat to reduce the chance of non-native species being established.

The restored wetlands and riparian uplands will reduce flooding and recharge groundwater. The wetlands will capture runoff and allow the water to soak into the ground.

Education and Interpretation:

1. Community Engagement:

    - ERA Project Coordinator - Restoration and Stewardship Project, Beth Millions (MSc Environmental Science) and ERA Executive Director, Lee-Anne Walker worked collectively 50 hours assisting Tom Biebighauser between October 23 and November 3 with measuring the proposed wetland spillway, staking the high water mark, sourcing live stake collection sites, and coordinating community engagement activities.

    - On October 31, 2017 ERA coordinated 9 volunteers to seed the Hosmer Wetland, collect cut and plant 500+ live willow cuttings along the perimeter of the high water mark, and apply straw mulch to the spillways. Volunteers dedicated 63 hours during these days.

2. Education and Outreach:

    - Delivered BC Wildlife Federation "Wetlandkeeper Course" in Fernie at the College of the Rockies and in the field at West Fernie and McDougall Wetlands in Fernie, October 12-14, 2018. Certified ten participants, some of whom volunteered with the ERA community engagement activities at Hosmer Wetland later in October-November.

    - Utilized ERA Wetlandkeeper instructional kit and supplies (in-kind).

- Developed and distributed 6 articles under the theme 'Wild about Wetlands' entitled: "Beavers: Friend or Foe? (Nov. 8/2017), "Transforming Old Gravel Pits into Wetlands requires a Team Effort" (Jan. 12/2018), "Celebrating and Creating Wetlands: World Wetland Day" (Jan. 25/2018), "Wetland and Species at Risk" (February 2018), "Wetland Plants Perfect for Water" (March 2018), "Wetlands Are Flood Solutions" (March 2018)

- Coordinated with the College of the Rockies, Mountain Adventure Skills Training Program (MAST) to engage 18 students in an action project to help with native planting in Hosmer spring 2018 when weather permits.

- Kiosk has been planned and will be installed as soon as weather/ground conditions permit. Additionally, NCC will have a short segment of trail constructed extending from the nearby Elk Valley trail leading to the interpretive site and a table will be installed.

- NCC and ERA jointly released a press release that was published in the Fernie Free Press and E-Know highlighting the partnerships and importance of wetland restoration in the Elk Valley (15 Jan 2018). https://www.e-know.ca/regions/elk-valley/bringing-wetland-back-requires-team-effort/

- NCC representative was interviewed by The Drive FM radio station highlighting the importance of wetland conservation and restoration (05 Dec 2017).

- Monitoring program to assess the effectiveness of wetland construction and stewardship prescription to start up once the snow melts in April.

- NCC posted "A thirst for wetlands" on its national website highlighting the project and identifying the partners involved, including the FWCP.

  http://www.natureconservancy.ca/en/where-we-work/british-columbia/stories/a-thrist-for-wetlands.html

Discussion

The gravel pit was opened in 1999 under a land use permit by Tembec. Spruce, cottonwood and aspen trees were pushed to the side and the topsoil scraped, salvaged and stockpiled in large berms. Gravel was mined and shipped to homeowners, and businesses in the region to build roads, driveways, houses and septic systems. The Nature Conservancy of Canada acquired the land in 2006 and has worked with many partners to restore a naturally appearing area with wetlands and riparian uplands from a large gravel pit with vertical banks.

The reclamation of the gravel quarry required by the permit provided by the Ministry of Energy and Mines (MoEm) states that the final land use shall be Lake and Wetlands, Wildlife Habitat, and Aquatic Habitat. Many reclamation projects, when completed, simply involve spreading soil over mined ground and re-vegetating with domestic seed mix. The lessee, Fiorentino Brothers Contracting Ltd. was used to complete the project and Jim Fiorentino agreed to donate up to one-half of the cost of heavy equipment needed to restore a portion of the gravel pit where gravel had been removed and was no longer being mined. The efforts undertaken by the lessee, NCC and partners has provided wildlife and

wetland habitat above and beyond the minimum required under the MoEM permit. Long-term monitoring and continued enhancement efforts will continue to ensure that as the gravel quarry operation is phased out that the reclamation provides benefits to the wildlife and ecosystems along the Elk River floodplain.

Recommendations

Long-term monitoring will be conducted to determine the efficacy of wetland restoration techniques and prescription to ensure that the objectives of the project are being achieved.

Monitoring will also include tracking any priority 1 invasive species and manage where necessary.

Several actions are recommended to improve wildlife and wetland habitat on portions of the Wilson Lake Gravel Pit that are no longer being mined (adjacent to this site) and this site has been recommended for restoration in 2018. Conditional funding has been approved by FWCP conduct a variety of techniques that would improve habitat for waterfowl, waterbirds, and several other wildlife species associated with wetlands and riparian areas in the Elk Valley (Biebighauser 2015).

Map

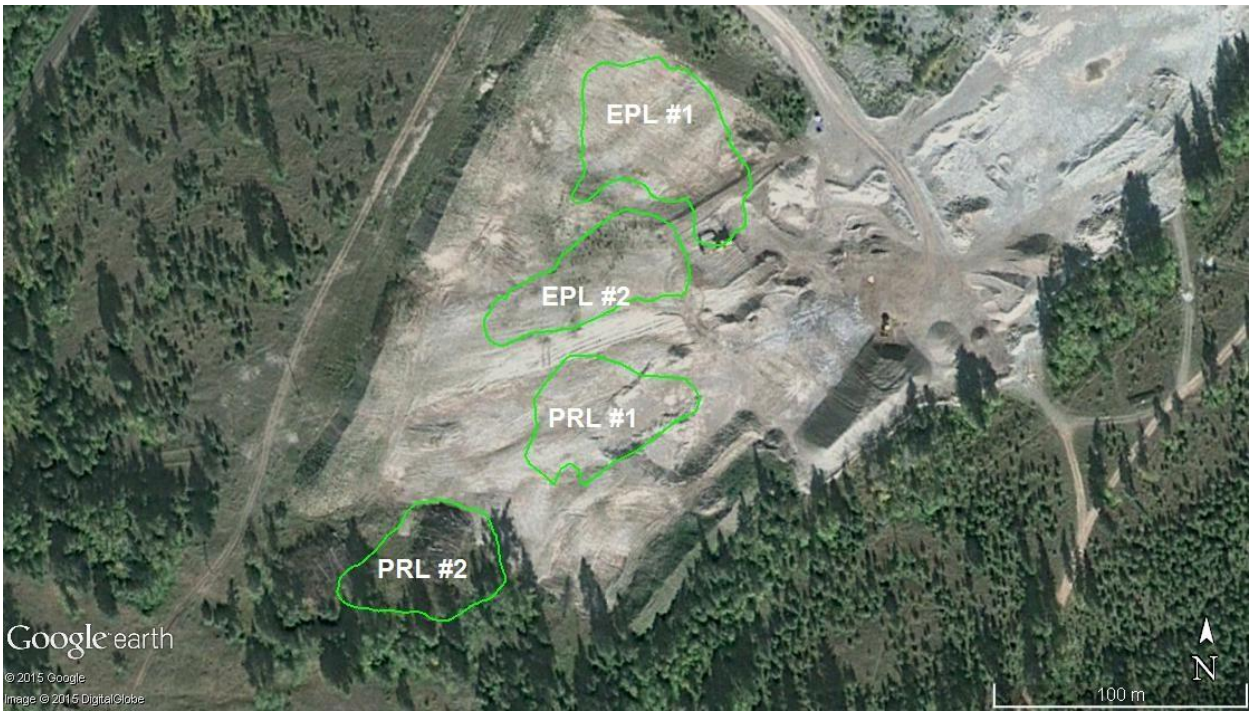

Figure 2. Map of southern portion of gravel quarry no longer being mined for gravel where four wetlands were constructed in 2017.

References

Biebighauser, T. 2015. Fiorentino Gravel Pit Wetland Restoration Projects. Unpublished report prepared for Nature Conservancy of Canada. 22 pgs.

Acknowledgements

The Nature Conservancy of Canada would like to acknowledge the financial support of the Fish and Wildlife Compensation Program on behalf of its program partners BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and public stakeholders.

Appendix. Photos

Figure 3. Photo of inactive gravel quarry on NCC's Elk Valley Heritage conservation area where wetland restoration took place, September 2015.

Figure 4. Overview photo of wetland restoration area before work was started in October on NCC's Elk Valley Heritage conservation area, August 08, 2017. Note heavy smoke from wildfires burning in the region.

Figure 5. Initial test pits to start the wetland restoration project on NCC's Elk Valley Heritage conservation area, October 23, 2017 near Hosmer, BC.

Figure 6. Completed wetland restoration of perennial wetlands PRL#1 and PRL#2 on October 31, 2017, Hosmer BC.

Figure 7. Pre- and post-restoration photos looking south towards perennial wetlands PRL#1 and PRL#2, October 31, 2017, Hosmer BC.