

Advancing Wetland Capacity and Stewardship

Project No: PEA-F21-W-3197 [Year 4 of 10+]

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Wetlands Education Program

BC Wildlife Federation

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From the reporting period: April 1st, 2020 to February 11th, 2022

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Executive Summary

Beginning April 1st, 2020, the BC Wildlife Federation's (BCWF) Wetlands Education Program successfully delivered programming in the Peace region to fulfill commitments made within the FWCP proposal "Advancing Wetland Capacity and Stewardship" (PEA-F21-W-3197). Due to safety concerns surrounding COVID-19, workshop dates were postponed until workshops could be safely conducted in-person, as virtual workshops would not have provided as great of a benefit to the communities and were difficult due to limited access to Wi-Fi and technology. The workshops were hosted for Doig River First Nation, the Kwadacha Nation and McLeod Lake Indian Band, and focused on enhancing wetland plant identification, inventory, restoration, and classification capacity for First Nation community members, Land Guardians and Technicians. This training will build upon capacity and partnerships developed in previous years.

BCWF's Wetlands Program also successfully constructed a 150m² demonstration wetland at Mackenzie Secondary School in Mackenzie, BC. Students and school staff were engaged during construction, and the main goal for the project is to provide students with an outdoor learning lab for STEM (Science, Technology, Engineering, Mathematics) education, which would give them unparalleled opportunities to investigate animals, plants, soils, and water through hands-on, experiential learning.

These workshops and projects in this region have led to lasting partnerships and future workshop opportunities, which allows for the continued support and building the capacity of local stewards.

The following is a quick summary of the programming results:

- Trained a total of 21 community members, from Doig River First Nation, McLeod Lake Indian Band and Kwadacha Nation, through the Doig River Map our Marshes Workshop, Mackenzie Wetland Restoration Workshop, and the Kwadacha Wetland Plant ID Workshop.
- Engaged 64 students and several school staff during the construction of a 150m² liner wetland at Mackenzie Secondary School
- Identified potential future restoration sites in partnership with McLeod Lake Indian Band and the District of Mackenzie
- Formed a foundational relationship with partnering Nations to further wetland conservation and restoration within their traditional territories

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1.0 Introduction

In comparison to many other ecosystems, the benefits from wetlands are exceptionally large relative to their size (MacKenzie & Shaw, 1999). Based on one commonly referenced study, the market and non-market values of wetland goods and services (e.g., climate regulation, nutrient cycling, and food production) are valued at \$19,580 hectare/year (Costanza et al., 1997), which extrapolates to approximately \$100 billion/year in BC (Millennium Ecosystem Assessment, 2010). More recent studies have indicated a value of about \$1.8 million/km² per year and a median value of \$91,000/km², especially for coastal areas (Sun & Carson, 2020). When total economic values are considered, wetlands often provide greater economic returns than when the land is converted for other uses (Millennium Ecosystem Assessment, 2005).

However, in the Peace Basin, the abundance and distribution of wetland habitat have been significantly altered by dams and subsequent changes to flood regimes. Reservoir creation eliminated extensive floodplain areas along the basin. (Peace Basin Riparian and Wetlands Action Plan, 2020). In particular, the Williston Reservoir continues to cause substantial impacts to wetland ecosystems that border the reservoir due to erosive forces along the shore and eroding tributaries. The Peace Region directly east of the Williston Reservoir and sections along the southern tip of the Williston Reservoir are identified as areas of Continental Significance for waterfowl habitat by the North American Waterfowl Management Plan, and both these regions are witnessing increased industrial development pressures and agricultural drainage which have further implications to wetlands within this region (Davidson & Dawson, 1990).

The FWCP's Riparian and Wetlands Action Plan intends to "restore or enhance the functioning of riparian and wetland ecosystems through habitat improvements, reducing threats, and encouraging compatible uses" (2020). Due to often small and/or diminishing environmental budgets from provincial and federal governments, the conservation of wetlands relies heavily on the local stewardship initiatives of private landowners, First Nations, non-profit organizations and other individuals and groups. In 2017, BCWF's Wetlands Education Program (WEP) began an initiative to build the capacity of Peace residents to protect, enhance, and restore wetlands through a Wetlandkeepers workshop. This initiative was, in part, instigated by Dan Boullion (past FWCP coordinator) who asked if wetland programming could be brought to the Peace Region after seeing BCWF's initiatives in the Columbia Region enhance local capacity and engagement in wetland projects. In 2018, BCWF hosted five workshops/outreach events, facilitated meetings, and created nine restoration prescriptions for areas in the Peace region. As a result, restoration has taken place at two locations: Morfee Elementary school and Del Rio well pad. In 2019 the WEP team continued to deliver quality wetland stewardship and restoration training to Peace region community members with a focus on remote and Indigenous communities who otherwise may not have training opportunities.

2.0 Goals and Objectives

Goals

1. Provide three high quality wetlands workshops in Fort Ware, Mackenzie, and Doig River, tailored to the needs of the partnering communities, to enhance the capacity of Peace Region residents and First Nations to classify wetlands, assess their health, and identify potential restoration sites. Train a minimum of 25 participants through the delivery of these workshops.
2. Create a naturally appearing and functioning wetland at Mackenzie Secondary School to provide students with an outdoor learning space.

Objectives

Objective 3: Reduce threats to ecosystem function,

Sub-objective 3b: Reduce human-caused impacts.

Achieved through **Habitat-base Action 3b-2:** Provide extension materials/activities (e.g., BMPs, workshops) to industries, developments, communities and organizations for the purpose of providing information on best practices to users of riparian and wetland areas can reduce impacts and improve the functioning of ecosystems without imposing additional regulation. (Peace Basin Riparian and Wetlands Action, Plan 2014).

3.0 Study Area

Below are GPS locations of related workshops and events, with descriptions of field locations when appropriate.

- Map our Marshes Workshop – Mackenzie
Mackenzie, 55.272306, -123.111944
 - Training was hosted in Mackenzie, BC and site locations were identified by local community members, including sites within the Williston Reservoir (55.272306, -123.111944).
- Wetland Training Workshop – Kwadacha, formerly called Fort Ware
 - Kwadacha First Nation Lands, 57.422338, -125.629312
Training was hosted within the traditional territory of the Kwadacha Nation, and site locations were identified by local community members
- Doig River Map our Marshes Workshop
 - Doig River First Nation Lands, 56.578467, -120.495897

Training was hosted within the traditional territory of the Doig River First Nation, and site locations were identified and suggested by local community members and elders.

- Wetland creation and youth engagement - Mackenzie Secondary School
 - Mackenzie Secondary Schoolyard, 55.340478, -123.087307

A liner wetland was constructed on District of Mackenzie property near Mackenzie Secondary School, for the primary purpose of educating the students and secondary purpose of creating wildlife habitat. Students were invited to help install the liner and install wetland plants.

4.0 Methods

Map our Marshes

Map our Marshes is a 2-day course tailored to the community that teaches community members the technical and field skills for identifying and mapping wetlands and other stewardship training. This course taught participants how to classify wetlands, identify the wetland edge, and track changes to wetland landscapes using GPS technology, which lays the foundation for habitat protection and conservation. Participants visited multiple wetland sites to learn how to identify the different wetland ecological communities by vegetation, soil types, and water source. Methodologies are primarily based on the Wetlandkeepers Handbook (Southam & Curran, 1996) and LMH 52 Wetlands of British Columbia: a guide to identification (Mackenzie & Moran, 2004).

Educational Wetland Build

This wetland was designed by Tom Biebighauser with input from landowners and regional biologists, and the project was supervised by Robin Annschild. Tom has designed over 2000 wetlands, and since 2014, Robin has restored over 200 wetlands. The wetland was designed to function as a natural wetland, provide ecological benefits, be inexpensive, and require little to no maintenance as water control structures were not used. Excavated soils remained on site and were used to create ridges, islands, and hummocks to increase habitat complexity, and local native wetland plants were harvested from within the Williston reservoir and replanted at the project site. Students and school staff participated in aspects of the build, when safe, such as removing rocks and other sharp objects, and laying down the liner.

An educational sign was installed at the demonstration wetland. Information on wetland ecosystems and activity suggestions for student engagement were included on this sign.

5.0 Results and Outcomes

Wetland Training Workshop (Kwadacha) (June 24-25, 2021)

Four community members attended this training. Participants included influential community members, such as Kwadacha Nation Land Guardians, and the Nation's previous chief, who is running for election. Participants verbally expressed that they learned many valuable skills and appreciated in-person training due to their remote location. After the workshop, the community expressed interest in receiving more training on wetlands and plants.

Mackenzie Map our Marshes (May 31-June 2, 2021)

Eight community members attended this workshop. These participants included individuals who monitored and maintained wetlands as well as professionals who identified wetlands for restoration opportunities. Of the 5 participants who responded to the post-workshop evaluation 100% rated the

workshop as one of the best they've attended. Additionally, all participants responded that they would highly recommend this workshop to others.

Doig River Map our Marshes Workshop (Aug 3-4, 2021)

Nine community members attended this workshop. Participants included Land Guardians, as well as staff members from the Lands and Resources department of Doig River First Nation. Of the 7 participants who completed the post-workshop evaluation, 5 of the 7 rated the workshop as one of the best they've attended, with the remaining 2 participants rating the workshop as above average. 100% of responders stated they would recommend this workshop to others. Participants felt that learning and understanding the different classifications of wetlands and how to conduct a health assessment to be immensely valuable.

Mackenzie Demonstration Wetland (June 3, 2021)

A 150m² liner demonstration wetland was created at Mackenzie Secondary School. 64 students and several school staff members were engaged in outreach during the wetland build. 700 native wetland plants were installed with the help of the students.

6.0 Discussion

BCWF's Wetlands Education Program continued its support in the Peace Basin, and was in line with multiple FWCP priorities, as workshops directly addressed sub-objectives 3b and 3c by implementing the habitat-base actions 3b-2 and 3c-1 respectively, as outlined in the Peace Basin Riparian and Wetlands Action Table (2014 version). BCWF understands that the Peace Region Riparian & Wetlands Action Plan was updated in 2020 and revised in 2021, after our original application was submitted, and our project supported Sub-objective 6: increase opportunities for community engagement and resource stewardship through citizen science.

Sub-objective 6: increase opportunities for community engagement and resource stewardship through citizen science.

- A fully functional, naturally appearing liner wetland was constructed at Mackenzie Secondary School and for the purpose of providing hands-on, experiential engagement and learning in the outdoor learning space for students.

Habitat Action 3b-2: Provide extension materials/activities (e.g., BMPs, workshops) to industries, developments, communities, and organizations.

- Wetlands training and workshops were delivered to our partners (particularly First Nations and Land Guardians) on an array of best-practices and wetland-related topics including (but not limited to) land stewardship, inventory, restoration, plant identification, classification, and mapping. Through providing wetlands education workshops, the participants will understand and learn to assess the functioning of wetlands and how to reduce human impact on these ecosystems.
- Through partnering with District of Mackenzie and Mackenzie Secondary School, a demonstration wetland was built on school grounds. This build engaged 64 student, teachers

and school staff on how to construct a liner wetland, and outreach on the importance and functions that wetland ecosystems provide. Alongside the engagement done during the wetland build, resources and support on wetland care was provided to the school to support the long-term stewardship of this wetland.

- Mackenzie Secondary School is planning to maintain the constructed educational wetland long term as an outdoor learning lab for its students and as habitat for wildlife such as birds, waterfowl, amphibians and insects.

7.0 Recommendations

BCWF's Wetland Education program strongly believes that training and providing support to communities, local stewardship groups, First Nations members, government workers, and professionals can increase the capacity for improved conservation and protection actions throughout British Columbia. With the pressing need for wetland conservation in the Peace region, workshops and restoration actions that engage and support community members will provide sustainable and significant improvements to wetland conservation in the region. Like in previous years, BCWF's 2020/2021 works had a strong emphasis on wetland restoration and enhancement, which resulted in the creation of an educational wetland for students. This educational wetland will promote engagement and exposure to wetland ecosystems and create opportunities to learn about the functions that wetlands provide, such as improved water quality, carbon sequestration, water retention, and flood mitigation. The training opportunities BCWF provided to First Nation communities in the Peace region will help these Nations conserve and restore wetlands on reserve lands and within their traditional territory. Due to the negative effects of climate change, education and experiences based on conservation, stewardship, and the importance of restoring wetlands is especially important. It is the Wetland Education Program's recommendation that the FWCP and other organizations continue to invest in similar capacity building programs in the Peace region to build upon the momentum that the Wetlands Program instigated through the delivery of workshops and projects from 2012 to present.

8.0 Acknowledgements

We would like to acknowledge the following financial supporters:

- Fish and Wildlife Compensation Program
- Government of BC - Community Gaming Grant
- Wildlife Habitat Canada
- Environment and Climate Change Canada

We would also like to thank the following project partners for their support:

- McLeod Lake Indian Band
- Mackenzie Secondary School – School District No. 57
- District of Mackenzie
- Kwadacha Nation

- Doig River First Nation


Confirmation of FWCP Recognition



Figure 1. Example of a post-event Twitter post recognizing and thanking FWCP and other funders for the Doig River Map our Marshes workshop.




Figure 2. Example of a post-event Facebook post recognizing and thanking FWCP and other funders for the Mackenzie Secondary School educational wetland build.

 **BC Wildlife Federation's Wetlands Education Program** ...
 Published by Molly Dubé · May 27 ·

Read [the Prince George Citizen](#) article about our upcoming wetland and planting project in Mackenzie!

Thank you to our funders, [Wildlife Habitat Canada](#), [British Columbia & Fish and Wildlife Compensation Program](#), for contributing to this project!

<https://www.princegeorgecitizen.com/.../bc-wildlife...>



PRINCEGEORGE-CITIZEN.COM
B.C. Wildlife Federation to build wetland at Mackenzie Secondary School
 The wetland will function as an outdoor learning lab

Figure 3. Example of acknowledgement of FWCP in a media piece written on the Mackenzie Secondary School project.

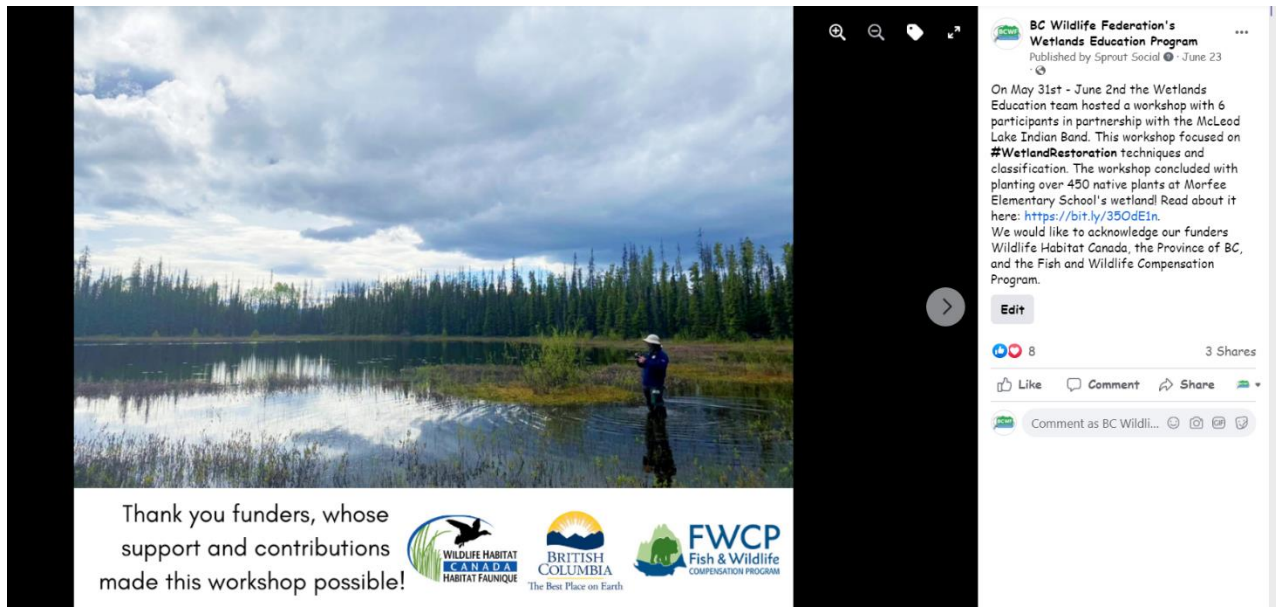


Figure 4. Example of a post-event Facebook post recognizing and thanking FWCP and other funders for the McLeod Lake Map our Marshes workshop.

Mackenzie Secondary School Wetland

What is a wetland? You will notice that this wetland looks very different from the schoolyard lawn. Wetlands contain **water** for most of the year and have **special soil**. Because of this, **unique plants** like cattails, sedges, and lily pads are able to grow in wetlands. There are many types of wetlands, such as swamps, marshes, bogs, and fens. Use this wetland to explore and learn about the different plants, animals, and insects that depend on these special ecosystems!

Why are wetlands important? Wetlands are like nature's grocery store, where animals can find **food** to eat and **water** to drink. Some use wetlands to **rest** in, **hide** from predators, or even **raise their young**. About 600 species in BC depend on wetlands to survive, including more than 30% of our threatened and endangered species. Wetlands are important to humans too! Some can help **filter water**, making it cleaner. Others provide water regulation and can help prevent both floods and drought!

Things you may see in a wetland...



Sedges

Sedges are a grass-like species that thrive in moist soils. To help identify them, roll the stem in your fingers and say this poem: "Sedges have edges, rushes are round, and grasses have joints all the way to the ground."



Olive-sided Flycatcher

Wetlands provide a great source of food for birds. Watch branches of the trees for these **Flycatchers** who sit up high, watching for large flying insects, especially bees.



Egg Mass

Look closely at the submerged vegetation to see if you can spot an egg mass... Some amphibians including **Wood Frogs** lay their eggs in a gelatinous mass. This species can lay up to 2000 eggs at once!

Wood Frog

Outdoor Learning Lab

This wetland was built as a learning tool for **science, art, and studying the natural world** right in our schoolyard. Use your knowledge in **physics, chemistry, and biology** to study water movement and quality, aquatic invertebrates, and vegetation. Get **creative** and make a model of the wetland, take photographs, or sketch your favourite critters you see using it. Since this wetland receives all of its water from rain, use your **math** skills and measure the water volume throughout the year. Come back and visit at different times of the year to observe the wetland and see how it changes throughout the seasons. **Most importantly, enjoy this wetland, learn from it, and treat it with care!**

This project was a partnership between the B.C. Wildlife Federation, Mackenzie Secondary School, and the District of Mackenzie.

The Mackenzie Secondary School Wetland was made possible by the financial contributions of the following organizations:



Scan this code to learn more about wetlands.
bcwfogblog.com



Environment and Climate Change Canada

Environnement et Changement climatique Canada


Illustrations by Eryne Donahue, 2021.

Figure 5. The educational sign displayed at the Mackenzie Secondary School wetland. Acknowledgement of funders and partners are displayed on the sign.

2:00 - 5:00 PM	Field Location – Morfee Elementary School (310 Nechako Dr, Mackenzie, BC V0J 2H5)
	6. Evaluations and certificates 7. Planting native wetland vegetation at Morfee Elementary School Wetland 8. Wrap-up, return, & clean equipment

If you are running late or need to contact the Wetlands Education Program Staff, please call:
Alana Higginson, Wetlands Program Assistant: 778-809-0337

THIS WORKSHOP IS HELD IN PARTNERSHIP WITH:



AND WOULD NOT BE POSSIBLE WITHOUT THE GENEROUS FINANCIAL SUPPORT OF THE FOLLOWING CONTRIBUTORS:








Figure 6. A screen capture of the McLeod Lake MoM agenda, sent to all participants, acknowledging FWCP as a financial supporter.



MAPPING OUR MARSHES WITH DOIG RIVER FIRST NATION
Posted by Alana Higginson on November 5, 2021 · Leave a Comment (Edit)



BCWF's Wetlands Education Program (WEP) spent August 3-4th in the community of Doig River (Hanás Saahgé?) for the final *Map our Marshes* workshop of the 2021 season. Traditionally, *Map our Marshes* workshops are a 1-day hands on course, but this extended workshop allowed for more time to discuss wetland assessment, and much more time to spend in the field!

WANT TO READ MORE ABOUT...

- Map our Marshes
- Wetlandkeepers
- Wetlands Institute

OUTREACH, RESTORATION & TRAINING

- Outreach Events
- Wetland Restoration Projects
- Wetland Stewardship Continued Projects
- Working Group Workshops
- Restoration Workshops

UPCOMING EVENTS AND COURSES

More information on registration for

Figure 7. A screen capture of our Bog Blog article on Doig River Map our Marshes, where FWCP is recognized.

The article can be found here: <https://bcwfbogblog.com/2021/11/05/mapping-our-marshes-with-doig-river-first-nation/>

9.0 References

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