



Final Report Prepared For:
Fish and Wildlife Compensation Program

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Project Title: Advancing Wetland Stewardship & Restoration in the Kootenays

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Executive Summary

Beginning April 1 2017, the BC Wildlife Federation's Wetlands Education Program successfully completed a series of wetland restoration projects in the Kootenays and hosted a Wetlands Institute in order to deliver upon commitments made within the FWCP proposal "Advancing Wetland Stewardship & Restoration in the Kootenays" (COL-F18-W-2449). The overarching goal of the Wetlands Institute is to build the capacity of East and West Kootenay residents to protect, enhance, create, and steward wetlands. In collaboration with multiple partners, BCWF was able to restore wetlands for wildlife while controlling invasive species, mitigating cattle impacts, filtering water, and protecting Species at Risk. The 2017 projects closely align with the FWCP's Columbia Basin Riparian and Wetland Action Plan and included initiatives in two of the FWCP priority areas: Upper Columbia Valley and the Duncan/Lardeau Valley. With the extension of our funding, BCWF was able to complete several initiatives in the Kootenay region. A quick summary of the results are as follows:

- *Trained 21 participants in wetland restoration and stewardship techniques during a Wetlands Institute in the East Kootenays (September 23-29), which included wetland restoration at three sites, securing 2.76 hectares of wetland habitat.*
- *Hosted two wetland planting events at KP Park Wetland, Salmo (May 5, July 22), where students planted 1500 native plants.*
- *Restoration of two wetlands in the Duncan-Lardeau Area; The Grange Farm (1.8 hectares), and the Nature Trust of Canada's DL570 property (3.2 hectares)*
- *Managed 7 invasive plant species on The Grange Farm, and a total area of 5,544 m² was treated.*

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1. Introduction

In comparison to many other ecosystems, the benefits from wetlands are exceptionally large relative to their size (MacKenzie and Shaw 1999). Based on one commonly referenced study, the market and non-market values of wetland goods and services (ex. climate regulation, nutrient cycling, and food production) are valued at \$19,580 hectare/year (Costanza, *et al* 1997), which extrapolates to approximately \$100billion/year in B.C.(MOE 2010). When total economic values are considered, wetlands often provide greater economic returns than when the land is converted for other uses (WRI 2005). However, wetlands have been historically degraded and destroyed in low-elevation areas of the Kootenay region from large scale developments (such as hydro-electric production, agriculture, diking, and transportation networks) as well as from residential growth (e.g., see Utzig and Schmidt 2011). Furthermore, remaining wetlands are at risk of degradation from human activities such as mud-bogging and the introduction/spread of invasive plants. Interestingly, in the Columbia River headwaters, the low-lying wetland areas have remained largely intact while the upland and “bench land” wetlands surrounding them have been impacted. The Columbia River Wetlands is one of the longest intact wetlands in North America and possesses significant cultural significance to First Nations such as the Ktunaxa.

The Fish and Wildlife Compensation Program considers wetland conservation and restoration as a priority for the Columbia Basin and has developed a number of interim initiatives (*Columbia Basin Riparian and Wetlands Action Plan* [Draft] 2012). Other action plans in the Columbia Basin identify wetlands as a priority habitat for conservation/restoration (e.g., see Green et al. 2006). As with previous years, the BC Wildlife Federation’s Wetland Education Program (WEP) supported these initiatives by building the capacity of Kootenay residents to protect, enhance, and restore wetlands through the delivery of the Wetlands Institute in Canal Flats in 2017. This 7-day workshop provided hands-on training to 15 full-time and 6 part-time participants through restoration at three sites, increasing their capacity to restore wetlands in their communities. They also received training on a variety of wetland stewardship topics ranging from Western Painted Turtle biology to landowner communication techniques.

Restoration work has also continued in the Duncan-Lardeau area at two sites. Nineteen wetlands totaling 3.2 hectares were restored at the Nature Trust of Canada’s DL570 property (of which BCWF funded 1 hectare). Seven wetlands totaling 0.4 hectares were restored nearby at the Grange Farm, which is privately owned by Erik and Audrey Matthews. 2018-19 marks the 5th fiscal year that BCWF has engaged Duncan-Lardeau landowners in wetland restoration and enhancement. In 2017, two events also engaged 37 community members and students in planting 1500 native plants at the KP Park Wetland in Salmo to limit the establishment of weedy species and increase habitat value.

This report provides further details to the above projects, their impact, and future steps to be taken.

Goals and Objectives

1. Goal: Through the Wetlands Institute, increase community capacity to protect, enhance, restore, and steward wetlands in the Kootenays.
 - Objective: Train 10-35 participants during the delivery of a 7-day Wetlands Institute workshop in the Columbia River Wetlands area
2. Goal: Restore wetlands in the Columbia River headwaters area
 - Objective: Restore wetlands at Gyppo Logging Basin and Turtle Lake.
3. Goal: Restore wetlands in Duncan-Lardeau area.
 - Objective: Restore wetlands on the DL570 property and Grange Farm
4. Goal: Enhance KP Park Wetland in Salmo
 - Objective: Plant 500 native plants at KP Park Wetland

Study Area

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

- Wetlands Institute, Canal Flats area
 - Columbia River Wetlands: 50.163748, -115.843477
 - Wetland ecosystem where participants learned to classify wetlands and plant communities.
 - Marion Creek Wetlands: 50.232956, -115.897933
 - Marsh and swamp ecosystem where participants learned to classify wetlands and plant communities.
 - Island Pond Wetland: 50.028618, -115.749734
 - Marsh ecosystem which had recently been burned by wildfires.
 - Fishermayden Lake: 50.165517, -116.016180
 - Marsh, swamp, and shallow open water system where participants learned how to classify wetland systems.
 - Gyppo Logging Basin: 50.157972, -115.887218
 - Wetland system on crown land which was heavily impacted by cattle use
 - One of three sites restored during the Wetlands Institute
 - Turtle Lake: 50.196397, -115.894373
 - Man-made waterbody on crown land which was at risk of being drained due to eroding banks
 - One of three sites restored during the Wetlands Institute
 - Hoodoo Property: 50.385446, -115.935130
 - Nature Conservancy of Canada property where previous restoration efforts have not been successful.
 - One of three sites restored during the Wetlands Institute
- Wetland Restoration
 - Grange Farm, Meadow Creek: 50.229733, -116.973532
 - A beef farm impacted by cattle and dominated by Reed Canary grass, bull thistle, and sedges. Historically drained and modified for agriculture by leveling and constructing drainage ditches.

- One of two restoration projects in the Meadow Creek area.
- DL570, Cooper Creek: 50.181269, -116.9628
 - Historically drained and modified for agriculture by leveling, constructing drainage ditches, and stream diversion. Vegetation primarily invasive Reed Canary Grass, with a variety of sedges. Currently owned and managed by the Nature Trust of BC.
 - One of two restoration projects in the Meadow Creek area.
- KP Park Wetland, Salmo: 49.195929, -117.274674
 - Historically a wetland which was filled. In 2013, BCWF restored the site but it unfortunately became dominated with weedy species.
 - Site was enhanced by planting native species.

Methods

Wetlands Institute

The Wetlands Institute provided hands-on training to workshop participants through the construction/restoration of two wetlands on crown rangeland north-west of Canal Flats (Mt. Findlay Region), and two wetlands on the Nature Trust of BC's Hoodoo Property, near Fairmont Hot Springs. Field experts and high-quality speakers are selected to provide leading and relevant information on wetland topics such as Beaver Management and Wetland Hydrology (See Appendix C for complete list of speakers and topics).

Training included methodologies on soils texturization, vegetation zonation, wetland mapping, plant/wildlife inventories, project planning, and landowner contact and dialogue techniques primarily based on the *Wetlandkeepers Handbook* (Southam and Curran, 1996) and with additional details from Land Management Handbook 25: *Describing Terrestrial Ecosystems in the Field*. Furthermore, participants learned how to identify wetland ecological communities using the Land Management Handbook 52 *Wetlands of British Columbia: A Guide to Identification* (Mackenzie and Moran, 2004), in conjunction with draft wetland classification forms, which were developed in conjunction with the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (FLNRORD). Participants were also introduced to additional methodologies, where available/appropriate, in order to harmonize with well-established protocols in BC. These include a Marsh Bird Monitoring Protocol, being piloted in BC by the Canadian Wildlife Service and the Columbia Wetlands Waterbird Survey, and a new wetland rapid health assessment form, which was modified from Dr. Paul Hansen's highly successful methods from the United States. Wetland restoration specialist Tom Biebighauser was a featured educator and taught participants how to design wetland restoration prescriptions. Hands-on methods were largely based on those found in *Wetland Restoration and Construction—A Technical Guide* (Biebighauser, 2011). Restoration methods for the Gyppo Logging Basin, Turtle Lake, and Hoodoo sites can be found below.

Wetland Restoration, Enhancement, and Securement

Wetland design prescriptions were developed by Tom Biebighauser and Robin Annschild, with input from landowners and regional biologists. Over the past 35 years, Tom has designed over 5,000 wetland restoration projects and successfully restored over 2000 wetlands in North American and New Zealand. Since 2014, Robin has restored over 200 wetlands. Projects were designed to provide maximum ecological lift, be inexpensive, and require little to no maintenance (i.e., without the use of water control structures). Excavated soils remained on site and were used to create ridges, islands, and hummocks to increase habitat complexity. Soil was seeded to reduce erosion. Logs and coarse woody debris were also placed in and around wetlands as habitat features. Specific site details can be found below.

- Gyppo Logging Basin
 - Designed with input from tenure holder Brian Mckersie, and biologist Dave Lewis, this restoration was planned to mitigate and restore impacts made by cattle. Using heavy machinery, compacted soil was loosened and the existing wetland depression was

deepened to return the site to its original hydrology, which will support a greater variety of wetland vegetation, and support native amphibian populations by holding water longer into the summer. Excess soil was loosely spread in mounds to guide cattle access and provide habitat for American Badger and their main prey, Ground Squirrels. Cattle access ramps were strategically placed to mitigate future impacts caused by cattle.

- Turtle Lake
 - Designed with input from tenure holder Brian Mckersie, biologist Dave Lewis, and herpetologist Jakob Dulisse, this prescription was created to secure and enhance an existing wetland ecosystem which was at risk of failing due to erosion. The eroding banks and spillway were repaired by filling with compacted soil and a new spillway was created. It was armoured with rock and contained a wide, gradual slope to ensure no future erosion. A new turtle nesting site was prepared upland using the surrounding substrate.
- Hoodoo Property
 - Designed with input from biologist Dave Lewis and Kootenay Conservation Land Manager with The Nature Trust of British Columbia, Chris Bosman, this prescription was designed to hold water on site longer than past efforts have allowed. Previous to the Wetlands Institute, water was being pumped to the surface to support wetland vegetation. Two wetlands were created, one with an artificial liner and one with a compacted clay liner. Clay was mined on site and used to create a 2 foot clay layer in an excavated basin. The artificial liner was place in an excavated basin and covered with soil to support wetland vegetation and native amphibian populations.
- Grange Farm
 - This sites prescription was created to reduce and remove invasive species, restore impacts from cattle, protect stream habitat, and treat pasture runoff before entering a tributary of Meadow Creek. In addition to restoring wetlands to create habitat, wetlands were created to intercept drainage ditches, which previously ran directly into the tributary. A cattle ramp was built to provide improved access to drinking water for cattle in the pasture while limiting access to stream and protecting stream water quality. An area colonized by Bull Thistle was bulldozed and additional grading was completed around several wetlands restored in January 2017 to improve access for weed control. A culvert was later installed, which was not possible in January due to the high water table. In 2019, BC Wildlife Federation competitively retained Arrowstone Forest Contracting, a small company based out of Creston, to support native riparian vegetation enhancement and invasive species management at the site.
- DL570 Property
 - This prescription was designed to restore the historic floodplain and associated wetland pools. The on-site drainage ditch was cleaned and filled to recharge groundwater, while 190m of stream was restored to provide a wide, gradual spillway for the naturalized flood regime. Excavated soils were used to create drier habitat and logs were embedded into the downstream spillway to prevent any further erosion. As Western Painted Turtle were previously observed on site, 11 sand and gravel mounds were created to provide nesting habitat. Native hawthorn, willow, hazelnut, and red-osier dogwood that were affected by restoration activities were transplanted.
- KP Park Wetland
 - This site was enhanced over two days through manual removal of weedy species and planting 1500 native plants. Students from Salmo Secondary School contributed through in-kind labour.

Results

Wetlands Institute

21 participants (15 full time) attended the workshop. Participants increased their capacity to conserve, steward, and restore wetlands across BC, particularly in the Kootenays. Of the 12 participants who completed a post-workshop evaluation 100% stated that concentrating on hands-on field skills helped them with their projects. Furthermore, 100% stated that the Wetlands Institute was “among the best” when compared to other workshops or extension courses, and 100% stated that they would recommend the workshop to others.

Our work at Gyppo Logging Site and Turtle Lake aimed to build local support and buy-in from the ranching community in an effort to proceed with additional restoration projects that have been identified in the area. In partnership with Brian Mckersie (President, BC Cattleman’s Association) additional wetland restoration activities are now being developed for several additional rangeland sites.

It is worth noting that registration was originally higher for the Wetlands Institute, but many registrants (including members of the Ktunaxa Nation) were unable to attend due to complications from the continually-changing wildfire status in BC during that period. A link to a detailed Wetlands Institute Report can be found under “Confirmation of FWCP Recognition”.

Wetland Restoration, Enhancement, and Securement

Methods described in the previous section were successfully carried out, resulting in the below:

- Gyppo Logging Basin: September 24-26, 2017
 - 0.4 hectares (ha) of wetland were restored. The site was monitored for invasive species in 2018.
- Turtle Lake: September 27-28, 2017
 - 2.5 hectares of productive wetland habitat was secured by repairing the eroding banks. The site was monitored for invasive species in 2018.
- Hoodoo Property: September 28-29, 2017
 - Restored 2 wetlands totaling 0.06 ha of habitat
- Grange Farm: October 31-Nov 3 2017, 2018 & 2019
 - Restored 7 wetlands totaling 0.4 ha of habitat with FWCP funding (an additional 1.47 hectares were restored in Jan 2017 with NWCF funding)
 - Cattle Ramp upgrades – Oct 11, 2018
 - Enhancement and monitoring works were carried out April 15, June 11-13, September 6-7, November 4-8th, 2019.
 - Planted 880 live stakes of native vegetation (e.g., Red osier dogwood, Willow spp.)
 - Treated 5,544 m² of area for invasive plant species (e.g., Thistle spp., Reed canarygrass, Nodding beggarticks)
 - Arrowstone gave management recommendations to mitigate the spread of these species in the future
- DL570 Property: January 22-February 3, 2018
 - Overall 3.2 ha of wetland habitat were restored, of which 1.0 ha can be directly attributed to BCWF’s funds.
- KP Park Wetland: May 5, July 22, 2017

- BCWF was able to recruit 35 students from Salmo Secondary School to plant 1500 plants at the KP Park Wetland. This was three times our original intent.

Discussion

BCWF's Wetlands Education Program continued its support in the Columbia Basin in 2017, and was in line with multiple FWCP priorities, as outlined in the Columbia Basin Riparian and Wetland Action Plan, including:

Table 1: Recommended actions that apply to all six focal areas

- 12-1- "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)"

The Turtle Lake, Gyppo Logging Basin, Hoodoo Property, and Meadow Creek restoration projects are in Upper Columbia and Duncan-Lardeau priority areas.

- 13-4- "Explore options to collaborate with partners, in order to conserve and enhance wetland and riparian areas."

The Wetlands Institute and restoration projects involved over 15 partners including Government, First Nations, Private Landowners, Fish and Game Clubs, and ENGOs. See "Acknowledgements" for a complete list.

Table 2: Action Priorities for the Upper Columbia Valley

- 1-1- "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)."

The Turtle Lake, Gyppo Logging Basin, and Hoodoo Property restoration projects restored and secured wetland habitat in the Upper Columbia Valley focal area.

- 2-1- "Restore wetland and riparian areas impacted by livestock use"

The Gyppo Logging Basin wetland had been impacted by livestock and has now been restored. Livestock had compacted the soil, preventing groundwater from filling the wetland and preventing vegetation establishment. This project loosened the soil, created a deeper basin, and return the site to its original hydrological regime. Specific access points were created to ensure water availability to livestock while minimizing future livestock impacts.

Though not written into the project proposal, BCWF was able to provide assistance at The Nature Conservancy of Canada's Hoodoo Property and create one artificial liner and one clay liner wetland as part of the Wetlands Institute. In addition to the lasting, direct benefits that wetland restoration projects will provide, it is expected that future partnerships and restoration projects will result from these projects. Brian McKersie, president of the BC Cattleman's Association, has range tenure on the Gyppo Logging Basin Site and has expressed interest in future restoration projects on other cattle-impacted sites.

As with previous Wetlands Institutes, participants will continue to receive support to attain their wetland stewardship goals in their own communities. In the past, this has existed in the form of grant writing assistance, additional training, site visits, or hosting workshops in partnership. Two 2017 participants have already received support; Beth Millions was provided with resources and coordination assistance to run a Wetlandkeepers in Fernie, and Stacy Boczulak met with BCWF to further discuss grant writing and design for her restoration project.

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. The 2017 Wetlands Institute and previous workshops have fostered a community of practitioners and have increased the capacity of the region to be more self-reliant with long lasting benefits. These community members are expected to not only be stewards of local wetlands, but will also help identify locations for future wetland projects. Wetland restoration has improved habitat for wildlife, provided invasive species management, mitigated cattle impact, and improved water quality. It is expected that restoration efforts will lead to future restoration opportunities, as they have in the past. It is the Wetland Education Program's recommendation that the FWCP and other organizations continue to invest in similar capacity building programs in the Columbia Basin to build upon the momentum that the Wetlands Program instigated through the delivery of projects through 2012-2018.

Acknowledgements

We would like to thank the following financial supporters:

- Fish and Wildlife Compensation Program on behalf of its project partners BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and the public.
- Columbia Basin Trust
- Government of BC - Community Gaming Grant
- Wildlife Habitat Canada
- The Government of Canada's National Conservation Fund
- The Habitat Conservation Trust Fund
- Environment and Climate Change Canada
- TD Friends of the Environment Fund

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

- BC Ministry of Forests, Lands, and Natural Resource Operations, The Columbia Wetlands Stewardship Partners, Lake Windermere District Rod and Gun Club, Canal Flats Wilderness Club, Ktunaxa Nation, Nature Conservancy of Canada, Shuswap Band, The Nature Trust of BC, Jakob Dulisse Consulting, Goldeneye Ecological Services, Alberta Riparian Habitat Management Society, Anchor Excavating, the McKersie family, The Village of Salmo, the Salmo Watershed Streamkeepers Society, Erik and Audrey Matthews, and Salmo Secondary School.
- We would like to extend a sincere and special thanks to biologist Dave Lewis and Lake Windermere Rod and Gun Club President, Rick Hoar, for helping make the Wetlands Institute possible.

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Confirmation of FWCP Recognition

FWCP's logo was displayed before the related workshops on all advertisements, including posters and the Eventbrite pages. During WEP workshops the BCWF recognized the financial support of the FWCP on participant packages, and in presentations. FWCP's contribution is also recognized online on the BCWF website, on blog posts, and in photo album descriptions. The 2018 Wetlands Update, Wetlands Institute Report, BCWF AGM booklet, and BC Outdoors Magazine all recognize FWCP's contribution in print format. A sign was installed at the Grange Farm, which thanks FWCP for its contribution.

In May 2017, BCWF hosted a field tour of FWCP-supported restoration projects in Meadow Creek for the Kootenay Conservation Program. 15 participants attended and were informed of the project sponsors. In addition, BCWF continues to distribute the Landowner Contact pamphlets that were created in 2015 with funding from FWCP.

Our 2017 Wetlands Institute Report can be found on the following page:

<https://drive.google.com/file/d/1Q3T90O3CAOT3LBx910NsBBvI70VffsUF/view?usp=sharing>

Over 500 photos of the 2017 Wetlands Institute can be found at the following link. Sample images below.

<https://www.flickr.com/photos/bcwfwep/albums/72157687213726622>



Below are some other examples of FWCP's financial support being accredited:



Figure 1: Sign installed on the Grange Farm, acknowledging funders.



Map our Marshes deer tracks

tion of local governments.

Neil presented at the National Wetland Roundtable Working Group Workshop in Ottawa, where stakeholders explored recent information on Ecological Goods and Services and how these concepts can integrate into better wetland conservation.

UPCOMING WEP ACTIVITIES

Wetlandkeepers, Cheam Lake - May 26-28

Two-and-a half day Wetlandkeepers hands-on workshops educate participants about wetland conservation and provide them with technical skills to steward their own wetlands. Each course is uniquely tailored to the host community, and topics such as wetland classification and mapping, soil sampling, vegetation surveys and wetland services are part of the basic structure.

Map our Marshes, Oliver - July 28

Participants in the Map our Marshes

course learn how to identify conservation needs at a wetland or watershed scale. Community groups are taught how to upload important GPS data to Google Earth and the BC Wetlands Atlas. This data can be shared publicly with other stakeholders and is the first step to conserve wetlands.

Wetlands Institute, East Kootenays - Sept 23-29

Participants come to the intensive seven day Wetlands Institute with a wetland project they wish to implement in their home communities, whether it is restoration, protection, enhancement, or education related. During the workshop, participants receive support from knowledgeable experts from around the province and obtain hands-on training in order to successfully implement their wetland projects upon returning home.

Check for upcoming workshops across the province under the Programs menu



Neil Fletcher with Wetlandkeepers participants in Golden



Workshop Participants look at test pit Burton Flats

at www.bcwef.bc.ca or subscribe to bcwef-bogblog.com for updates.

Thanks to our 2017 sponsors, the Wetlands Education Program is able to offer workshops at no cost to participants. ○



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Figure 2. Sample page from BC Outdoors Volume 73 issue 3 (May/June), where we thank our 2017 funders.



Wetlands Education Report



Wetlands Education Program



Wetlands Institute work crew.

WETLANDS EDUCATION PROGRAM

BCWF's Wetlandkeepers Courses are 2.5-day workshops that educate participants about wetland conservation. Upon community request, BCWF hosts the Wetlandkeepers workshop to cover topics of interest to community stewardship groups. Each workshop is unique, but will cover basics such as:

- wetland plant ID
- soil sampling
- compass use
- wetland classification

Wetlandkeepers is a mix of hands-on fieldwork and in-class presentations that provide participants with the technical skills to steward their own wetland. Upon completion of the workshop, participants receive a Wetlandkeepers Certificate, and are provided follow up support from the Wetlands Education Program Manager.

UPCOMING WETLANDKEEPERS COURSES

• Fort St. John | July 7-9 | Where: TBA
• Campbell River | July 14-16 | Where: North Island College, 1685 S Dogwood St, Campbell River, BC.

Wild Kidz camp



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Figure 3. Sample page from BC Outdoors Volume 73 issue 4 (July/August). Funders are thanked at the end of the article.



WEP

Wetlands Education Program: Stars Align for 2018 Wetlands Institute By Jason Jobin

FOR MOST OF THE SUMMER it appeared as though the 2017 Wetlands Institute may have had to make a drastic change in scheduling and, for the first time in history, proceed without any accompanying wetland restoration projects. With BC experiencing the worst wildfire season ever recorded, the three restoration projects that would have made the bulk of the Wetlands Institute were on the chopping block. People weren't allowed to set foot off of pavement, much less allowed to work with the heavy machinery required to restore wetlands. Biting nails, the Wetlands staff was relieved to see the off-road restrictions lifted just days before the Institute, and elated to see the campfire ban lifted shortly after. A few days later the "Fire Danger Class" was lowered, and the week was allowed to proceed unhampered. What resulted is being viewed as possibly the most successful Wetlands Institute to date.

From September 23-29, fifteen participants from across the province were trained how to successfully complete their wetland projects through a mix of hands-on and in-class sessions. Non-profits, First Nations, consultants, and even agricultural practitioners were represented by the diverse cast of participants. Equally diverse were the topics and expert trainers.

As a few examples: Norine Ambrose (Alberta Riparian Habitat Management Society) presented on Living with Beaver, which included their biology, challenges that arise with co-habitation, and



management case studies; Dr. Suzanne Bayley, (University of Alberta) presented a slew of research on the Columbia River Wetlands, including a field tour of its unique structural features; and Dr. George Nicholas (Simon Fraser University) discussed the rich historical connection with wetlands and how that informs current Wetland Archaeology. Other topics and speakers included:

- History of Wetland Drainage in North America (Tom Biebighauser, Wetland Restoration and Training LLC)
- Painted Turtle Biology and Restoration Considerations (Jakob Dulisse)
- Wetland Classification (Neil Fletcher, BC Wildlife Federation)
- Wetland Plant Identification (Valerie Huff, V.J. Huff Consulting)
- Ktunaxa's Connection with Wetlands (Leanna Gravelle, Ktunaxa Nation Traditional Knowledge and Language Sector)
- Interpretation and Communications Techniques (Dan Clark, Interpretive Guides Association)
- Amphibians of BC, and The Northern Leopard Frog Recovery Project (Penny Ohanian)
- Wetland Fire Ecology (Jeff Allen, Jeff



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Donate by calling our office
1-888-881-2293

14 • JANUARY/FEBRUARY 2018

Figure 4. Sample page from BC Outdoors Volume 74 Issue 1 (January/February): Funders are thanked at the end of the article.



BC WILDLIFE FEDERATION PRESENTS

East Kootenays Wetlands Institute

An intensive 7 day workshop that educates participants about wetland stewardship, restoration, and construction. Receive hands-on experience and training from experts so you are able to complete your own wetland project (whether it be restoration, protection, enhancement, or education related). Also gain experience restoring three wetlands using different techniques. Apply today for this highly sought-after program.

When: September 23-29, 2017

Where: Based in and around Canal Flats, BC

Cost: **Free to residents of BC!** * (\$2000+ value)

Contact: Jason Jobin, Wetlands Education Program Coordinator

wetlands_coordinator@bcwf.bc.ca or 604-882-9988 ext 225

More information and application at: <https://2017WetlandsInstitute.Eventbrite.ca>

This workshop is made possible with financial support from following organizations:



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

*(Subject to acceptance of application. Meals and accommodations not included. See website for more details.)

Figure 5. Example of poster used to advertise FWCP-Supported Event

Wetlands Update



The Newsletter of the BC Wildlife Federation's
Wetlands Education Program

2018 Edition



The Cherry Creek Wetland only months after restoration

Ramping up Restoration in 2017

It was a banner year for the Wetlands Education Program when it came to wetland restoration. In addition to those restored during the Wetlands Institute (see pages 2-3), we were able to restore over a dozen hectares at multiple sites across BC.

One such site was the "Cherry Creek" project (near **Kimberly**), which restored habitat that once supported the red-listed Northern Leopard Frog. **Meadow Creek** continued to be a hotbed of wetland restoration with three sites last year; two on private property and one completed in partnership with The Nature Trust of BC. Another project on private land, just south of **Salmo**, converted unproductive farmland back to wetland habitat while improving the adjacent cropland; a win-win situation!

We were also able to design wetlands for future restoration on **Salt Spring Island**, **Vancouver Island**, near **Fort St. John**, in the **Lower Mainland**, **Revelstoke**, and at various locales across the **Kootenays**.

Of course, the Wetlands Education Program does more than restoration! Please continue reading to learn more about our 2017 programming, and what workshops may be coming to your area in 2018.

In This Issue

Wetlands Institute

A 7-day workshop where we
restored 4 wetlands!

Wetlandkeepers

Stewardship courses in Courtenay,
Cheam Lake, Fort St. John,
Campbell River, and Fernie

Map our Marshes

Learning how to map small
wetlands with GPS units in
North Van, Lillooet, and Oliver

Wetlands Outreach

Hundreds of people learn about
wetlands in Squamish, Salmo,
Mission, and Surrey

Partnering for Better Workshops

WEP hosts joint events across BC

Workshops in 2018

Mark your calendars!

A Space For "Wetworking"

Keep up to date with our
"Bog blog" and more



Figure 6. The Wetlands Update is available free online, with printed copies distributed at all workshops and public events. The final page acknowledges FWCP and other funders. Current version available here <https://buff.ly/2D6IEKD>



SEP 23

2017 Wetlands Institute - East Kootenays

by BC Wildlife Federation Wetlands Education Program

Free

Sales Ended

DETAILS

REGISTRATIONS ARE CLOSED

Thank you for your interest in the 2017 Wetlands Institute. Unfortunately registration is no longer available. The Wetlands Education Program anticipates hosting another Wetlands Institute in 2018. To be informed when the next Wetlands Institute is announced, you can "like" our Facebook page or follow us on Twitter. Thank you
<https://www.facebook.com/BCWFWEP/>
<https://twitter.com/BCWFWetlands>

DESCRIPTION

2017 Wetlands Institute Workshop - East Kootenays

DATE AND TIME

Sat, 23 Sep 2017, 9:00 AM –
 Fri, 29 Sep 2017, 4:00 PM MDT
[Add to Calendar](#)

LOCATION

Centred around Canal Flats,
 BC
 Canal Flats
 bc
[View Map](#)

For more information, you may contact:

Jason Jobin, Wetlands Education Program Coordinator
 604-882-9988 ext 225
jason.jobin@bcwf.bc.ca

or

Neil Fletcher, Wetlands Education Program Manager
 604-882-9988 ext 232
neil.fletcher@bcwf.bc.ca

The growing list of partners includes:



The workshop was undertaken with the financial support of: /
 Ce projet a été réalisé avec l'appui financier de:



Figure 7. Portion of registration page for a FWCP-supported workshop.



BC Wildlife Federation's Wetlands Education Program

Published by Justin Deer (?) · October 11, 2017 ·

...

Read about the 2017 Wetlands Institute on our Bog Blog!

Thank you again for support from Government of British Columbia, Wildlife Habitat Canada, Columbia Basin Trust, Environment and Climate Change Canada, Fish and Wildlife Compensation Program, National Wetland Conservation Fund, Habitat Conservation Trust Foundation, Ktunaxa Nation, Columbia Wetland Stewardship Partners, Nature Conservancy of Canada / Conservation de la nature Canada, Shuswap Band Canal Flats Wilderness C... See More



Stars Align for 2017 Wetlands Institute

For most of the summer it appeared as though the 2017 Wetlands Institute may have had to make a drastic change in scheduling and, for the first time in history, proceed without any accompanying wet...

BCWFBLOG.COM

Figure 8. Sample of BCWF Wetlands Education Program Facebook post thanking FWCP

STARS ALIGN FOR 2017 WETLANDS INSTITUTE

Posted by [jasonjohn](#) on October 6, 2017 · [Leave a Comment](#)



For most of the summer it appeared as though the 2017 Wetlands Institute may have had to make a drastic change in scheduling and, for the first time in history, proceed without any accompanying wetland restoration projects. With BC experiencing the *worst wildfire season ever recorded*, the three restoration projects that would have made the bulk of the Wetlands Institute were on the chopping block. People weren't allowed to set foot off of pavement, much less be allowed to work with the heavy machinery required to restore wetlands. Biting nails, BCWF Staff were relieved to see the off-road restrictions lifted just days before the Institute, and elated to see the campfire ban lifted shortly after. A few days later the "Fire Danger Class" was lowered, and the week was allowed to proceed unhampered. What resulted is being viewed as possibly the most successful Wetlands Institute to date.

From September 23-29, fifteen participants from across the province were trained how to successfully complete their wetland projects through a mix of hands-on and in-class sessions. Non-profits, First Nations, consultants, and even agricultural practitioners were represented by the diverse cast of participants. Equally diverse were the topics and expert trainers. As a few examples: Norine Ambrose (*Alberta Riparian Habitat Management Society*) presented on *Living with Beaver*, which included their biology, challenges that arise with co-habitation, and management case studies; Dr. Suzanne Bayley, (*University of Alberta*) presented a slew of research on the *Columbia River Wetlands*, including a field tour of its unique structural features; and Dr. George Nicholas (*Simon Fraser University*) discussed the rich historical connection with wetlands and how that informs current *Wetland Archaeology*. Other topics and speakers included:

- *History of Wetland Drainage in North America* (Tom Biebighauser, *Wetland Restoration and Training LLC*)
- *Painted Turtle Biology and Restoration Considerations* (Jakob Dulisse)
- *Wetland Classification* (Neil Fletcher, *BC Wildlife Federation*)
- *Wetland Plant Identification* (Valerie Huff, *V.J. Huff Consulting*)
- *Ktunaxa's Connection with Wetlands* (Leanna Gravelle, *Ktunaxa Nation Traditional Knowledge and Language Sector*)
- *Interpretation and Communications Techniques* (Dan Clark, *Interpretive Guides Association*)
- *Amphibians of BC, and The Northern Leopard Frog Recovery Project* (Penny Ochanjanian)
- *Wetland Fire Ecology* (Jeff Allen, *Jeff Allen Contracting Limited* & Randall Harris, *Wandering Ecotone*)
- *Waterfowl ID, The Columbia Wetland Waterbird Survey, and The West Bench Inventory & Assessment Project* (Rachel Darvill, *Goldeneye Ecological Consulting*)

BLOG CATEGORIES

BC Wetland Photo of the Month
Outreach
Species Profiles
Wetland Stewards Continued Projects
Wetlands Education Program
Map Our Marshes
Restoration Workshop
Wetland Institute
Wetlandkeepers
Wild Kidz Camp
Working Group Workshops



UPCOMING EVENTS AND COURSES

For more information on registration for courses and workshops, see our [Eventbrite page](#).

**Wetlandkeepers:
Courtenay**
May 19th, 2017

completed.

**Wetlandkeepers: Cheam
Lake Wetlands**
May 26th, 2017

completed.

**Invasive Species
Removal Workbee:
Cheam Lake Wetlands**
June 10th, 2017

sold out!

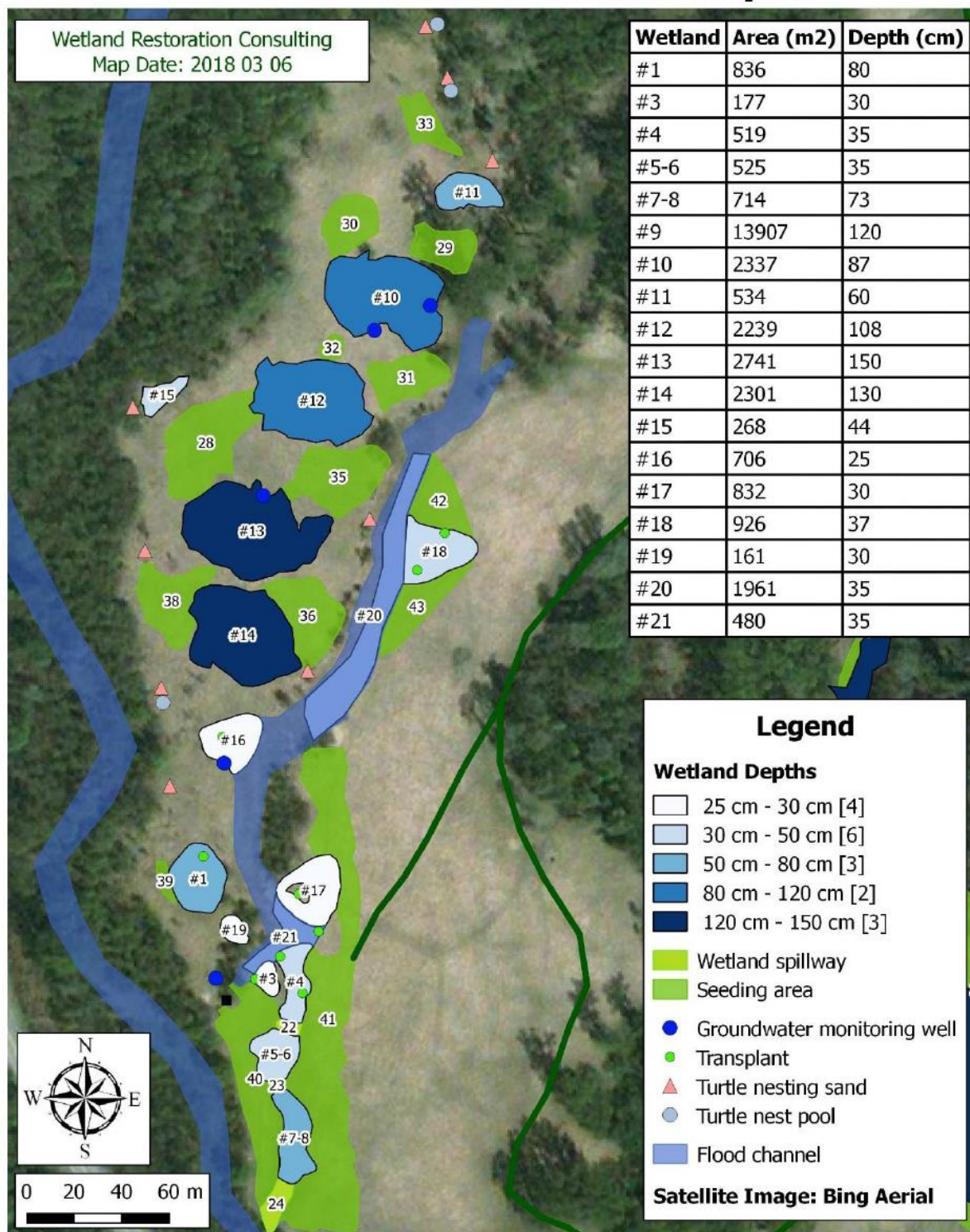
Map our Marshes: North

Figure 9. Sample from a Blog Post about the Wetlands Institute. Funders are recognized at the end. Full article can be found at <https://bcwfbogblog.com/2017/10/06/stars-align-for-2017-wetlands-institute/>



Figure 10. Sample of a webpage on the BCWF website, thanking the 2017 funders

DL570 Restored Wetland Depths



1. Satellite image showing areas restored on the DL570 property



2. Wetland #9 on the DL 570 Property



3. Satellite image showing areas restored on the Grange Farm.



4. Satellite image showing a closeup of the cattle ramp installation on Grange Farm.



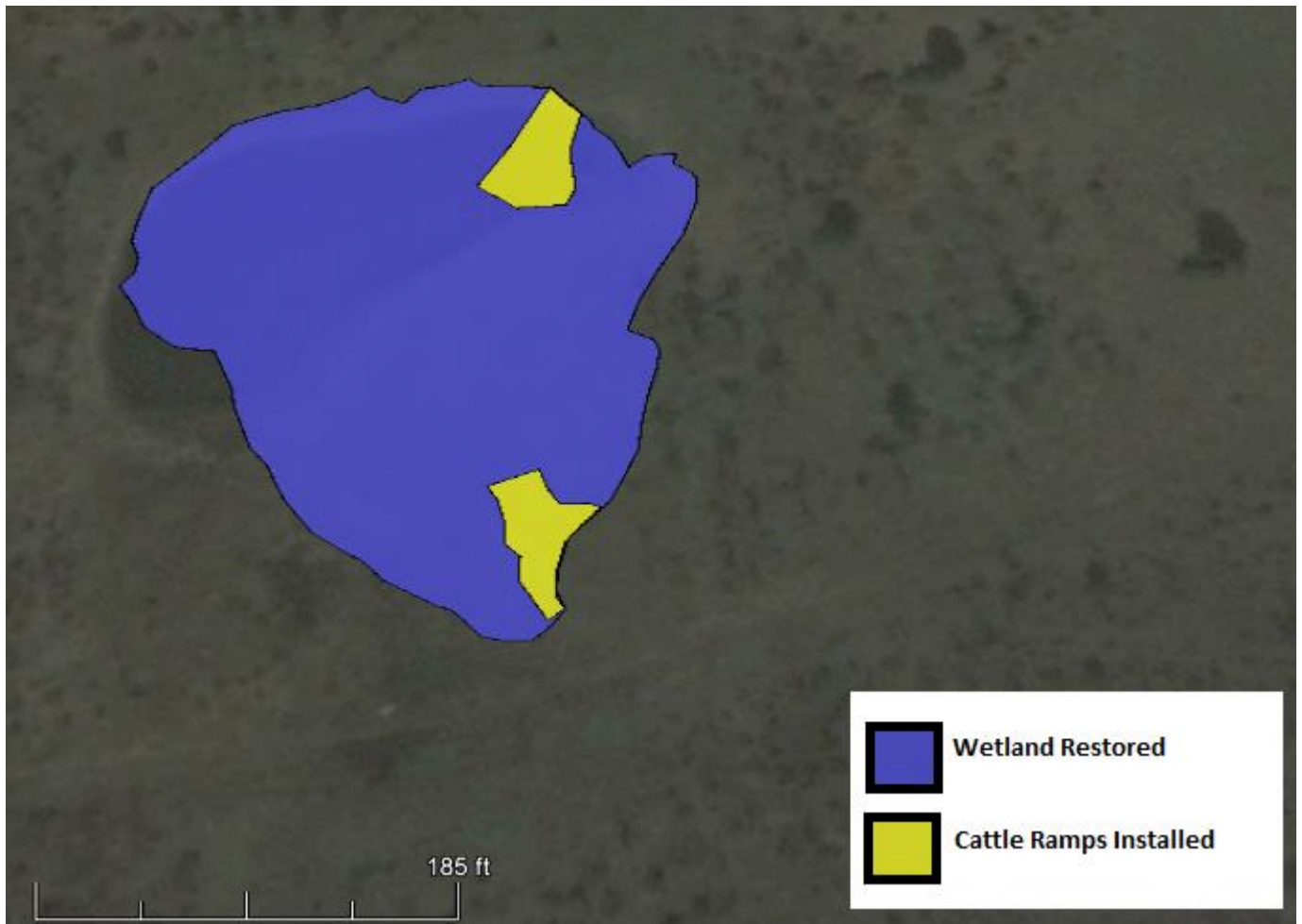
5. Satellite image showing a closeup of wetland 3e, designed to filter runoff from the pasture.



6. Planting at the KP Park Wetland in Salmo



7. Satellite image showing the areas restored and secured at Turtle Lake.



8. Satellite image showing the areas restored at Gyppo Logging Basin.



9. Aerial view of Gyppo Logging Basin during construction



10. Satellite image showing the areas restored at the Hoodoo Property.



11. Aerial view of the Hoodoo property during construction

Appendix B: Wetlands Institute Agenda

WETLANDS INSTITUTE SCHEDULE									
	Sep-23	Sep-24	Sep-25	Sep-26	Sep-27	Sep-28	Sep-29		
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday		
7:30am	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	7:30am
8:00am	Registration - Classroom	Travel to Gyppo Logging Basin	Travel to Canal Flats	History of Wetland Drainage in North America, <i>Tom Biebighauser</i>	Travel	Travel to Brisco	Travel	Travel	8:00am
8:30am	Intro to Wetlands Institute	Design Gyppo Logging Basin Restoration, <i>Tom Biebighauser</i>	Wetland Classification, <i>Neil Fletcher</i>	Archeology and Wetlands, <i>George Nicholas</i>	Design Hoodoo Wetland Restoration, <i>Tom Biebighauser</i>	Columbia Wetland Stewardship and Watershed Processes, <i>Suzanne Bayley</i>	Hoodoo Wetland liner installation.	Hoodoo Wetland liner installation.	8:30am
9:00am	Participant Project Presentations	Lunch/ Watch excavator break ground	Wetland Plant Identification, <i>Valerie Huff</i>	First Nations & Wetlands: A cultural connection, <i>Leanna Gravelle</i>	Observe Turtle Lake Restoration, Additional Mock Designs	Amphibians: ID, Recovery, etc, <i>Penny Ochanjanian</i>	Visit completed Turtle Lake/ Lunch	Visit completed Turtle Lake/ Lunch	9:00am
9:30am	Lunch	Wetland Health Assessment Forms, <i>Jakob Dulisse & Neil Fletcher</i>	Lunch	Lunch	Lunch/ Travel	BBQ Lunch (Free)	Waterfowl ID, Columbia Wetlands Waterbird Survey, <i>Rachel Darvill</i>	Waterfowl ID, Columbia Wetlands Waterbird Survey, <i>Rachel Darvill</i>	9:30am
10:00am	Wetland Restoration Techniques, <i>Tom Biebighauser</i>	Travel to Turtle Lake	Wetland Classification and Plant ID, <i>Neil Fletcher & Valerie Huff</i>	Living with Beaver: Ecology, Management, and Case Studies, <i>Narine Ambrose</i>	Gyppo Logging Basin Seeding, Spreading Straw, etc	Field portion in Columbia Wetlands, Brisco Bridge, Spillimacheen Bridge, Brisco Road, etc	Soil Texturing Quiz (Using calibrated soils)	Soil Texturing Quiz (Using calibrated soils)	10:00am
10:30am	Travel	Design Turtle Lake Restoration (with Painted Turtle considerations), <i>Tom Biebighauser & Jakob Dulisse</i>	Wetland Classification and Plant ID, <i>Neil Fletcher & Valerie Huff</i>	Engage your Audience Using Interpretive Techniques, <i>Dan Clark</i>	Fire Ecology and Wetlands. Site visit at Island Pond Wetland		How to write a successful grant, <i>Neil Fletcher</i>	How to write a successful grant, <i>Neil Fletcher</i>	10:30am
11:00am	Intro to Wetland Health Assessment Forms, <i>Jakob Dulisse & Neil Fletcher</i>	Travel	Travel	Dinner	Travel	Travel	Evaluations, wrap up, final messages	Evaluations, wrap up, final messages	11:00am
11:30am	Welcome Dinner (Free)	Dinner	Dinner		Dinner	Dinner			11:30am
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Classroom	Blue Lake Centre (Unnamed Road, Fairmont Hot Springs, BC V0B 1L2)	Blue Lake Centre (Unnamed Road, Fairmont Hot Springs, BC V0B 1L2)	Base Camp Café Gymnasium (4957 Burns Ave, Canal Flats)	Base Camp Café Gymnasium (4957 Burns Ave, Canal Flats)	Base Camp Café Gymnasium (4957 Burns Ave, Canal Flats)	Brisco Hall (Dorney Rd, Spillimacheen)	Base Camp Café Gymnasium (4957 Burns Ave, Canal Flats)	Classroom	
Accommodations	Blue Lake Centre	Blue Lake Centre	The Flats RV and Campground (9110 Hwy 93, Canal Flats,)	The Flats RV and Campground (9110 Hwy 93, Canal Flats,)	The Flats RV and Campground (9110 Hwy 93, Canal Flats,)	The Flats RV and Campground (9110 Hwy 93, Canal Flats,)	The Flats RV and Campground (9110 Hwy 93, Canal Flats,)	Accommodations	
Field Sites	20 minutes south of Blue Lake Centre	Gyppo Logging Basin, Turtle Lake	Marion Creek Wetland	N/A	Turtle Pond, Gyppo Logging Basin and Island Pond Wetland	Columbia Wetlands	Hoodoo Wetland, Turtle Pond	Field Sites	
Restoration Project	N/A	Gyppo Logging Basin	Gyppo Logging Basin	Gyppo Logging Basin	Turtle Pond and Island Pond Wetland	Turtle Pond & Hoodoo Wetland	Hoodoo Wetland	Restoration Project	

Appendix C: Wetlands Institute Speakers

Topic	Speaker	Organization
Wetland Restoration Techniques	Tom Biebighauser	Wetland Restoration & Training
History of Wetland Drainage in North American		
Rapid Wetland Health Assessment	Jakob Dulisse	Jakob Dulisse Consulting
Western Painted Turtle Biology and Design Considerations		
Wetland Classification	Neil Fletcher	BC Wildlife Federation, Wetland Stewardship Partnership
How to write a successful grant		
Soil Classification		
Wetland Plant ID	Valerie Huff	
Archeology of Wetlands	Dr. George Nicholas	Simon Fraser University
First Nations and Wetlands, A cultural connection	Leanna Gravelle	Ktunaxa Nation
Living with Beaver: Ecology, Management, and Case Studies	Norine Ambrose	Alberta Cows and Fish
Engaging your Audience Using Interpretive Techniques	Dan Clark	N/A
Fire Ecology and Wetlands	Randy Harris	The Wandering Ecotone
Columbia Wetland Stewardship and Watershed Processes	Dr. Suzanne Bayley	University of Alberta, Columbia Wetlands Stewardship Partners
Amphibians: ID, Biology, and the Leopard Frog Recovery	Penny Ohanjanian	Northern Leopard Frog Recovery Team
Waterfowl ID. The Columbia Wetlands Waterbird Survey, and the Marsh Bird Monitoring Program	Rachel Darvill	Wildsight BC