



THE WETLANDS WORKFORCE PROJECT FINAL REPORT | 2021

OPENING PRAYER

*“Pray for mother earth, especially the wetlands, which
are vital to our very existence.*

*The wetlands hold everything that we hold dear to
our survival. Say prayers for all the people who put in
countless hours to help revive our wetlands.*

*Prayers should also be said for the water that runs
through these wetlands. Water is essential for life on
earth and for human life.*

*Lastly, I would like to pray for all the animals that live in
these wetlands. May they continue to thrive as a result of
all the hard work put into saving our wetlands.”*

Elder Louie Basil Stevens, Shuswap Indian Band





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MESSAGE FROM THE DIRECTOR & PROJECT MANAGER

On behalf of the B.C. Wildlife Federation's Wetlands Workforce project, we are pleased to present this final report highlighting the work our crews accomplished and the collaboration achieved throughout 2021.

The Wetlands Workforce project was just one of the over 60 projects supported by the Healthy Watersheds Initiative. These projects aimed to improve the health of watersheds while creating economic and skill building opportunities and strengthening relationships with First Nations and Indigenous-led organizations.

This fund provided an opportunity for us to work with several of our partners who have known for a long time the value of protecting watersheds. Unfortunately, it is difficult to access much needed funds to maintain and to monitor some of these most important ecosystems of British Columbia. We know this work is critical in many ways in improving the way we do restoration, as well as improving the way that we protect and conserve wetlands and watersheds.

In addition, the funding allowed us to offer meaningful employment to those most impacted by the economic effects of COVID-19. It provided an opportunity to work with and learn from several Indigenous communities and allowed us to do a health check on the province's wetlands, one of our most important ecosystems.

This report provides an overview of the Wetlands Workforce project, our economic impact, how we engaged and learned from Indigenous communities, and the environmental outcomes that were achieved at our numerous project sites.

There was an abundance of positive stories and accomplishments that came out of the Wetlands Workforce. Unfortunately, we were unable to highlight all of them in this report. We encourage you to visit our website at www.wetlandsworkforce.ca to learn more about the great work that was completed.

We hope the Wetlands Workforce project and the other projects supported by the Healthy Watersheds Initiative will inspire and demonstrate the value of investing in watershed protection and conservation, which may result in longer-term funding opportunities.

In closing, we would like to take this opportunity to thank our Wetlands Workforce headquarters team, our project partners, and all those at the B.C. Wildlife Federation. The work we accomplished would not have been possible without your endless support, dedication, and enthusiasm.

Yours in Conservation,



Neil Fletcher
Director of Conservation Stewardship
B.C. Wildlife Federation



Meghan Saunders
Project Manager
Wetlands Workforce

ECONOMIC IMPACT

“In addition to the jobs and the people we employ, we buy tools, we buy resources, we support our local economies, and we engage with volunteers. I feel like we are really part of the communities that we work in. If you want to support those communities and create jobs, just keep doing this and we’ll keep doing the work that we do.”

Cass Rondeau, Wildcoast Ecological Society

Entering the second year of the global COVID Pandemic, 2021 was a year of uncertainty. Many people had lost work due to the impact of provincial health orders, travel across regions and between communities was restricted and large in-person engagements were not recommended.

Directing stimulus dollars towards the enhancement of our watersheds served as an opportunity to get people back to work, while enhancing outdoor spaces which served as safe refuge for many throughout the pandemic.

By investing in the restoration of vibrant and healthy waterways we can better serve our communities, benefiting fish, wildlife, and people.

One of the key objectives of the Wetlands Workforce was to provide employment opportunities for people affected by the recent economic recession, targeting women, people under 30, and Indigenous peoples.

We supported employment for the following individuals:*



**These numbers were gathered through a Gender Based Analysis Plus Survey (through optional participation) to help us better understand the representation and experiences of different people who were part of the Wetlands Workforce. Of the 205 individuals who were provided employment through the Wetlands Workforce, 69 participated in the survey.*

The Wetlands Workforce also created a diversity of positions, providing employment to those who specialize not only in Environmental Fields but also in Accounting, Administration, Arts, Communications, Community Engagement, Ecology and Operations.

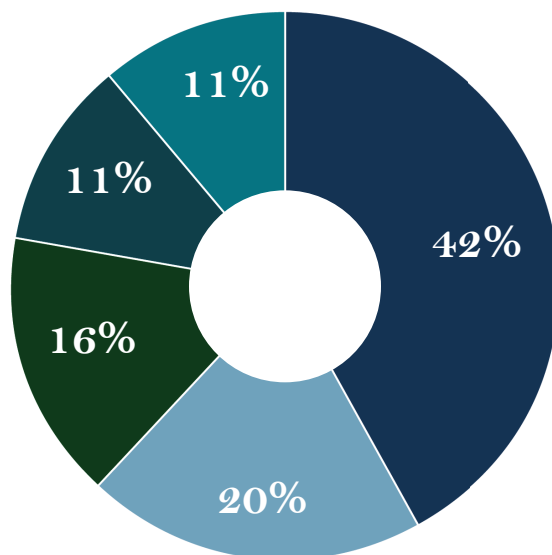
The project funding supported communities across the province through investing in employment, labour, equipment, site supplies and materials.

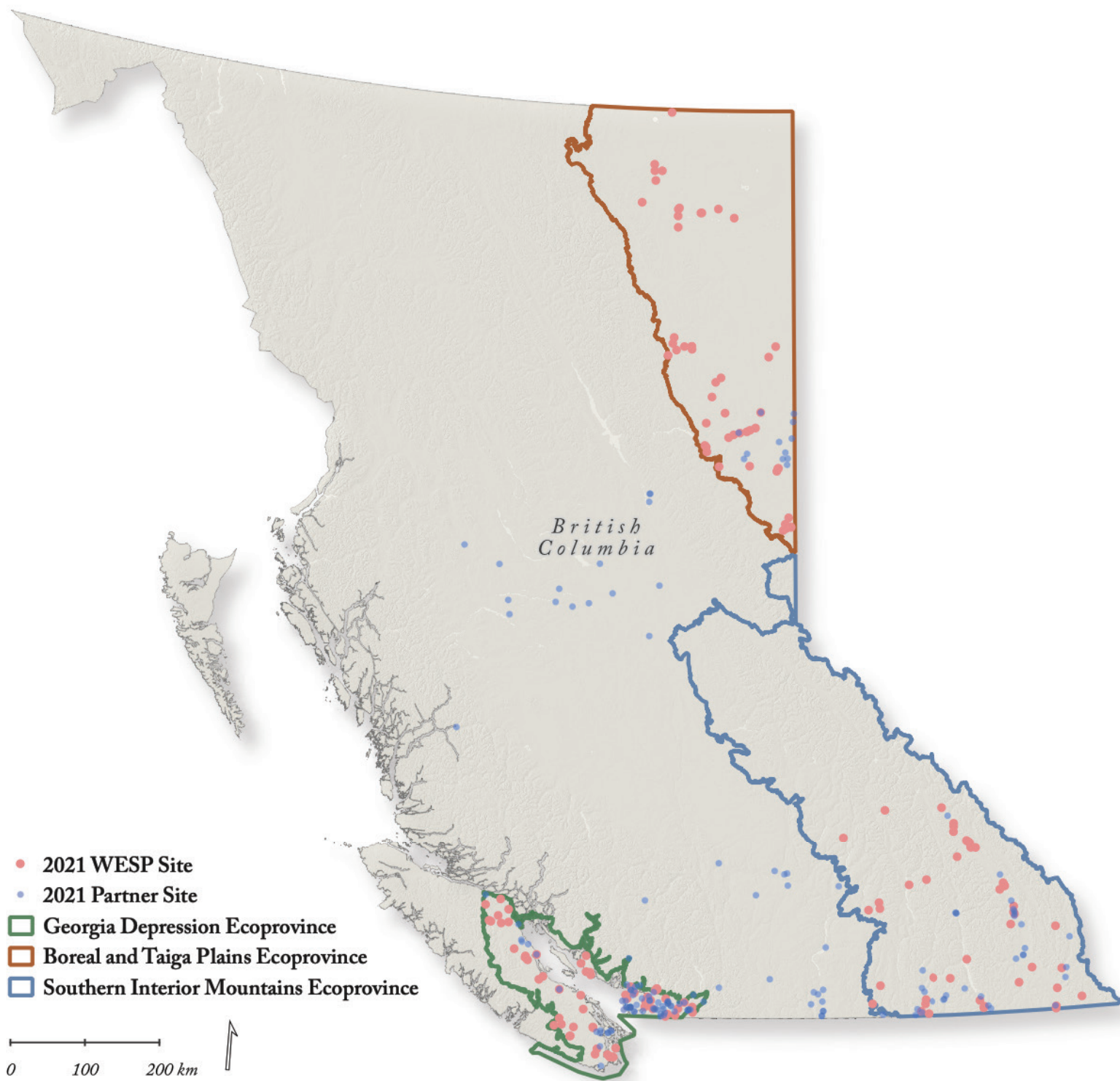
\$5,055,000

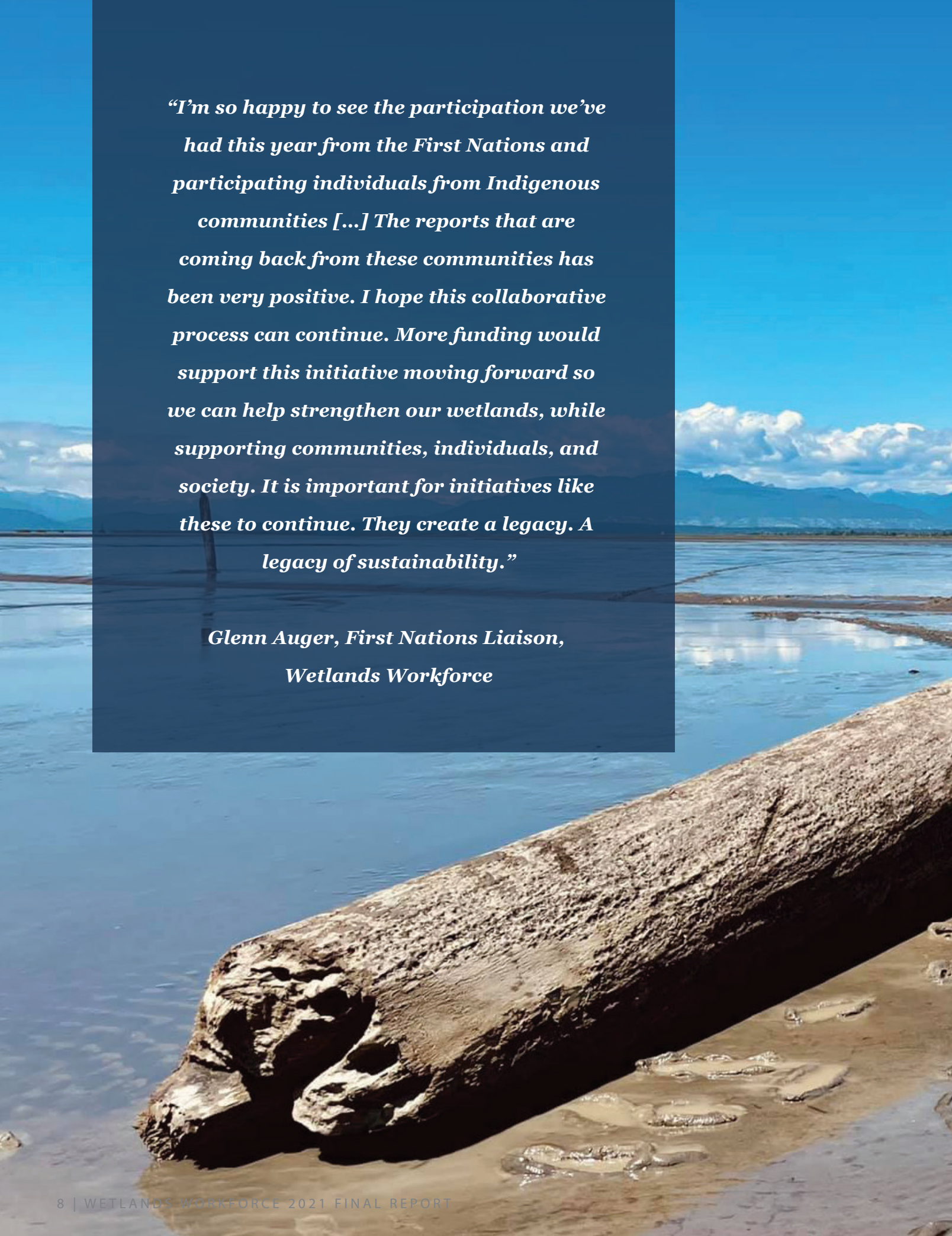
Grant amount provided through the Healthy Watersheds Initiative

The following is a breakdown of how this funding was spread regionally. Please note, financial impact regional breakdowns are estimates. At the time of the report publication, budgets were not completely allocated.

- South Coast ~ \$2,123,100
- Kootenay-Boundary ~ \$1,011,000
- Thompson-Okanagan ~ \$808,800
- West Coast ~ \$556,050
- Northeast ~ \$556,050







“I’m so happy to see the participation we’ve had this year from the First Nations and participating individuals from Indigenous communities [...] The reports that are coming back from these communities has been very positive. I hope this collaborative process can continue. More funding would support this initiative moving forward so we can help strengthen our wetlands, while supporting communities, individuals, and society. It is important for initiatives like these to continue. They create a legacy. A legacy of sustainability.”

**Glenn Auger, First Nations Liaison,
Wetlands Workforce**

YEAR IN REFLECTION



Photo by Samara Kolasko, Ducks Unlimited Canada

PROJECT HIGHLIGHTS

252

Wetlands Received Work by
Wetlands Workforce Work-pods

Actively Engaged with

45

Indigenous
Communities

205

Jobs were Created
and Supported

Invasive Species Removed
from an area of

1,006,090 m²

*This measurement is a combined amount
incorporating the work of all the partner
work-pods across 160 wetland sites.*

1

Wetland Plants of
British Columbia
Field Guide Created



8

Organizations Supported
Work-pods

221

Wetlands Assessed through the
Wetlands Ecosystem Services Protocol

*191 Non-Tidal wetlands and
30 Tidal wetlands were assessed.*

Native Species Planted
encompassing an area of

575,489 m²

*This measurement is a combined amount
incorporating the work of all the partner
work-pods across 52 wetland sites.*

Debris and Garbage
Removed from

108

Wetland Sites

13

Online Training Modules &
Webinars Created for Work-pods

*This includes 4 custom Decolonization
& Cultural Awareness training
sessions.*

THE WETLANDS WORKFORCE PROJECT

As the largest collaborative wetland initiative of its kind in Canada, the Wetlands Workforce project has aimed to bring increased knowledge and understanding of the condition of B.C.'s wetlands to community, regional and provincial levels. Our work this year has shown that people are eager to collaborate and work together for the betterment of our wetlands, watersheds, and water.

This one-year project was supported by the Healthy Watersheds Initiative, a \$27-million program supported by the Province of BC to stimulate British Columbia's economic recovery through investments in community-driven watershed conservation and restoration projects.

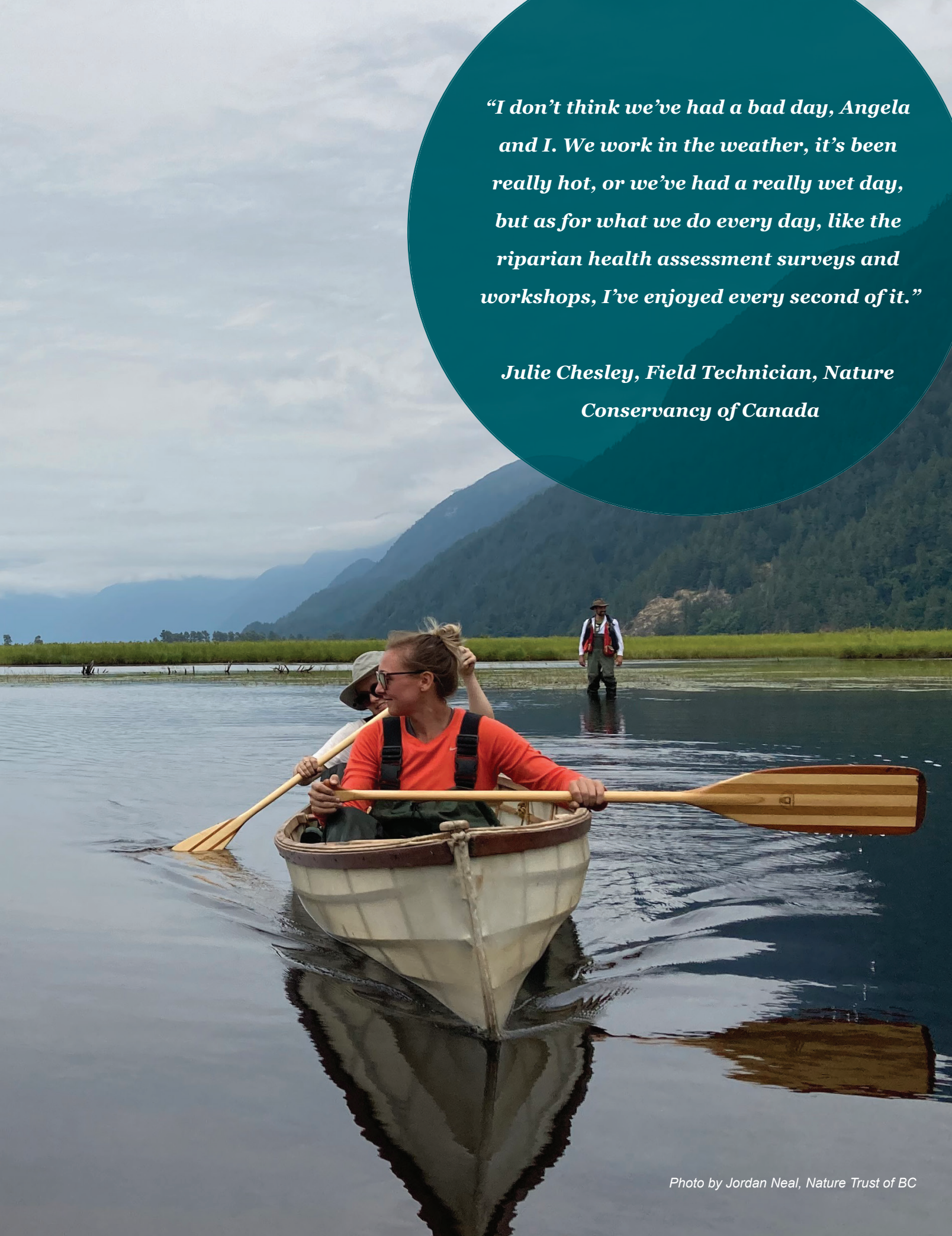
The Wetlands Workforce aimed to provide:

- Meaningful employment around the province;
- Help address critical conservation actions that are often under-resourced;
- Provide an opportunity to advance reconciliation among Indigenous and non-Indigenous communities and;
- Jump-start an economy that fully integrates restoration and conservation into the future.

In a noticeably short amount of time, the Wetlands Workforce has managed to accomplish some amazing feats.

This includes the training of field technicians; virtual and in-person engagement with members from over 40 First Nation communities; maintenance and monitoring work at over 250 wetland sites; and the advancement of a rapid wetland functional assessment model across three regions of the province.





“I don’t think we’ve had a bad day, Angela and I. We work in the weather, it’s been really hot, or we’ve had a really wet day, but as for what we do every day, like the riparian health assessment surveys and workshops, I’ve enjoyed every second of it.”

Julie Chesley, Field Technician, Nature Conservancy of Canada

INDIGENOUS ENGAGEMENT

We acknowledge the heartbreaking pain for Indigenous peoples across Canada.

Connecting with Communities

Strengthening relationships has been a common thread that has tied many aspects of the Wetlands Workforce project together. From developing stronger bonds with the organizations that supported work-pods to the communities and community members that witnessed our work on the ground.

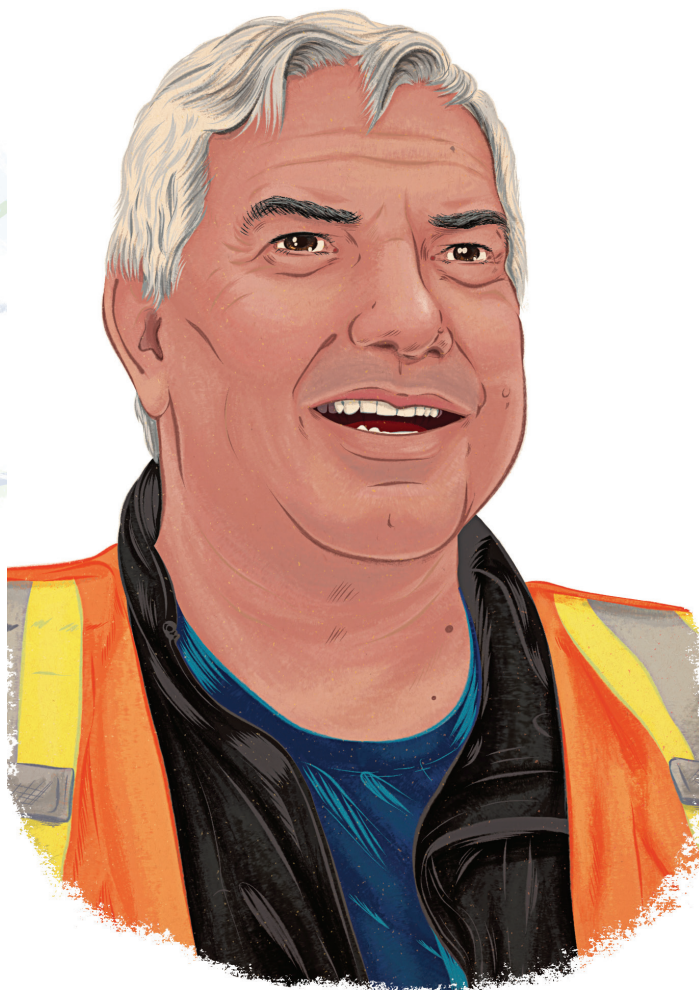
Engaging with First Nations and Indigenous-led organizations was a key focus from the start of the project. However, forming relationships from scratch is not an easy task, especially with a project that has a clear expiration date. Nevertheless, our First Nations Liaisons, Glenn Auger and Diana Cote took up their roles with enthusiasm. They guided staff in fostering meaningful engagement with First Nation communities, while providing the crews with the tools and knowledge they needed to enter these relationships with respect and humility.

Part of this education was the development of custom Decolonization and Cultural Awareness training sessions provided by Glenn and Solomon Reece, First Nations Consultant for the B.C. Wildlife Federation (BCWF). All team members that were part of the Wetlands Workforce were required to take this training.

Through this training and guidance, many First Nation community members and work-pod crews were able to come together to help support the land and the water, while sharing their knowledge and learning from each other.

We are proud of the connections and relationships that were made over the year, but we acknowledge that our process in communication with communities was limited to the short timeframe of the project. Although securing sufficient and long-term resources would allow these relationships and connections to truly flourish, we are committed towards building trust and bettering relationships into the future.

"The significance of water is that it is a very healing element and is the essence of who we are as Indigenous people as well as non-indigenous people [...] It's really significant for me to be out here and participate because it's a really big part of my culture. It is everything I have been taught about who I am, and that I am not different from the land and the land is not different from me. We are just the same."
Kiana Medicine Crane, Lower Kootenay Band



Steward of the Land: Glenn Auger, First Nations Liaison

With heavy hearts we had to say good-bye to a key member of our Wetlands Workforce team. Over the past year, Glenn Auger served as our Indigenous Advisor and was a role model to many working on the Wetlands Workforce project. With honesty and humility, he guided the team on a journey that helped them strive to have meaningful relationships and dialogues with indigenous people and communities.

Sadly, Glenn passed away on the morning of December 1, 2021. In his final months, he was supported by palliative care at home surrounded by his loved ones.

Glenn was a beloved husband, involved father, and loving grandfather. As an elder, he provided a voice and support to many in his community. He was a Cree member from Tallcree First Nations in Northern Alberta and was a signatory to Treaty 8.

Glenn had a diverse background of skills and experience, having worked in the sawmill industry and the oil and gas industry for much of his career. In these fields he held varying positions as a First Nations Liaison, which gave him much joy in his work.

Education and training were a huge passion for Glenn. In an interview conducted earlier in the year, he said,

"I have always had a passion for education and training. I think it is so important for our youth, our children and even our elders. You are never too late to start learning. You can still go to school. You can still pursue your dreams. Live your dreams. Be proud of who you are, and do not be afraid to go after and challenge what you want to become. If you want to be courageous and adventurous, there are opportunities out there that can help you and support you."

Glenn brought that passion to the Wetlands Workforce, serving as a role model to our partnering Northern Light College students who were starting their careers in environmental guardianship work. He was always patient and treated each relationship he had with our staff with care and solid guidance. He left a legacy that will be carried on by the teams he mentored.

In September, he confidently and clearly spoke on behalf of the Wetlands Workforce project to the Select Standing Committee on the importance of investing in watersheds. He described how the work we were all completing was so meaningful to him, not only for healing the land, but also for healing relationships among the people who live on this land.

Even in his final month, he remained committed to his team and his passion for education by delivering the final session of Decolonization and Cultural Awareness training to the staff.

He believed in the work he was doing as part of the Wetlands Workforce, and he always found the strength and the time to contribute his knowledge and experience to all those around him.

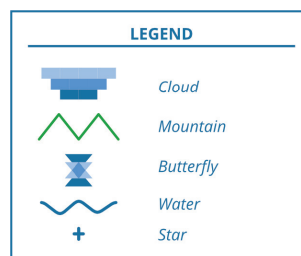
Glenn had a kind soul, a boisterous laugh, and a knack for telling powerful stories. He will be deeply missed by all those he impacted this year through his work with the Wetlands Workforce.



Glenn Auger with Northern Lights College students and Project Manager, Meghan Saunders at a wetland near the Sickanni River in Northern B.C. Photo by Wetlands Workforce

"We are only here for a short time on earth. During that time, we need to ensure that our children and our great-grandchildren have and can enjoy what we have been able to enjoy."

In Memory of Glenn Auger 1960 - 2021



INDIGENOUS ENGAGEMENT

Over the course of the year, we shared information about our project with over 100 First Nations, hosted 5 First Nations' Regional Collaborative Sessions, and actively engaged with representatives from over 40 First Nation communities. This section looks at some of the highlight engagements from the year.

"Our strength comes from the Land. Our Wetlands Workforce were honored to work alongside our Indigenous Elders, Youth and Community Members in support of Wetlands across British Columbia. Gaining momentum as we, as Indigenous Peoples, have known for centuries that wetlands hold life in its hands. The voices of our Knowledge Keepers were heard, in a good way, to ensure the protection of our Wetlands." Diana Cote, Indigenous Advisor, Wetlands Workforce

Traditional Knowledge Sharing



Faron Hamblar of Kelly Lake Cree Nation participating in WESP. Photo by Rebekah Ingram, B.C. Wildlife Federation.

Many of the work-pods were able to connect with First Nation community members across the province and learn about the traditional knowledge of the land. The Squamish Nation and Tsleil Waututh First Nations supported the Wildcoast Ecological Society's restoration work along Mackay Creek. They shared their knowledge on the history of the area and were instrumental in aiding to preserve and enhance a Wapato bed within MacKay Wetland.

Members of Kelly Lake Cree Nation joined the BCWF Northern work-pod in the field to learn about the Wetlands Ecosystem Services Protocol (WESP) and provide their traditional knowledge of the area.

Wei Wai Kum Elder June Johnson shared her traditional knowledge of the native vegetation around Campbell River with the BCWF and Nature Conservancy of Canada (NCC) work-pods.

Many similar engagements occurred between First Nation elders, youth, and the Wetlands Workforce work-pods, where both traditional and scientific knowledge of the land was shared.

On the Land with the Lower Nicola Indian Band



LNIB Elders and youth at Logan Lake with the BCWF Southwest work-pod. Photo by Wetlands Workforce

Elders and Youth from the Lower Nicola Indian Band (LNIB) joined the BCWF Southwest work-pod at one of the wetland sites near Logan Lake. The crew shared information on the Wetlands Workforce and the work being done at the site.

The Youth and Elders helped the crew with taking vegetation plots and participated in the amphibian coverboard surveys. Elders also shared their traditional knowledge of the native plants at the wetland site with the crew.

Strengthening Pre-existing Friendships and Partnerships

The partner organizations that came together to support the Wetlands Workforce project have worked over the years to build and establish relationships with First Nation communities through their various projects.

The Wetlands Workforce did not just provide an opportunity to form new relationships, it also provided a chance to further build on pre-existing friendships. For instance, Nature Trust of BC (NTBC) and partners in the West Coast Conservation Land Management Program have worked with the Snuneymuxw First Nation for several years in the design, implementation and monitoring of several large-scale restoration projects in the Nanaimo River Estuary.

In 2021, this collaborative work was able to be continued at the Nanaimo River Estuary. The work conducted includes monitoring of previous restoration activities, additional habitat enhancement work in off-channel fish habitat area, design and implementation of carex restoration site, on-going water quality monitoring, juvenile salmonid monitoring and sampling.



Planting and Shared Learning at Sparrowhawk Farm



?Aq'am Elders and BCWF Kootenay crew lead learn about the restoration work at Sparrowhawk Farms near Kimberley B.C. Photo by Wetlands Workforce

Elders and youth from the ?Aq'am Community joined the BCWF Kootenay work-pod at one of the wetland sites near Kimberley. The participants were shown the work being completed at the site, they learned about the implementation of WESP and the youth helped with seeding around the wetlands.

The Elders shared their traditional knowledge of the area and shared in the discussions regarding Kokanee Salmon no longer spawning up Cherry Creek and the historic and current management of beaver in the area.

Stqeeye' Learning Society

The Youth Crew from the Stqeeye' Learning Society joined the BCWF Southwest work-pod several times at the wetland sites on Salt Spring Island. The crew helped with vegetation plots and planting.

In the fall, the youth crew joined the work-pod for a planting day at the McEwan wetland site where they helped plant over 100 native plants. Wild tobacco was sprinkled into each hole before planting and the youth concluded the day with a song. The BCWF work-pod were also invited to visit the Xwaaqw'um wetland site where they helped remove invasive Canada Thistle and Scotch Broom.

The NCC work-pod also had the opportunity to work alongside the Stqeeye' Learning Society.

Earl Ranch with the Tobacco Plains Band

The BCWF Wetlands Workforce team was honoured to meet with Elders and community members from Tobacco Plains Band at the Earl Ranch restoration site.

The participants were able to engage with the Wetlands Workforce Wetland Assessment and Field Coordinator, Kyla Rushton, a Habitat Biologist from FLNRORD, as well as Wetland Restoration Specialist, Robin Annschild regarding the restoration project.

They learned about the historic draining of wetlands and Elder's shared their knowledge of the historic water levels of water bodies on their reserve.

BCWF restoration expert Tom Biebighauser was invited to visit the Tobacco Plains Band reserve where he worked with members of the band to develop several wetland restoration prescriptions. The band is now utilizing this information to lead restoration work on their reserve.



Although this is a brief glance at the engagements and connections made through this project, we are hopeful many of these relationships will continue to grow in the coming years.

Thank you to all the communities, Chiefs and Councils, Knowledge Keepers, Elders, and youth that welcomed our work and helped us learn about the land and water in a more connected and meaningful way.

The following pages illustrate some of the knowledge and teachings shared with our team.



Shuswap Elders and community members learn about the importance of wetlands at Pascal Pond. Photo by Wetlands Workforce

Connecting with Shuswap Band Elders

Wetlands Workforce team members joined Elders and community members of the Shuswap Band at Pascal Pond on the Shuswap Band Reserve.

This wetland is significant as it is a place where Band members often gather to enjoy family time. This engagement provided an opportunity to discuss the large impacts various projects and changes of land use have had on the area.

The discussions and concerns raised at this event have resulted in further engagement and learning opportunities that will be pursued in 2022 between the BCWF's Conservation Stewardship programs and the Shuswap Band.

Virtual Engagement

The COVID pandemic and the nature of the project, which provided employment to people all around the province, required much of our engagement to be hosted online.

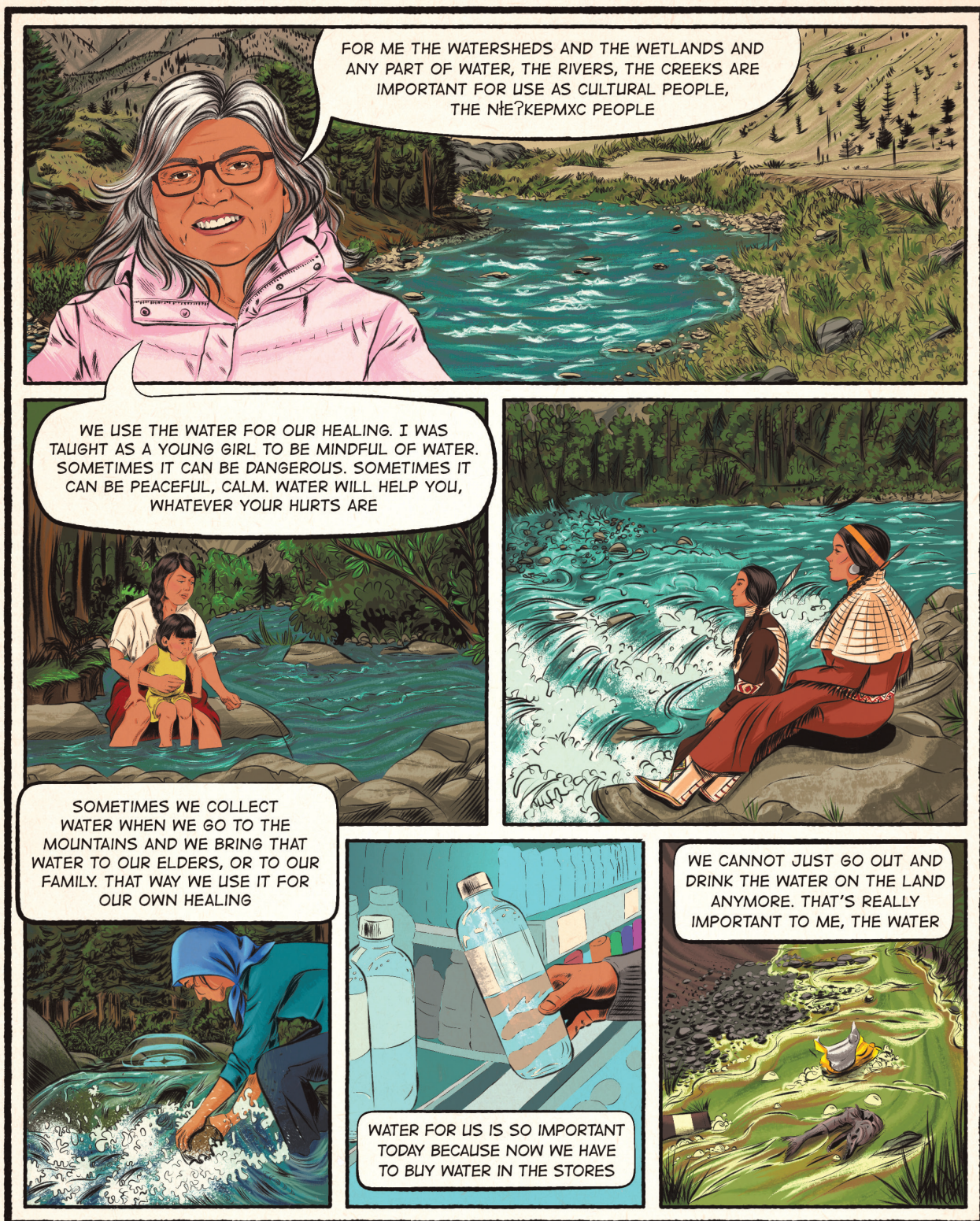
At the start of the project, prior to field season, the headquarters team hosted 5 First Nation Regional Collaborative Sessions. These sessions provided an opportunity to connect with First Nation community members to discuss the work and environmental benefits of this fund and determine potential areas for collaboration and training opportunities. Representatives from 40 First Nation communities attended these sessions.

These collaborative sessions allowed a space for Indigenous communities to communicate directly with the teams about local priorities and explore the opportunities and resources available for training and participation by guardians, knowledge keepers and other Indigenous stewards. At the end of the field season, we hosted a year end virtual wrap up with an open invitation to communities we were able to engage with and those who wanted to learn more about the project.

We were honoured to have 48 participants from First Nation communities from around the province. First Nation representatives joined us from Vancouver Island, the Lower Mainland, the Kootenays, Interior, Skeena and B.C.'s Northeast to learn about what was accomplished over the year by the Wetlands Workforce work-pods.

INDIGENOUS ENGAGEMENT |

Rena Joe, Lower Nicola Indian Band



I ENCOURAGE MORE YOUTH TO PARTICIPATE IN PROJECTS LIKE THIS AND TRY TO REACH THEM AND LET THEM KNOW THAT THIS IS PART OF THEM



THIS WILL HEAL THEM. THIS WILL HELP THEM IN THEIR LIFE AND THAT IS WHAT MY MOM AND MY SIBLINGS HAVE TAUGHT ME



THIS IS THE WAY OF OUR LIFE, IS THE LAND, IS THE WATER, BEING IN NATURE



I FEEL REALLY GOOD WHEN I AM OUT ON THE LAND. I THINK THE YOUTH WOULD ALSO FEEL THAT COMFORT AND KNOW THAT THEY'D BEEN LOVED AND THAT THIS IS A WAY OF OUR LIFE

THIS IS JUST A WAY OF OUR LIFE, IS BEING A PART OF THE LAND



INDIGENOUS ENGAGEMENT |

June Johnson, Wei Wai Kai First Nations



ILLUSTRATED BY ǂǂǂǂǂǂǂǂ (CHENOA GAO)

INDIGENOUS ENGAGEMENT |

Faron Hambler, Kelly Lake Cree Nation

FARON IS A TRAPPER OF A LONG FAMILY LINE OF TRAPPERS. THE ANIMALS ON THE TRAP LINE MUST NOT TOUCH THE GROUND. ONCE THEY'VE BEEN HARVESTED THE REMAINS ARE HUNG ON TREES FOR THEIR SPIRIT TO GO BACK INTO THE LAND -- THROUGH THE BIRDS, BUGS AND OTHER ANIMALS THAT CONSUME THE PARTS OF THE ANIMAL THAT ARE LEFT BEHIND.



"MY MOM INSISTED THAT I GO TO CHURCH EVERY SUNDAY, GO TO SCHOOL MONDAY TO FRIDAY."



"MY DAD ON THE OTHER HAND WOULD SAY, 'THE LAND WILL LOOK AFTER YOU AS LONG AS YOU LOOK AFTER THE LAND'"

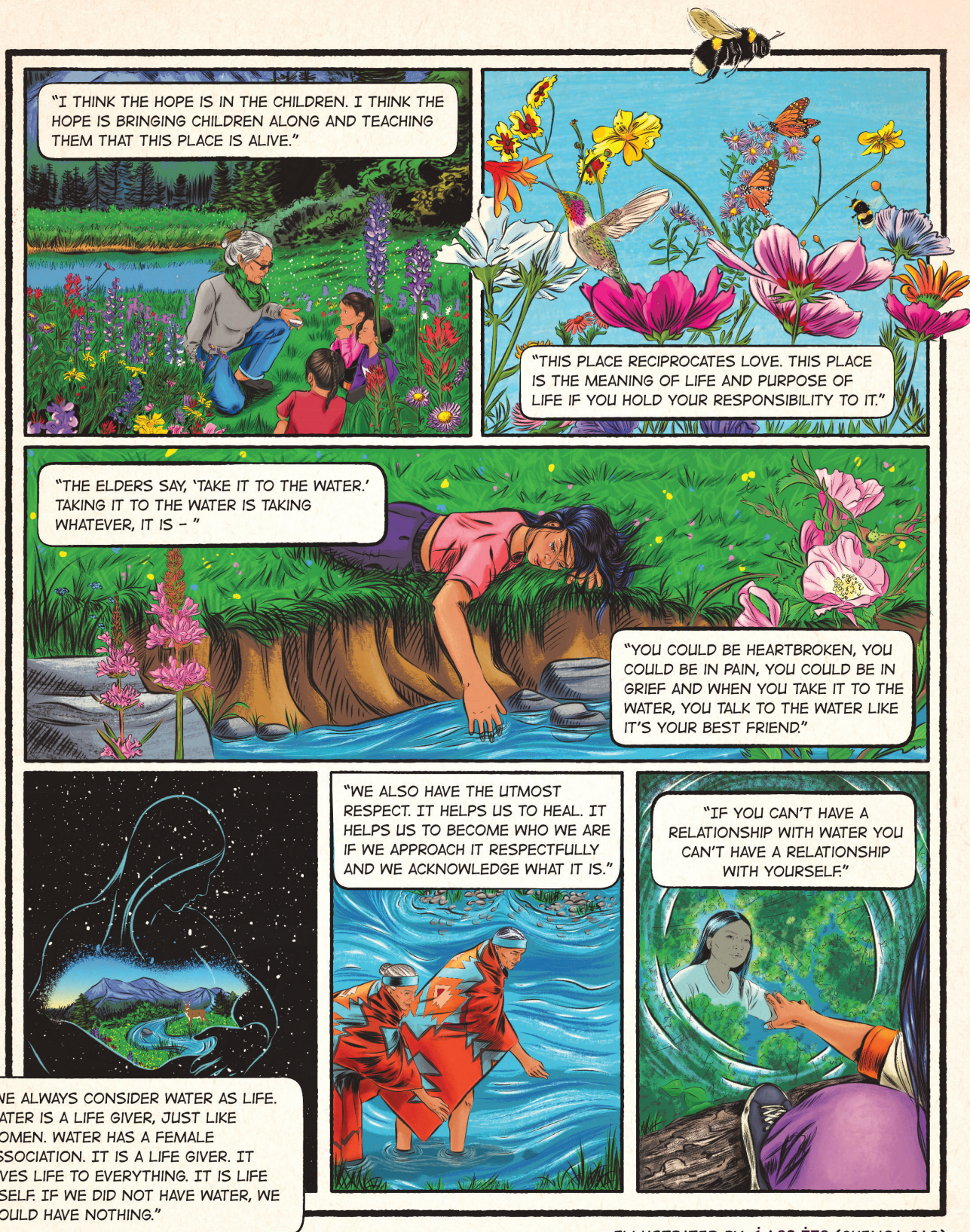
THAT IS MY PHILOSOPHY NOW. I TRY TO LOOK OUT FOR THE LAND, TAKE CARE OF THE LAND TO MAKE SURE THAT IT CAN STILL PRODUCE FOR ME AND PROVIDE FOR ME... WE'VE BEEN TAUGHT THAT THE LAND GIVES YOU WHAT YOU CAN LIVE ON. YOU'RE THANKFUL TO THE LAND. THE ANIMALS GIVE UP THEIR LIFE FOR YOU TO LIVE, BUT DON'T DISRESPECT THEM."



ILLUSTRATED BY ᑭᑭᑭᑭ ᑭᑭᑭᑭ (CHENOA GAO)

INDIGENOUS ENGAGEMENT |

Marilyn James, Autonomous Sinixt



ILLUSTRATED BY ǂǂǂǂǂǂǂ (CHENOA GAO)

Johnny Jackson, Lower Nicola Indian Band

A detailed illustration of a large, brown, eel-like fish, possibly a sturgeon, swimming in a stream. The fish has a long, pointed snout, a small eye, and a row of bony scutes along its back. It is surrounded by green foliage and rocks.


HI, MY NAME IS NEX'O?EYA

THE STURGEON IS THE ANCIENT ONE, SO I ALWAYS FEEL HONOURED WHEN I INTRODUCE MYSELF AND USE MY NLAKA'PAMUX NAME.




MOST OF OUR NLAKA'PAMUX FEMALE, THEIR NAMES END UP ENDING WITH Q'W'Ú?. THAT'S WATER. AND WATER IS ALL POWERFUL.

WE KNOW HOW POWERFUL WATER IS. IT LOOKS SO INNOCENT, BUT YET IT CAN TAKE YOU AND WITHOUT IT YOU WILL DIE.

A cartoon illustration of a dead cow lying on its side in a desert. The cow is white with brown spots and has a red flower in its ear. It is surrounded by green cacti with red and yellow flowers. In the background, there are rolling hills and a blue sky with two birds flying. The scene is set in a dry, arid landscape.

An illustration of five Native American women, likely from the Navajo or Hopi tribes, dressed in traditional ceremonial attire. They are standing against a solid blue background. The women are wearing elaborate beaded necklaces, large hoop earrings, and traditional dresses with fringed hems. Two of the women are wearing feathered headdresses. The woman in the center foreground is holding a small bowl. The overall style is that of a colorful, stylized illustration.

ILLUSTRATED BY 陳諾高 (CHENOA GAO)



“LEPS is thrilled to host a Wetlands Workforce work-pod. This project increases our capacity to undertake watershed enhancement and monitoring in the Langley area, and provide good, green jobs to young professionals just launching their environmental careers. In what has been a challenging time, the Wetlands Workforce is providing positive benefits and we are excited for the coming year!”

*Nichole Marples, Executive Director, Langley
Environmental Partners Society*

Photo by Cheyenne Bergenhenegouwen, Wetlands Workforce



OUR WORK-POD PARTNERS

The level of collaboration that has gone into the Wetlands Workforce project between the B.C. Wildlife Federation, partner NGOs and Indigenous communities is unlike any collaboration that has occurred in B.C. to date. The cohesive goal being strived for by all those involved: healthier, functional wetlands.

At the start of the project, it was anticipated the partner work-pods would conduct maintenance and monitoring work at 70 identified wetland sites. As the work commenced and new opportunities arose, more wetland sites were able to receive work. In total, the work-pods managed to visit and provide support to 252 wetland sites around the province.

The Wetlands Workforce project's key partners with work-pods include:

- B.C. Wildlife Federation (BCFW)
- Ducks Unlimited Canada (DUC)
- Fraser Valley Watersheds Coalition (FVWC)
- Wildcoast Ecological Society (WES)
- Langley Environmental Partners Society (LEPS)
- Nature Conservancy of Canada (NCC)
- Nature Trust of BC (NTBC)
- Yaqan Nukiy | Lower Kootenay Band (LKB)

The following section provides some of the highlights and achievements of our work-pods.

You can visit our partners online to learn more about their work, projects and accomplishments.



5

WORK-PODS

39

WETLAND SITES

50,355m²

INVASIVES & WEEDS REMOVED

59,040m²

NATIVE VEGETATION PLANTED

B.C. Wildlife Federation

Sharing Knowledge and Perspectives:

The Northern work-pod had the opportunity to host volunteers from Kelly Lake Cree Nation (KLCN) on site for WESP assessments. This was a major highlight for the crew as there was a deep sense of collaboration. The crew learned about KLCN's on-going study of caribou habitat and the work the community is doing for wildlife conservation. Experiences like this, allowed the work-pod to shift their perspective on wetlands from a primarily scientific understanding to a consideration of the value and functions different wetlands provide to local communities.

Outdoor Education with the Wetlands Workforce:

The Southwest work-pod organized planting and education days with two schools. At Dewdney Elementary School the crew helped students install native plants in the wetland on the school grounds. The BCWF Youth Program participated as well providing educational activities for the children to learn more about wetlands. The Southwest work-pod also had a planting day at KLO Middle School during the school's annual Green Day. The work-pod had students help plant trees and pick up garbage. These educational planting days were a high point for the work-pod as they got to teach youth about wetlands and the importance of maintaining these important ecosystems.



Combating Canada Thistle:

At their wetland site in Meadow Creek, the Kootenay work-pod made progress in combating a large area dominated by Canada Thistle. The area is the spoils pile from the construction of adjacent ponds, and establishment of native vegetation was extremely limited by the thistle. Following up on two years of previous annual brushing, the crew selectively brushed the area three times during the 2021 growing season-- enough to significantly interrupt seed production. In the fall, it was evident that the existing natural vegetation was successfully establishing full coverage, with little thistle remaining. These results are very encouraging for the effect that continuous persistent brushing can have on this problematic post-construction exposed soil.



Photos by Wetlands Workforce

Nature Conservancy of Canada

Chase Wetland Live Staking and Native Plant Restoration:

The West Coast work-pod maintained a native plant enclosure at NCC's Chase Wetland restoration site as part of a broader effort to re-establish wetland function and suppress invasive canary reed grass. The work-pod maintained the health of the native plant enclosure, removed invasive plants, monitored growth and produced an adaptive technique (using burlap coffee bags) to smother invasive plant species. The crew also initiated a large scale live staking work event for the wetland, preparing thousands of cuttings and teaching others live staking techniques.



Native Plant Restoration at Lac Du Bois:

The Southern Interior work-pod designed a native plant restoration project at Lac du Bois where they seeded and planted adjacent riparian and upland areas with native plant species. They installed restoration fencing, signage, browse guards and cleaned debris from the site.

Riparian Health Assessments:

The NCC work-pods completed 233 riparian health assessments across the province. These assessments help further understand the wetland health conditions across NCC conservation areas, help track health over time and these assessments helped map the extent of wetlands through ground truthing, leading to more accurate wetland extent data across the lands.



2

WORK-PODS

49

WETLAND SITES

17,310m²

INVASIVE & WEEDS REMOVED

10,857m²

NATIVE VEGETATION PLANTED



Photos by Wetlands Workforce



3

WORK-PODS

45

WETLAND SITES

112,468m²

INVASIVES & WEEDS REMOVED

54,000m²

DEBRIS & GARBAGE REMOVED

Ducks Unlimited Canada

Vegetation Surveys in the Fraser River Estuary:

The Fraser River Estuary (FRE) work-pod conducted vegetation surveys of 49 created and natural tidal marsh sites throughout the Fraser estuary to provide greater insight into the reasons why fish habitat compensation tidal marshes are often unsuccessful in the Fraser Estuary. The opportunity to assess additional sites allowed the team to increase their data set by twice the original size – providing a more comprehensive overview of the effectiveness of restoration projects along the Lower Fraser River. The FRE crew then drafted a report analyzing some of the factors that contribute to tidal marsh compensation success, which will be a useful tool for practitioners and advance the practice of tidal marsh compensation and restoration in B.C.



Surveillance and Maintenance in the Peace Region:

The Peace Region work-pod helped carry out required surveillance and maintenance at 33 of DUC dams across the Peace and Nechako regions of B.C. They were trained in application of herbicides for invasive plant control, and this allowed them to carry out this task at several sites with moderate Canada Thistle infestations which had not been treated for a few years. In addition, they installed 7 new project signs acknowledging DUC projects and the partners that helped develop them.



Nature Trust of BC

Wetlands from Above:

Work-pods were provided an opportunity to learn how to fly and utilize drones on Wetland Assessments and their own projects. Drones have improved the quality and efficiency of wetland assessments by allowing field technicians to situate themselves on a site to strategize site visits. The NTBC work-pods used their drone to conduct photo monitoring and inventory of the results of wetland restoration at the southern end of Cherry Creek. Photos taken by drones, and those stitched together to create orthophotos can allow high resolution site maps to be created and to monitor changes on the ground like weed patches, planting projects and large-scale restoration. The NTBC crew also used the drone and the skills they learned to take pictures of the Sun Creek Wetland Restoration site prior to restoration.

Shoreline Rubbish Clean-up:

The NTBC coastal work-pod hosted a community shoreline clean-up event on Savary Island. The crew were joined by residents who offered a helping hand. Together they removed 100 kg of rubbish. Most of the garbage collected included Styrofoam, ropes, plastic bottles and old camping gear. After the demanding work, the work-pod was able to connect more with the community volunteers over a hot lunch around a bonfire at the beach. Overall, the NTBC crews removed rubbish and debris from 59 sites. They completed 3 beach clean-ups and cleaned-up the mess from several unauthorized campsites.



Tree Planting with the Slocan Streamkeepers Society:

The NTBC Kootenay crew worked closely with the Slocan River Streamkeepers Society (SRSS) to plant 50 trees and shrubs at the Walter Clough Wildlife Area. Songbird nesting boxes were also installed as part of a larger project that represents a new partnership between NTBC, SRSS and the Ministry of Forests, Land, Natural Resource Operations and Rural Development. The NTBC crews managed to plant a total area of 5,500m² with new vegetation to improve the habitats at 9 different sites.

NATURE TRUST
BRITISH COLUMBIA



4

WORK-PODS

48

WETLAND SITES

102,000m²

INVASIVES & WEEDS REMOVED

5,500m²

NATIVE VEGETATION PLANTED



Photos by Nature Trust of BC



YAQAN NUKIY
LOWER KOOTENAY BAND

1

WORK-PODS

4

WETLAND SITES

420,000m²

INVASIVES & WEEDS REMOVED

470,000m²

NATIVE VEGETATION PLANTED

Yaqaan Nukiy | Lower Kootenay Band

Western Painted Turtle Habitat:

The LKB work-pod spent some time enhancing habitat for Western Painted Turtles. The massive Yaqaan Nukiy wetland restoration project is benefiting many species at risk such as the Northern Leopard Frog, Brown Bats, White Sturgeon, Burbot, and the Western Painted Turtle. The work-pod helped clear 6 turtle nesting sites of vegetation including invasive plants. They also participated in daytime amphibian and turtle surveys.



Learning from a Wetland Expert:

The LKB work-pod had the opportunity to learn first-hand from Wetland Ecologist and Wildlife Biologist, Tom Biebighauser. Tom is a contractor who leads the design and construction of wetland restoration projects across North America. For the past decade he has worked as a contractor for the BCWF on their wetland restoration projects. The work-pod had the opportunity to shadow Tom, who was working in partnership with the Yaqaan Nukiy LKB on their project to restore floodplains that cover hundreds of hectares along the Kootenay River. The crew helped flag and measure the ground water depth during Phase 4 of the restoration project.

Tom provided virtual training to all the partner work-pods on wetland restoration, restoration techniques and the history of drainage. For the LKB crew it was a huge highlight to learn from Tom in-person during the restoration of a wetland.

Seeding and Live Staking:

The LKB work-pod used the live staking technique extensively at their wetland site. The crew live stacked with red osier (dogwood), cottonwood, and willow, covering an area of 2.44 hectares. The crew planted 900 live stakes. They also planted TRS live stakes. TRS stands for Tall Rooted Stake. This is when a live stake has been rooted in a deep container for off-season bio-engineering installations. The crew started growing 800 TRS stakes with 670 surviving the cutting and being re-planted. In addition, the crew seeded over 47 hectares of the wetland and spent several days collecting seeds from native plants like sedges and bullrush to add to their seed mix.



Langley Environmental Partners Society

Invasive Species Removal:

The LEPS work-pod visited 32 past project sites providing maintenance and enhancement work. Many of these sites have not been worked on for some time. Many of the native plants that were previously planted were found covered in blankets of Himalayan Blackberry and Ivy. The LEPS work-pod cleared 199,200m² of invasive plants, pest, and weeds from their sites. In returning to these sites, the work was meaningful, not just a cursory snip but multiple trips back when needed and time to dig up invasive roots and stake up trees keeping these wetlands healthier and more functional.



Restoring Traditional Names:

The LEPS work-pod collaborated with Kwantlen Lands, Resources and Stewardship division, Katzie First Nation and Semiahmoo First Nation on a project to identify traditional names of local streams, in order to add the traditional indigenous names to road crossing signs throughout Langley, the Walnut Grove/Willoughby, and South Langley areas. Some of the creek names identified include: Samaqua - Nathan Creek and TATALU - Little Campbell River

Exploring New Opportunities:

The project provided increased capacity for LEPS to take on new projects and engage in other partnership project opportunities. A major highlight for the LEPS work-pod was the opportunity to participate in a wide diversity of projects and receive a variety of experiences including training, hands-on labor in the field, and being involved with projects of different scope and scale.



1

WORK-PODS

38

WETLAND SITES

199,200m²

INVASIVES & WEEDS REMOVED

12,240m²

NATIVE VEGETATION PLANTED





1
WORK-PODS

17
WETLAND SITES

53,312m²
INVASIVES & WEEDS REMOVED

9,969m²
NATIVE VEGETATION PLANTED

Wildcoast Ecological Society

Rejuvenating Flower Lake:

The WES work-pod helped with restoring Flower Lake in Mount Seymour Provincial Park. Flower Lake had been negatively affected by erosion of nearby ski trails, causing infilling, and reducing water quality for amphibians. The Flower Lake Restoration Project was in partnership with BC Parks, Mt Seymour Resort, with support from the Tsleil Waututh First Nation. The work-pod worked hard collecting pre-restoration data at the site, including water quality, vegetation cover and invertebrate analysis. Native plants were salvaged in preparation for the excavator to restore the lake.



Flower Lake Before



Flower Lake After

Restoring Riparian Habitat at Trout Lake:

The WES work-pod worked to restore the riparian area around Trout Lake in the City of Vancouver. Urban areas are sometimes overlooked for habitat restoration, but they are extremely important for waterfowl, songbirds, bats, and numerous other species. WES worked on the project in partnership with the City of Vancouver Parks Board, with support from the Tsleil Waututh First Nation. Following the riparian restoration work, the work-pod led residents on an evening "bat walk" around the lake. It was a major highlight for the crew to see children and parents get excited to see bats flying around and to educate them on how important bats are to wetland ecosystems.

Strengthening MacKay Wetland:

MacKay Wetland in North Vancouver had been severely neglected over the years, was used as a dumping site, and was overgrown with invasive species. WES had excavated the wetland and removed the garbage and invasive plants, but the site needed riparian area restoration. The WES work-pod worked throughout the year to help restore this habitat by removing garbage and invasive plants and planting native plants. The project was carried out in partnership with the District of North Vancouver, with support from the Squamish and Tsleil Waututh First Nations.



Photos by Wildcoast Ecological Society

Fraser Valley Watersheds Coalition

Maintaining Restoration Sites:

The ability to return to previous project sites and provide maintenance and monitoring work was a huge highlight for the FVWC. Monitoring past sites allowed needs and deficiencies to be identified; so that the crew could take measures to improve the site's functions towards supporting people and biodiversity values. Maintenance is one of the most important aspects of restoration project success and watershed management. The FVWC work-pod planted 4,335m² of native vegetation, installing over 4,000 native shrubs, plants, and trees.

Training and Hands-on Learning:

The FVWC work-pod dedicated 560 hours to training and education. Through the online training provided by the Wetlands Workforce the work-pod was able to have a shared learning experience on a variety of topics. The work-pod also learned how to: build a nesting structure for Purple Martins, follow proper procedures for measuring and weighing fish (salmon such as coho and chinook) caught during monitoring sessions, identify native vegetation (red alder, salmonberry, and nootka rose) vs. invasive vegetation (such as Himalayan blackberry), and control invasive species.



Watershed Education:

The Wetlands Workforce project provided the capacity for the FVWC to hire a Watersheds Educator to support spreading awareness and understanding of watersheds and biodiversity. This helped the FVWC share their work and achievements more broadly on social media and develop more in-depth curriculum-based lessons delivered to schools and organized community groups.



1

WORK-PODS

12

WETLAND SITES


47,513m²

INVASIVES & WEEDS REMOVED

4,335m²

NATIVE VEGETATION PLANTED





“This work is important because wetlands are some of the most valuable habitats you can restore that cover a vast majority of everything within the area. In restoring wetlands, you can create habitat for a range of animals, plants, invertebrates, amphibians, and fish. Everything uses them.”

*Norm Allard, Community Planner,
Lower Kootenay Band*

ENVIRONMENTAL OUTCOMES

WETLAND RESTORATION

Many of the wetlands our work-pods worked at were previously restored sites. Quite often there is funding to support restoration projects, but it is difficult to find funding to continue to maintain and monitor these sites. The Wetlands Workforce provided an opportunity to remedy this with crews dedicating their time to enhance the quality and functions of these restored wetlands.

The Wetlands Workforce also provided an opportunity to support many new restoration projects around the province.

Yaqaan Nukiy Wetland Restoration



LKB work-pod with Tom Biebighauser at the Yaqaan Nukiy wetland restoration site. Photo by Cheyenne Bergenhenegouwen, Wetlands Workforce.

The LKB work-pod helped support the fourth phase of the Yaqaan Nukiy wetland project in Creston B.C. This project aims to restore over 517 hectares of naturally appearing and functioning wetlands and floodplains by filling ditches, removing reed canary grass, and recontouring altered wetland basins along the Kootenay River.

As of 2021, over 121 hectares of the site's floodplains, wetlands, streams and rivers have been restored and connected for a variety of wildlife species.

Dillon Creek Wetland Project

The Wetlands Workforce provided support to the Dillon Creek Wetland Restoration Project, a project launched by the Friends of Cortes Island and Linnaea Farm Society.

Two wetlands were restored along Dillon Creek, fencing was installed to exclude livestock, and native vegetation was planted. This project will enhance habitat for a diversity of species, such as frogs, newts, bats, dragonflies, birds, and waterfowl.

Denman Island Wetland Project



Planting prep at Denman Island wetland project. Photo by Kendall McLaughlin, B.C. Wildlife Federation.

The BCWF Southwest work-pod supported the preliminary steps to the construction of the Butterfly Reserve at Denman Island Provincial Park. The crew conducted baseline surveys and invasive species removal prior to construction.


This project was part of the BCWF's 2021 Wetlands Institute (a 7-day stewardship workshop). Ten hectares of wet meadow habitat was constructed to support the endangered Taylor's checkerspot butterfly (*Euphydryas editha taylori*).

Ginty's Pond

The Wetlands Workforce was able to support in the planning stages of the Ginty's Pond project. Ginty's Pond (Lowe Slough), also known as N7aŝw̓t in the Syilx language, remains a culturally significant gathering and hunting place for Smelqmix people, as well it holds significance to the local Cawston community.

The restoration project is scheduled to take place in the fall of 2022 and aims to restore nearly two hectares of wetland and riparian woodland-shrub habitat by deepening (excavation) of the wetland, adding woody debris, and planting native grasses, shrubs, and trees adjacent to the wetland.

This project will support and enhance wildlife habitat, extend the length of time water remains in the wetland, and provide more opportunities for wildlife viewing.



“Wetlands and watersheds really represent life. Without water, you are not going to have life [...] Since we are losing them at such a fast rate around the world, it is important that we start discovering how we replace them and conserve them as much as we can.”

*Steve Blair, Field Technician,
B.C. Wildlife Federation*

Photo by Cassie Friesen, B.C. Wildlife Federation

WETLAND MAINTENANCE

Work-pods were deployed with a focus of maintaining and strengthening wetlands and riparian habitats. Some of the maintenance work completed includes:

- Removal of Invasive Species, Pest and/or Weeds
- Planting of Native Species
- Installation and Repairing of Protective Fencing
- Waste and Garbage Removal
- Installation of Signage
- Dam Maintenance

Peach Creek and Hooke Wetlands



Peach Creek and Hooke Wetlands post restoration. Photo by FWWC.

The FWWC work-pod did some major maintenance to Peach Creek and Hooke Wetlands along the Vedder River.

The work-pod cleared 5,210 m² of riparian area from invasive vegetation to help re-establish the natural vegetation and support biodiversity. In addition, 1,013 m² was planted with native trees and shrubs to help enhance the functionality of the stream and the wetland.

During November's catastrophic flooding of the Fraser Valley, rearing salmon were able to use the off-channel habitats of Peach Creek to escape the high-flow velocities of the Vedder River.

This provided space for adult salmon to spawn, supporting salmon populations. In addition, the Hooke Wetlands soaked up excess stormwater mitigating the flooding that impacted much of the Fraser Valley.

Herbivory Exclosures in the Mudflats



DUC Marsh Recession work-pod tighten the cables of the exclosures at Sturgeon Banks. Photo by Wetlands Workforce.

Fencing has been used in several ways by our different work-pods to help protect wetland ecosystems.

One of the tasks of the DUC Marsh Recession work-pod was to maintain goose exclosures, designed to exclude Canada and Snow Geese from grazing and grubbing native bulrush (*Schoenoplectus pungens*) in the mudflats of Sturgeon Banks and Roberts Bank Wildlife Management Area.

These exclosures are created with 6 PVC pipes that are wrapped around with stainless steel airplane cabling, creating a fence-like structure around certain vegetation.

The team worked to tighten the steel cables of the exclosures and removed any seaweed or debris they found.

Natural Fencing

At Hyppo Landing, a cattle range area managed by the Ministry, the BCWF Kootenay work-pod constructed a fence surrounding the wetland with the intention of excluding cattle from the riparian area without limiting access by wildlife.

The crew used a creative method of constructing the fence with zero material costs. By salvaging large woody debris, they interlocked root balls, large branches, and logs to create a 200-meter-long natural fence. It was one of the crew's proudest accomplishments of the season.

The efficacy of the fence will be monitored to see how the experimental design can be improved.



Several tires were removed from the shoreline by the clean-up crew. This one was removed from Boundary Bay. Photo by Wetlands Workforce.

Fraser River Estuary Clean-up

The BCWF Fraser Estuary Clean-up work-pod started work at the end of September. Their aim was to remove garbage and debris from over 60km of shoreline along the Fraser River Estuary. Over the course of 12 weeks the crew managed to remove 9,530 kg of debris from 62.6 km of shoreline.

The work-pod focused their efforts at 4 main locations with an additional day spent with Tsawwassen First Nation to clean up debris along the community beach. The crew cleaned the shorelines of, South Arm Marsh (SAM), Westham Island, Boundary Bay, and West Dyke Trail.

Styrofoam, ranging in size from a few centimetres to over 3 meters tall, was the most numerous item removed. Lighters, plastic bottles and plastic bags were also common.

These plastic materials are crucial to remove from the shorelines as they can lead to toxic materials entering the waterways and in turn the fish and wildlife that depend on these habitats.

Protecting the important ecosystems of the Fraser River Estuary from these potentially harmful materials was the main aim for implementing this large-scale shoreline clean-up.

Logs for Turtle Basking

The BCWF Southwest pod helped install turtle basking logs at a couple of wetland sites in the Southern Interior. At the Toles wetland site, near Kamloops, the crew installed 3 logs to create a basking log set up for Western Painted Turtle.

Once the basking logs were installed in mid-July, the wildlife cameras from the crew's monitoring project captured 4 turtles basking on the logs. The crew also helped install turtle basking logs at the wetland site near Gardom Lake.

Wetland Enhancement through Live Staking

Live staking is a method that reintroduces plant life into areas where it is needed most such as eroding stream banks. Live stakes are branches that are cut from pioneering species, such as Cottonwood (Balsam poplar), Red-osier Dogwood and Willow species. These branches are planted into a deep hole in the ground where they will begin to root.

If done correctly, this is a fast and efficient way to bring back natural vegetation to an area. Dave Polster from Polster Consulting LTD provided online training to all the work-pods on how to use live staking in the field. The recorded training session will act as a legacy as one of Dave's last public training sessions as he officially retired in 2021.

This technique was used by several of the work-pods at different wetland sites across the province. NCC used the technique at Chase Woods Nature Preserve to naturally combat the growth of invasive Reed Canary Grass at the site.

The LKB work-pod used this technique to establish vegetation at their newly restored wetlands. Once these stakes are established into mature trees, they will also provide shade for the streams and waterways that move through this wetland complex.



NCC work-pod installing live stakes at Chase Woods Nature Preserve. Photo by Wetlands Workforce.

“I think the biggest thing about this project which has been the most fascinating to me and it is something we can all use going forward is the amount of collaboration that has happened.

We have shown when different partners, non-profits, schools, and First Nations come together we are able to accomplish a lot.”

*Katie Mitchell, Field Technician,
B.C. Wildlife Federation &
Ducks Unlimited Canada Northern work-pods*



WETLAND MONITORING

Over the course of the Wetlands Workforce project, our crews monitored and collected data to assess the effectiveness of restoration techniques, the overall health of wetlands and how techniques can be improved moving forward. Some of the wetland monitoring activities that were conducted include:

- Bird Monitoring
- Amphibian Monitoring
- Wildlife Surveys
- Plant Surveys
- Photo Point Monitoring
- Water Quality Monitoring

BC Marsh Monitoring Program



BCWF Southwest work-pod conducting bird surveys at a site on Salt Spring Island. Photo by Wetlands Workforce.

The Wetlands Workforce work-pods participated in the first year of the BC Marsh Monitoring Program by conducting bird surveys for Wild Research.

In its first year of offering the Monitoring Program in B.C., Wild Research received more than 900 detections across 71 survey stations covering 21 wetlands within the Lower Mainland. More than 500 birds and 200 amphibians were detected, and more than a hundred plants were identified.

Wildlife Tree Effectiveness Monitoring

In addition to receiving training in the Canadian Aquatic Biomonitoring Network (CABIN), conducting invasive plant surveys and wildlife danger tree assessments, the NTBC Kootenay work-pod had the opportunity to do Wildlife Tree Effectiveness Monitoring.

This is an assessment of developing habitat features of wildlife trees created at least five years ago. The process is still being developed by the province, but the work-pod was able to apply it and help field-test the protocol.

Amphibian Cover Board Surveys



Our work-pods saw many frogs out in the field. Photo by Alex Newall, NCC.

Amphibians and reptiles, although small, play a key role in wetland ecosystems. They cycle nutrients in both water and land environments, and they contribute to the consumption of algae and insects.

As part of the BCWF's monitoring work to study the health and function of their selected restored wetland sites, 212 coverboards were placed at 18 of the wetlands the BCWF Southwest and Kootenay work-pods focused their efforts on.

The coverboard technique uses planks of wood that serve as habitats for reptiles and amphibians that seek moist and shaded areas of refuge. The crews have spotted western toad, long-toed salamander, common garter snake, northwestern garter snake and western terrestrial garter snake through these surveys.

Yaqaan Nukiy Wildlife Monitoring Program

As part of the Yaqaan Nukiy Wetland project the LKB is conducting a four-year Wildlife Monitoring project at the restored sites. Cameras were first installed in 2019.

The LKB work-pod helped set up 35 new wildlife cameras and song meters at the beginning of the season. During the fall they helped to upload, organize, and review the data that was collected.

After just two years of data collection the monitoring program shows grizzly bears, moose, elk and other large species utilizing the wetlands. The camera traps and song meters are also taking in migration patterns from waterfowl and migratory birds.

This monitoring program will help show the effectiveness of the restoration work being completed at the Yaqaan Nukiy Wetlands.

Macroinvertebrate Study



Steve Blair and Cindy Lu, Wetlands Workforce Field Technician, collecting samples from one of their study sites in the Kootenays. Photo by Wetlands Workforce.

The Wetlands Workforce was able to support the work of Steven Blair. Steven is a student at the British Columbia Institute of Technology and Simon Fraser University, completing his master's study that focuses on the effectiveness of restored wetlands. Through the collection of macroinvertebrates, Steven aims to determine the state of an ecosystem's health and recovery.

The goal of the study is to determine:

- if aquatic invertebrates are effective bioindicators of ecosystem health in created and reference wetlands;
- if the results of this study can help guide future restoration construction techniques; and
- what adaptive management actions can be used to increase colonization of aquatic invertebrates in restored or created wetlands.

Data collected at each wetland included aquatic macroinvertebrates, water quality, physical habitat characteristics, and soil organic thickness and compaction.

Although still early in the study, some initial results suggest young wetlands need more than 2 to 3 years to develop organic layers similar to reference wetlands. This preliminary conclusion should be taken with some caution as the organic soil thickness was only measured up to 10cm for this study, and some of the sites may have had organic soil added during the initial construction.

The Wetlands Workforce in collaboration with Integrated Ecological Research, Centre for Biodiversity Genomics (University of Guelph), STREAM and Slocan River Streamkeepers supported the work of Steven Blair.



Photos by Wetlands Workforce.

Wildlife Cameras

The BCWF work-pods installed 35 wildlife-monitoring stations at 22 of their wetland sites in the Southwest and Kootenays. These cameras not only captured wildlife that frequented the wetlands, but they also collected data on the wetland's fluctuating water levels over the field season.

This data will help determine the length of time water is available at wetland sites to support wildlife species and provide information about the resilience to climatic variability. The water levels will also establish the seasonality of the wetland.

Elk, deer, moose, bears, sandhill cranes, great blue herons, hawks, and several other wildlife species were spotted with the wildlife cameras utilizing the wetlands the BCWF work-pods supported.





Collecting drone imagery of a wetland in Northern B.C. for WESP. Photo by Rebekah Ingram, B.C. Wildlife Federation.

WETLANDS ECOSYSTEM SERVICES PROTOCOL & PREDICTIVE MAPPING

The Wetlands Workforce work-pods were trained in the Wetlands Ecosystem Services Protocol (WESP) and helped gather data to create a predictive mapping layer for wetlands in British Columbia. The field data gathered will support better decision-making products for wetland conservation.

Predictive Mapping

Effective wetland conservation requires knowledge of the location and types of wetlands that occur on the landscape. For decades, wetland practitioners identified the need for more accurate wetland data layers in B.C.

The advancement of technology has allowed us to use machine learning in our efforts to produce better wetland maps. A predictive wetland map is a data layer, generated from computer algorithms, that identifies locations, extent and type of wetlands based on probability. The quality of the maps produced relies on good input, such as verified field data.

As our work-pods went out to gather information to conduct WESP, they also gathered information to support a predictive map layer for the wetlands they assessed. Some of the data gathered includes drone footage, vegetation plots, and water quality.

This information was reviewed by a qualified ecological professional to ensure that our data would have high value for use by geospatial information specialists. Canadian Wildlife Service intends to integrate our field data into future predictive mapping products within B.C., and to use our data collection process as an example of high-quality wetland data collection for implementation with other groups and projects.

What Predictive Mapping Captured

Wetland classes are differentiated by developmental characteristics and the environment that a wetland exists in. Generally, wetland classes are distinguished by soil type, water inputs and what kind of vegetation is dominant. This is what we discovered:

95
Swamps

Nutrient rich with significant ground water inputs and able to support large trees and/or tall shrubs. These wetlands can support high levels of biodiversity and are some of the most time-intensive for field technicians to assess.

79
Marshes

Either permanently or seasonally flooded, these wetlands can be easily recognized by the dominance of grass-like vegetation. When water levels are low, marshes can be the fastest to survey since there usually is not as much vegetation to push through compared to other wetland types.

44
Bogs

The most acidic wetland class, these systems are isolated from groundwater and the vegetation is dominated by sphagnum moss, which over time has developed into deep peat. Bogs can support trees, shrubs and broad-leaved plants.

39
Fens

The other peatland ecosystem but with higher nutrient inputs due to groundwater influence. These communities are dominated by brown mosses and grass-like species.

42
Estuaries

These intertidal communities with brackish waters influenced by the tide can be found where marine environments meet freshwater sources in the Lower Mainland and on Vancouver Island.

24
Transitional Communities

Communities that do not fit into a single wetland class often occur in nature, because the western science classification systems of “rules” is not able to confine and capture the extent and diversity of our natural world. These transitional communities can be observed when a wetland is transitioning between different wetland classes and as such doesn’t fit into either category or is at the transition between a wetland and a drier upland.

21
Floodplain

These ecosystems may resemble wetlands but are located on the “benches” of rivers or wave-washed lakeshores and have well-drained soils due to seasonal flooding events. Floodplain ecosystems can be difficult to distinguish from marshes or swamps without sampling soils or investigating waterway inlet and outlets.

13
Shallow Open Water

These wetlands are permanently flooded and can be recognized by having open water with rooted submerged or floating-leaved aquatic plants such as lily pads.

Wetlands Ecosystem Services Protocol

Wetlands provide many eco-system services for free. Until now, there has been no standardized way in B.C. to measure the relative performance of a wetland’s various functions (e.g., flood attenuation, carbon storage, etc.).

This type of information has all sorts of value in terms of making better informed conservation decisions. WESP is a standardized method for rapidly assessing important natural functions of wetlands. It utilizes over 60 field questions and over 40 office/GIS questions as input to determine 17 functions and attributes of a wetland complex relative to other wetlands in the region.

The creation of the WESP model was focused on 4 ecoprovinces, where each Wetland Workforce work-pod dedicated a minimum of two weeks assessing randomly selected natural wetlands.

These are the main highlights discovered in each ecoprovince.

Between these two mountain ranges is the distinct Rocky Mountain Trench, a large, faulted valley extensively eroded and in-filled by glacial debris, which contains the iconic Columbia Wetlands, spanning 180km long and an important flyway for migrating birds.

Downstream of the Columbia Wetlands, much of the Columbia River has been impacted by a series of dams and water reservoirs, resulting in the loss of many low-lying wetlands. Forest-based industries are prominent in this region as well as coal mining in the Elk Valley and some metal mining across the region. Wetlands in this ecoprovince are concentrated at lower elevations and are important hotspots for biodiversity including the Flathead Valley in the far southeast and several national parks.

Wetlands are important wildfire breaks in the Interior region of B.C., with these wetter areas being more resistant to wildfire than the drier upland forests. Wetlands also play a key role in stream flow temperature and regulation, vital to native trout and salmon populations. Wetlands in this region store and shade water in the headwaters of many streams and rivers, which is especially important during hot and dry summers when native trout and salmon rely on healthy streams.

17 field technicians learned to use WESP and wetland classification for the assessment of wetlands across the Kootenays between Golden, Salmon Arm, Grand Forks, and Fernie.

At least 31 different types of plant associations were captured across 102 wetland verification points on 62 wetlands. These sites captured a diversity of wetland classes, including:



Top Goods and Services Provided



Stream Flow Temperature Support [SFTS] | A wetland’s effectiveness for maintaining normal surface flow and temperature regimes in receiving waters.



Fish Habitat [FH] | The capacity to support an abundance and diversity of native fish (both resident and visiting species).



Fire Resistance [FR] | A wetland’s capacity to resist ignition by wildfire, thus potentially limiting wildfire spread. (an attribute, not a function)

Southern Interior Mountains



The Southern Interior Mountains are in the southeast region of B.C. and made up of two dominant mountain ranges: the Continental Ranges of the Rocky Mountains are along the eastern extent and the Columbia Mountains extend across much of the ecoprovince.



Members from one of the NTBC work-pods enjoying the splendours of being outside in a wetland. Photo by Sylvie Hawkes, Nature Trust of BC.

Georgia Depression



The Georgia Depression is a large basin between the Vancouver Island Mountains and Olympic Mountains on the west and the southern Coast Mountains and northern Cascade Ranges on the east. This region includes many cities and contains most of B.C.'s population. Much of the ecoprovince has been converted to urban and industrial infrastructure, intense agriculture, or used for logging and recreation.

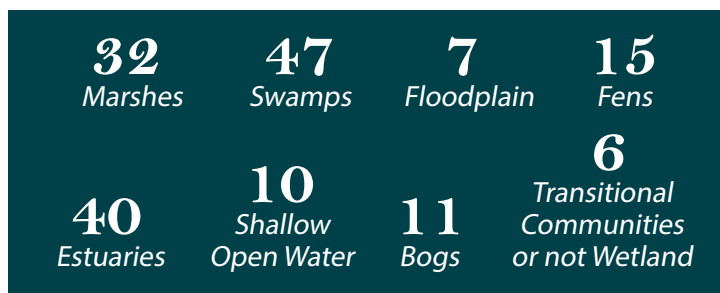
Wetlands in this ecoprovince are quite modified by draining, dikes and diversions, but all wetland classes can be found in the ecoprovince, along with tidally influenced wetlands. Wetlands are concentrated in the Fraser River delta, making up the largest single unit of wetland habitat and vital to migratory and wintering waterbirds.

Wetlands play a key role in storing water, especially during periods of heavy rainfall. The capacity of a wetland to soak up water and buffer the increase of flow in waterways downstream can reduce the impacts of flooding on infrastructure. Wetlands in the Georgia Depression also benefit water quality by sequestering Nitrogen and Phosphorus,

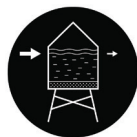
which are common contaminants associated with agriculture and the use of fertilizers on crops, lawns and greenspaces. Healthy wetlands can store Nitrogen and Phosphorus, therefore removing it from waterways and making our water cleaner to consume, grow food with, and recreate in.

40 field technicians across the Lower Mainland and Vancouver Island learned to use WESP and wetland classification for the assessment of wetlands across the Georgia Depression.

48 different types of plant associations were captured across 171 wetland verification points on 68 non-tidal and 29 tidal wetlands. Due to the highly modified condition and urbanization in this ecoprovince, classification of wetland classes can be difficult due to highly modified soils, invasive species and modified hydrology by draining, ditching and berms changing where wetlands would have occurred historically, or how they are developing currently. Wetland classes captured included:



Top Goods and Services Provided



Water Storage and Delay [WS] | The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods.

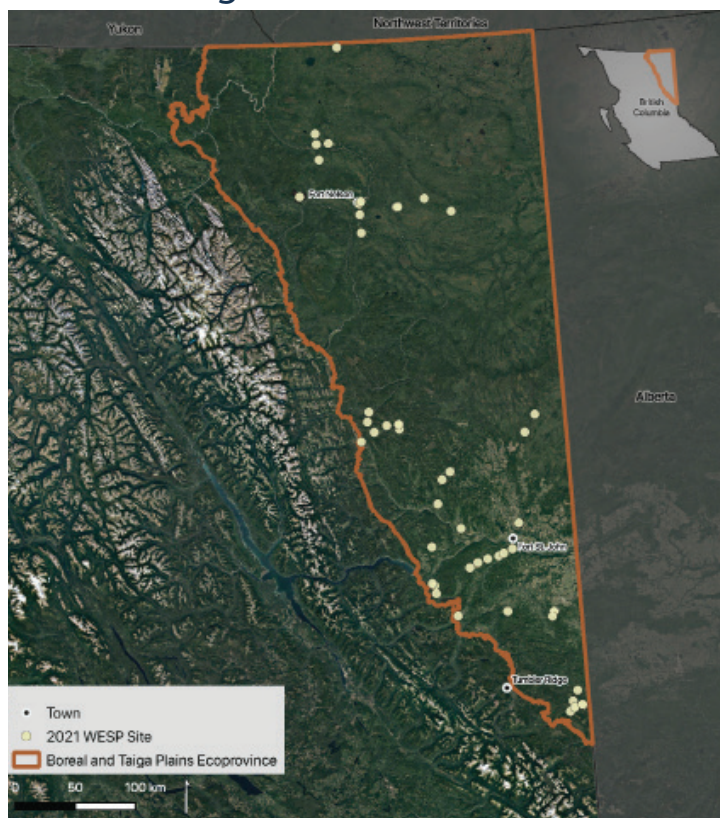


Nitrate Removal & Retention [NR] | The effectiveness for retaining particulate nitrate and converting soluble nitrate and ammonium to nitrogen gas, primarily through the microbial process of denitrification, while generating little or no nitrous oxide (a potent "greenhouse gas").



Phosphorus Retention [PR] | The effectiveness for retaining phosphorus for long periods (>1 growing season) as a result of chemical adsorption, or from translocation by plants to below ground zones with less potential for physically or chemically remobilizing phosphorus into the water column.

Boreal & Taiga Plains



Located in the northeast section of British Columbia, these ecoprovinces are northeast of the Rocky Mountains and consist primarily of areas with minimal topography, apart from deeply incised rivers. Forest fires are naturally abundant in these ecoprovinces, resulting in a mosaic of forest succession stages throughout the region.

The footprint of oil & gas activities is a prominent and expanding feature within these ecoprovinces, in addition to agricultural activity in the Boreal ecoprovince. The climate is mostly continental but is impacted by cold arctic air in the spring and winter months at the northern extent. In the Boreal and Taiga Plains, many ungulate species such as caribou and moose rely on wetlands as a food source, especially during winters with a deep snowpack.

Due to the minimal topography, wetlands in these regions' are vast, and peatlands are abundant. Often a single wetland complex can encompass hundreds of hectares. Bogs and Fens in these regions have deep reserves of peat underground. Peatlands hold high concentrations of carbon that have been transformed by plants from airborne greenhouse gases (like CO₂) into soil. This process, known as carbon sequestration, is a valuable service that wetlands provide. Once the carbon is stored underground, it is relatively stable and can remain within the peatland for thousands of years. This process is one important tool for reducing the amount of greenhouse gases in the atmosphere and mitigating climate change.

The Taiga Plains has one of the highest concentrations of wetlands in the province by area. Wetlands in these regions provide optimal habitat for breeding and migrating waterbirds, supporting 60% of all bird species known to occur in the province.

At least 26 different types of wetland plant associations were captured across 98 wetland verification points on 53 wetlands. Wetland classes captured include:



Top Goods and Services Provided



Carbon Stock [CS] | The total biomass of organic carbon that has accumulated over time within a wetland's soil/sediment. (An attribute, not a function).



Keystone Mammal Habitat [KMH] | A wetland's capacity to support a relative abundance of moose, caribou, beaver, muskrat, and/or grizzly/brown bear, even for brief periods annually.



Waterbird Habitat [WB] | The capacity to support an abundance and diversity of migratory and wetland-breeding waterbirds, such as ducks, grebes, bitterns, and rails.

“If everyone by the end of this project has a little greater appreciation for what wetlands do for humanity, I think that could have even bigger effects going forward in even more diverse fields.”

***Kyla Rushton,
Wetland Assessment
and Field Coordinator,
Wetlands Workforce***



Samantha Cochrane, Tamara St. Pierre and Joy Ann Chipesia participate in WESP near Pink Mountain. Photo by Wetlands Workforce.

NORTHERN LIGHTS COLLEGE

"This opportunity established a baseline for students to value an important part of the ecosystem and be able to apply their theoretical skills in botany, soil, and ecology in a purposeful way. The practicum also provided a consistent model that allowed relationships and trust to build with the practitioners. Students were given a sense of accomplishment and pride to be a part of this study." Shellie English, Instructor, Northern Lights College

Unique to the WESP work conducted in the northeast of the province, was a partnership between the Wetlands Workforce and Northern Lights College (NLC).

This partnership provided field hours for the practicum component of the College's Land and Water Resources Diploma, while also providing additional hands-on-deck for WESP assessments. Students in the NLC program joined the Wetlands Workforce work-pod for a minimum of one week in the field, learning first-hand wetland assessment techniques, investigating wetland function, and solidifying content learned in-class during their program.

"It's been really cool to be able to give the students an opportunity to get out into the field and see a bunch of different types of wetlands across the region. It has also been valuable to learn from their perspectives and traditional knowledge of the environment [...] The most unique thing about the Wetlands Workforce project is that it is involving a diversity of people in the field. The crews involve people that have a lot of experience in wetlands and those who have not come into these systems before, which I think is helping to spread knowledge and the importance of wetlands throughout our society." Rebekah Ingram, B.C. Wildlife Federation

While on site with the Wetlands Workforce, the students helped answer over 100 WESP questions used to classify each wetland site and provide an idea of the wetland's functions on the landscape.

This partnership provided the Wetlands Workforce with valuable local context and background knowledge for many of the sites, as well as offering unique perspectives to the assessments.

Over the course of the field season the work-pod hosted 16 students and 5 First Nation community members in the field.


"It's been really awesome to work with the Northern Lights College. We have all been able to learn a lot from each other. They've been able to teach us things about the wetlands that we didn't know, and we've been able to give them some tools for them to be able to bring back to their communities and help them to be able to protect wetlands in their area." Katie Mitchell, B.C. Wildlife Federation



Photos by Wetlands Workforce.

ACKNOWLEDGEMENTS



A photograph of a pond with a turtle resting on a log. The turtle has a yellow and black striped pattern on its head and neck. The water is calm, reflecting the surrounding greenery. In the background, there are more logs and some green plants growing along the edge of the pond.

“Healthy watersheds provide the foundation for vibrant healthy communities. Watersheds give us all a place to call home (people and wildlife). Its natural processes clean our air, soil and water. We use its natural resources for food, water, medicine, and rely on many of these resources for our daily lives and for trade and commerce. The opportunity to monitor, enhance and care for local watersheds is an investment in human health, community wellbeing, economic prosperity and resilient natural diversity that pays in dividends.”

*Natashia Cox, Program Director,
Fraser Valley Watersheds Coalition*

PARTNERS & COLLABORATORS

Thank you to our partners who participated in this project and to all those that supported the work of our various work-pods over the year.

Project Work-pod Partners

- B.C. Wildlife Federation
- Ducks Unlimited Canada
- Fraser Valley Watersheds Coalition
- Langley Environmental Partners Society
- Nature Conservancy of Canada
- Nature Trust of BC
- Wildcoast Ecological Society
- Yaqan Nukiy | Lower Kootenay Band

Visit our partners online to learn more about their projects and achievements.

First Nation Communities

Thank you to all the communities and community members that welcomed our work and shared their knowledge along the way.

- ʔaqam
- Akisqnuq
- Autonomous Sinixt
- Blueberry River First Nation
- Cowichan Tribes
- Doig River First Nation
- Fort Nelson First Nation
- Halfway River
- Holmalco First Nation
- Horse Lake First Nation
- Katzie First Nation
- Kelly Lake Cree First Nation
- Klahoose Nation
- Kwantlen First Nation
- Kwikwetlem First Nation
- Lake Babine Nation
- Lheidli T'enneh First Nation
- Little Shuswap Lake Band
- Lower Nicola Indian Band
- Lower Similkameen
- Lyackson First Nation
- Malahat First Nation
- Matsqui First Nation
- McLeod Lake Indian Band
- Musqueam Indian Band
- Nadleh Whut'en First Nation
- Nak'azdli Whut'en
- Nazko First Nation

- Nee Tahi Buhn Indian Band
- Nlaka'pamux Nation Tribal Council
- Okanagan Nation Alliance
- Prophet River First Nation
- Semiahmoo First Nation
- Shuswap Band
- Skwah First Nation
- Squamish Nation
- Tk'emlups
- Tobacco Plains
- Tsal'alh
- Tsawwassen First Nation
- Tsleil Waututh Nation
- Wei Wai Kai
- Wei Wai Kum
- Xwaaqwm First Nations (Stq'eeye' Learning Society)
- Yaqan Nukiy | Lower Kootenay Band

Project Collaborators

Thank you to all those who provided logistical support and services to the Wetlands Workforce and to our Partner work-pods.

- A Rocha Canada
- Abbotsford Rotary Club
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- BC Institute of Technology
- BC Marsh Monitoring Program
- Bertrand Creek Enhancement Society
- Bird Studies Canada
- Canadian Wildlife Federation
- Canadian Wildlife Service
- Capital Regional District (CRD)
- Cherry Hill Elementary
- Chilliwack Field Naturalists
- City of Abbotsford
- City of Burnaby
- City of Chilliwack
- City of Grand Forks
- City of Langley
- City of Mission
- City of Prince George
- City of Richmond
- City of Vancouver Parks Department
- Coastal Painted Turtle Project
- Deering Timber
- Delta Ladner Rod and Gun Club
- Denman Conservancy Association



Canada Geese at Brunswick Point. Photo by Samara Kolasko, Ducks Unlimited Canada.

- Derby Reach Brae Island Park Partners Association
- Dewdney Elementary School
- Discovery Coast Greenways Land Trust
- District of Logan Lake
- District of Mackenzie
- District of North Vancouver
- East Kootenay Invasive Species Council
- Ecologic Consulting Ltd.
- Elke Wind Consulting
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- Fisheries and Oceans Canada
- Fraser Valley Regional District
- Friends of Cortes Island
- Gardom Lake Stewardship Society
- Glen Valley Watersheds Society
- Greater Vancouver Zoo
- Hakai Institute
- Hummingbird Drones
- Integrated Ecological Research
- James Island Property Management
- Kerr Wood Leidal
- Kinseed Ecologies
- Kleanza Consulting Ltd.
- KLO Middle School
- Kwantlen Polytechnic University
- Langley Field Naturalists
- Linnaea Farm Society
- Little Campbell Watershed Society
- Mackenzie Secondary School
- Metro Vancouver East Area Parks
- Metro Vancouver Parks Department
- Ministry of Environment and Climate Change Canada
- Morfee Elementary School
- Mount Seymour Resort
- Northern Lights College

- North Shore Wetland Partners
- Ophiuchus Consulting
- Penticton and Area Cycling Association
- Polster Environmental
- Province of BC
 - BC Parks
 - Ministry of Environment and Climate Change Strategy
 - Ministry of Forests, Lands, Natural Resource Operations and Rural Development
 - Ministry of Transport and Infrastructure
- Regional District of Central Kootenays
- Regional District of Nanaimo
- Rewilding Water & Earth Inc.
- Saanich Parks Department
- Salmon River Enhancement Society
- Savary Island Land Trust
- Simon Fraser University Slokan River Streamkeepers
- Smart Shores
- Southern Interior Land Trust
- Stave Valley Salmonid Enhancement Society
- Surrey Parks Department
- Township of Langley
- Trinity Western University
- University of the Fraser Valley
- University of Guelph
- Wetland Restoration and Training LLC
- Wild Research
- Yorkson Watershed Enhancement Society

A big thank you goes out to all the Landowners that welcomed our crews to the restored wetlands on their property and to all our trainers who provided custom training sessions to our work-pods and staff.

We appreciate your support, dedication, and passion for wetlands.

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HEALTHY WATERSHEDS INITIATIVE

The Wetlands Workforce project was supported through the Healthy Watersheds Initiative, which is delivered by the Real Estate Foundation of BC and Watersheds BC, with financial support from the Province of British Columbia as part of its \$10-billion COVID-19 response.



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THANK
YOU
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