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Alouette Watershed Community Connections Project

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Prepared for Fish and Wildlife Compensation Program

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Cover photo: Trethewey Channel, downstream section flowing into the South Alouette River.

All photos in the report are courtesy of the Alouette River Management Society.

EXECUTIVE SUMMARY

The Alouette Watershed Community Connections project was completed in March 2025. It took place mostly over the summer of 2024 and fall of 2024, specifically the excavation of an off-channel salmon spawning and rearing habitat called Trethewey Channel and then the subsequent restoration of the excavated areas along the channel bank that included planting native tree and shrubs species including Thimbleberry (*Rubus parviflorus*), lady fern (*Athyrium filix-femina*), Salmonberry (*Rubus spectabilis*), Black cottonwood (*Populus trichocarpa*), and Hookers willow (*Salix hookeriana*).

The off-channel habitat had been previously choked with reed canary grass (RCG) and was greatly impacting the flow of water through the channel which drained from the South Alouette River and then flowed back into the South Alouette. However, due to the build up of silt and the extent of RCG, the channel was no longer functioning as fish habitat for salmonids. The channel now has been cleared of the RCG, native plants have been installed and invasive plants such as Himalayan blackberry have been removed from trees previously planted as well as some likely naturally revegetated. Along the way, we ran a number of different community workshops including Streamkeepers training and native planting workshops to help encourage local participation in stewarding areas along the South Alouette River that support salmon species including chum (*Onchorhynchus keta*), coho (*Onchorhynchus kisutch*), sockeye (*Onchorhynchus nerka)*, chinook *Onchorhynchus tshawytscha)*, and pink *Onchorhynchus gorbuscha)*.

A total of 1,288 m² was restored, including 527 m² of salmon habitat stream area and 761 m² of riparian area, where 687 native plants were installed. Over 200 volunteers helped with invasive plant removal and native planting, contributing 527 volunteer hours, with 11 volunteers trained in proper techniques. The restoration removed sediment and invasive reed canary grass, improving habitat connectivity. However, Japanese knotweed couldn't be treated due to its proximity to water. Key results include planting 687 trees and shrubs, rehabilitating 527 m² of stream area, and engaging a community of volunteers.

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INTRODUCTION

The completion of the Alouette Dam in 1928 effectively blocked salmon access to what was then called Lillooet Lakes, now referred to as the Alouette Reservoir. All five resident salmon species experienced dramatic declines in numbers due to the loss of habitat in the upper portion of the watershed as well as downstream impacts such as the loss of the river's natural capacity to overflow seasonal channels. This project was needed as there is limited rearing habitat for salmonids in the Alouette River. Trethewey Channel, originally completed in 2007, required built up fine sediments to be removed from the streambed and invasive reed canary grass to be cleared from the inlet and outlet of the channel in order to reopen valuable off-river salmonid habitat.

Trethewey Channel had filled in with sediment and invasive reed canary grass in recent years, significantly restricting the flow and reducing rearing habitat. By clearing out the channel and enhancing the surrounding riparian area, the amount of usable salmonid rearing spaces within Trethewey Channel was increased, providing 1288 square meters of off-channel habitat for salmonids to thrive in. Priority areas that were worked in were identified in conjunction with Fisheries and Oceans engineers and biologists, who also oversaw the instream works prior to works commencing.

It is anticipated that chinook, chum, coho, pink, and sockeye salmon will all benefit from this completed project work although some species such as coho salmon are more likely to benefit from this habitat in the winter season as well as additional freshwater fish species that reside within the Alouette Watershed.

REVIEW OF GOALS AND OBJECTIVES

Goal 1) Community Connections Workshops

Increased community education is directly related to improved ecosystem health due to the knowledge sharing and awareness brought by working together. A series of 12 community stewardship activities will strengthen connections within our community, while working together towards a common goal of improving the health of the watershed. Many of these activities will be run in partnership with other local stewardship groups, such as Green Teams Canada, Pacific Streamkeepers Federation, Invasive Species Council of Metro Vancouver, and Maple Ridge Adopt-a-Block Program.

Objectives

- Plan one event per month

- Activities will vary in content, ranging from litter cleanups, invasive species removals, native species plantings, storm drain markings, eco art activities, to water quality monitoring.
- Relevant guest speakers will be brought in for each activity, sharing their knowledge with community members and providing education on an abundance of topics, linked together by the overarching theme of enhancing ecological integrity in the Alouette Watershed through restoration and community engagement.

Goal 2) River Resident Streamkeepers Workshop

Due to the Alouette River being primarily privately owned, monitoring and restoration works often need to take place on private property. Working alongside residents can often pose challenges due to a lack of education surrounding stewardship activities, and further education would promote a positive environment looking forwards.

Objectives

- Host a Streamkeepers workshop for local residents.
- Participants will receive Pacific Streamkeepers Federation training to enhance their monitoring skills while learning what makes their role as river residents so important for the overall watershed health.

Goal 3) Trethewey Rearing Channel Enhancement

Channel has filled in with sediment and invasive reed canary grass in recent years, significantly restricting the flow and reducing rearing habitat. By clearing out the channel and enhancing the surrounding riparian area, the amount of usable salmonid rearing spaces within Trethewey Channel will be increased, providing off channel habitat for salmonids to thrive in. Works will be overseen by Department of Fisheries and Oceans engineers and biologists.

Objectives

- Clear 50 cubic meters of sediment build up.
- Remove 250 square meters of invasive grass.
- Replant area with 250 native plants and willow stakes to increase bank stabilization and channel cover.

Linkage to FWCP Action Plan and Specific Actions

- Coastal Watershed Action Plan - Alouette River Watershed Action Plan
- Ecosystem Chapter – Rivers, Lakes & Reservoirs
- Action Type – Habitat-based Actions
- Priority Action - ALU.RLR.HB.12.01 Implement habitat enhancements in Lower Alouette River-P1

- Description - Implement habitat enhancements in Lower Alouette River. If a restoration plan has been completed under Action 3, please reference that plan for more information.
- Outcome: Sustain and restore habitat capacity and population viability of anadromous and resident salmonids.

STUDY AREA

The South Alouette River is located in the City of Maple Ridge, British Columbia. The South Alouette River Watershed is a relatively small system (144 sq. km) arising in the Coastal Mountains of the Golden Ears Provincial Park, approximately 50 km northeast of Vancouver, BC. The upper watershed flows into an impounded reservoir known as Alouette Lake. At the reservoir's river outlet, the South Alouette River flows for 21 km through Maple Ridge and Pitt Meadows before entering the Pitt River.

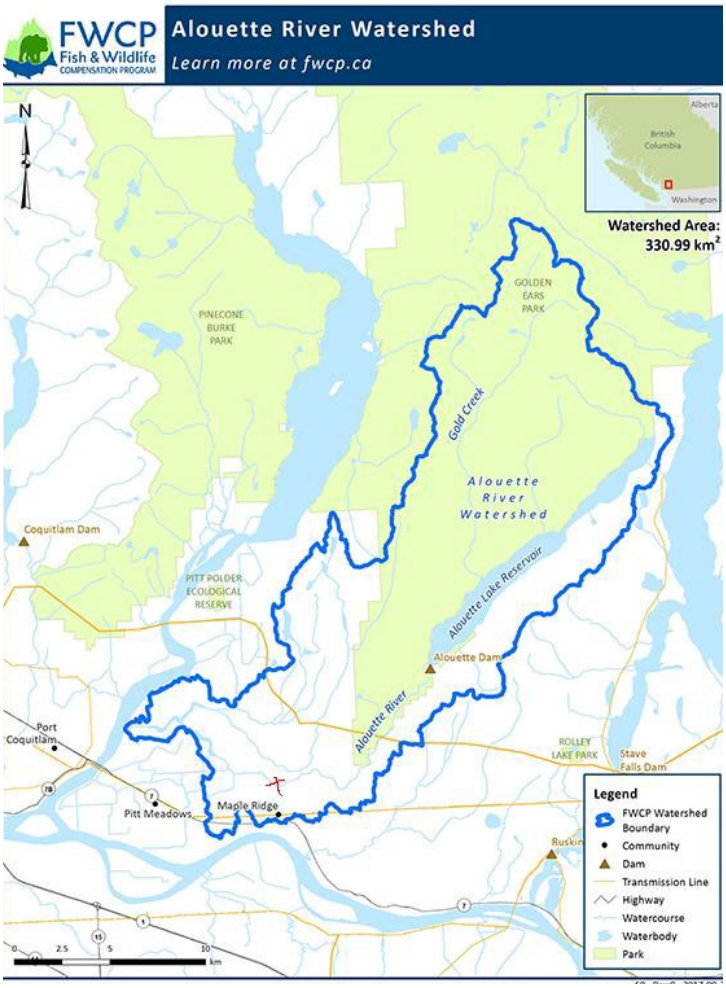

Figure 1 Map of Study Area-Alouette Watershed

The Pitt River, in turn, flows south into the Fraser River at Douglas Island. The Alouette Reservoir was constructed by the BC Electric Railway Company in 1925 and completed in 1928. A low-level earth-filled dam was constructed on the southern outlet of what were then two lakes called "Lillooet Lakes". The Alouette River was impounded for hydroelectric power through reservoir storage.

Specific Site Description of Instream Works

Trethewey Rearing Channel - GPS Coordinates: 49.24110° N, 122.62942° W

Figure 2 Trethewey Channel, Maple Ridge, B.C.

The project site is located as off channel salmon habitat along the South Alouette River. It is located on a private property in which deeded ownership includes both opposing riverbanks and the channel of the river, as was custom in old land grants on the Alouette. The land is owned by the Trethewey's and is managed under the name of "Coniagas Ranches". The original project was a partnership between Alouette River Management Society (ARMS), Department of Fisheries and Oceans Canada (DFO), and a private landowner in Maple Ridge, BC, with the financial support of BC Hydro Bridge Coastal Fish and Wildlife Restoration Program.

METHODS

In mid-April, the project team liaised with Fisheries and Oceans senior habitat restoration biologists and contractors to plan site visits and discuss the logistics of the proposed works. In mid-May, ARMS project team and Fisheries and Oceans senior habitat restoration biologist, resource technician and Lynx Consulting (contractor) met out at the project site to view the area, discuss logistics and how and when the work would start. From the site visit, the project lead coordinated with the Fisheries staff to confirm availability of the contractor for the summer fisheries window and then the project lead went ahead to order the necessary supplies for the invasive plant suppression including tarps, pins, sourcing gravel, sourcing large woody debris and other needed materials. Coordination included working with Fisheries and Oceans senior biologists to order large woody debris logs to place into the pond area of Trethewey Channel to increase rearing habitat. Once confirmation was received from the contractor, Lynx Consulting, the work was confirmed to start on the week of August 19, 2024. The project lead worked on selecting the appropriate species and number of native plants and ordered from a local wholesaler for plant installation later in the fall of 2024.

Prior to the excavation work commencing DFO senior biologists and technicians spent time at the Trethewey Channel to set up seine nets and exclusion nets to capture any fish in the channel prior to the work taking place.

The excavation team used a John Deere 85G excavator and skidsteer. In addition, a ZX5 Hitachi machine was hired and a SVL75 skidsteer to get the Hitachi in place to complete the work at the Trethewey pond area although there was a section that still could not be reached.

We used the Streamkeepers methodology for volunteer monitoring activities including water quality surveys, aquatic invertebrate surveys, and riparian area assessments. We intend to incorporate the information gathered into recommendations and next steps for future projects in the area.

RESULTS AND OUTCOMES

During the initial seine net and exclusion fences, the Fisheries and Ocean staff found the following invasive species in the Channel:

- sculpins
- oriental weather loaches
- stickleback

- pumpkinseed
- pike minnow

Figure 3 Sculpin

Figure 4 Pike minnows

The number of each species was not recorded, and all the invasive species were not returned to the river.

Figure 5 Weather loaches

A total area of 1,288m^2 was restored including in-channel area of 527m^2 of salmon habitat stream area was rehabilitated. The riparian area was replanted covering an area of 761 m^2 with a total of 687 native plants installed including slough sedge (*Carex obnupta*), beaked sedge (*Carex rostrata*), dense sedge (*Carex densa*), hardhack (*Spiraea douglasii*), Pacific Ninebark (*Physocarpus capitatus*), Black twinberry (*Lonicera involucrata*), Red osier dogwood (*Cornus sericea*), Thimbleberry (*Rubus parviflorus*), lady fern (*Athyrium filix-femina*), Salmonberry (*Rubus spectabilis*), Black cottonwood (*Populus trichocarpa*), Hookers willow (*Salix hookeriana*), pacific willow (*Salix lucida*), goldenrod (*Solidago canadensis*), and big leaf lupine (*Lupinus polyphyllus*). Over 200 volunteers participated in the invasive plant removals and native plant installations, 11 volunteers were trained in proper removal techniques and planting techniques and 527 hours of volunteer hours were contributed to the project through this work.

Prior to restoration, the upstream channel was completely sealed off from the Alouette River due to sediment buildup and dense reed canary grass, while the downstream channel had very limited access for juvenile salmonids.

Our efforts significantly improved connectivity and habitat conditions by removing excess sediment and invasive reed canary grass and replanting affected areas with native vegetation. However, we were unable to remove or treat the Japanese knotweed at this time due to its proximity to the water, as herbicide treatment was not an option.

- Number of trees/shrubs planted: 687
- Stream area rehabilitated: 527m^2
- Volunteers trained: 11
- Volunteers and community engaged: 201
- Volunteer hours donated: 527

Figure 6 Before - Trethewey Channel (downstream) choked with reed canary grass

Figure 7 After - Longreach excavator in Trethewey Channel

Figure 8 Upstream portion of Trethewey Channel - before

Figure 9 Pond section of Trethewey Channel with burlap coconut matting

Figure 10 Addition of angular gravel on streambank

Figure 11 Upstream portion - Before and after with angular gravel and coconut matting for bank stability

In addition, 4 large woody debris sections were installed in the pond area of Trethewey Channel, however, were not cabled in so two sections were caught up on a small foot bridge going over from the property over to the small island after the atmospheric river event in late October 2024 . These large woody debris sections were later removed by the property owner and pulled up onto the river bank for a future re-installation.

Figure 12 Large woody debris installation

Figure 13 Large woody debris being removed after atmospheric river

In post-monitoring, monitoring crew set gee traps on April 1, 2025, and came back on April 2. No salmon were detected in the traps at that time. However, there could have been chum fry in the channel, but they may have left already the area. In the traps that were set, the following species, both invasive and non-invasive were found.

- Signal crayfish - native
- Stickleback - invasive
- Sculpin - native
- Northern Pikeminnow - native

- Bridgelip Sucker - native

We also noticed some bank sloughing from the new channel that was created, from when we had high water levels in November 2024. We installed more willow stakes to increase bank stability. We also came back in June 26, 2025, and did not see any juvenile salmon at that time. We took the YSI and completed some water samples throughout the channel. The measurement results are below:

- Temperature 15.1C
- Dissolved Oxygen 89.4%
- Specific Conductivity 34.0
- pH 7.56
- NO mV (Nitric Oxide) 188.8

DISCUSSION

The Alouette Watershed Community Connections Project combined both machine and manual labor to restore vital salmon habitat. Heavy machinery was utilized to remove sediment buildup, invasive reed canary grass, and to install spawning gravel, while staff and volunteers manually planted native species, removed invasive plants, and installed beaver cages. One major challenge was that the excavator used for sediment removal could not fully reach the center of the pond, emphasizing the need for a long-reach excavator in future projects. To address this limitation, the operator strategically worked along the waterline and accessed multiple entrance points to remove as much sediment as possible. However, the excessive sediment build-up caused by reed canary grass extended the duration of machine work, leading to some budget overages for contracted services. Additionally, fluctuating water levels due to atmospheric rain events required adjustments to the placement of woody debris and planting efforts, highlighting the importance of scheduling these activities before storm season and securing debris with cables to prevent movement.

A significant challenge throughout the project was the density of invasive species, particularly Himalayan blackberry and Japanese knotweed, which exceeded initial expectations and required more time for removal. Knotweed management was particularly difficult, as herbicide treatment was not an option due to its proximity to water. Instead, we focused on manual removal and replanting with competitive native species, though long-term management will be needed to suppress regrowth effectively. Future efforts should allocate more dedicated time and resources for invasive species removal,

ensuring that areas cleared of blackberry and knotweed are replanted with shade-producing native trees and shrubs. Increasing native planting efforts will not only help suppress invasive regrowth but also enhance habitat quality and improve ecosystem resilience by preventing the return of reed canary grass, knotweed, and blackberry. Another key recommendation is to identify a better source of spawning gravel, as the material provided by the city contained excessive sand and variable-sized rocks, making installation more time-consuming.

Despite these challenges, the project led to several positive and unexpected outcomes. Volunteer engagement was higher than anticipated, with participants traveling from across the Lower Mainland to take part in planting and invasive removal events. This was largely supported by Lower Mainland Green Team's outreach efforts, demonstrating strong community interest in habitat restoration. The project also strengthened partnerships with stewardship groups and landowners, laying the foundation for future conservation initiatives. Additionally, the improved habitat has already seen increased use by local wildlife, signaling early success in restoring ecosystem function. Looking ahead, establishing a multi-year maintenance plan will be crucial to prevent the re-establishment of invasive species and ensure that native plantings continue to thrive. Expanding community education efforts on invasive species management and habitat restoration will further support long-term sustainability. By refining our approach, securing additional funding, and making strategic adjustments, future projects can enhance the effectiveness and efficiency of salmon habitat restoration in the Alouette Watershed.

An unintended outcome of this project was a deeper understanding of the challenges posed by invasive species in sensitive aquatic environments, highlighting the need for ongoing maintenance and adaptive management strategies to ensure long-term habitat restoration success.

Figure 14 Planting natives at Trethewey Channel, Nov 2024

In other areas of this project, we successfully met our objective of hosting 12 stewardship activities within the Alouette Watershed, including three invasive species removals, three native shrub plantings, three storm drain markings, and three litter cleanups. These events engaged over 200 community members, who contributed more than 527 volunteer hours toward the protection and advocacy of salmonid habitat. While we met our expected number of events, the total volunteer hours fell short of our initial estimate of 750 hours. This was due in part to some activities requiring less time to complete than originally anticipated. Additionally, storm drain marking activities, which can only be conducted during dry weather, were impacted by unexpected rainfall. As a result, some events had to be rescheduled, leading to lower participant turnout on the new dates. Despite these challenges, we were able to achieve our overall objectives, successfully engaging the community in hands-on conservation efforts and fostering greater awareness of salmonid habitat restoration.

Figure 15 Replanting the pond area with small shrubs and emergent sedges

We successfully hosted two Streamkeepers training sessions in July and September 2024 in partnership with the Pacific Streamkeepers Federation. Through these sessions, we trained 11 volunteers in water quality and habitat monitoring, equipping them with the knowledge and skills necessary to contribute to local conservation efforts. While we were just short of our goal of training 12 volunteers, the sessions fostered a stronger connection between stewardship groups and property owners, helping to build relationships that will support future restoration efforts in Trethewey, Coniagas, and in the future along Latimer Channel. An unintended outcome was the high level of engagement from participants, many of whom expressed a keen interest in continuing their involvement in future monitoring and restoration activities. This enthusiasm suggests a growing sense of stewardship among local residents, which will be beneficial for ongoing conservation initiatives.

Figure 16 Himalayan blackberry before removal

Figure 17 Lower Mainland Green Team volunteers remove blackberry from project area

RECOMMENDATIONS

For continued optimization of the work completed, we recommend that a long reach excavator be brought in for future work at this site due to mid-pond distance from streambank which we found difficult to reach with the equipment that was used during the project work this time around. There would be benefits to the ponded area with the addition of secured woody debris installations before the next storm season in 2025 if possible.

Additionally, continued removal of Himalayan Blackberry removal will assist in the reclamation of the streambanks so that more native shrubbery can be planted, preferably those that were planted during this project work, those that are fast growing and can out-compete the invasive plants.

During the project work, we found a medium size patch approximately 25 feet by 15 feet of Japanese knotweed (or one of the other variants) which should be monitored closely as it lies in the small island where Alouette River comes up in the fall and seasonally inundates the area. Knotweed is known to spread via small fragments broken off which float downstream and then regrow in new areas. It is fast-spreading and can quickly establish along the riverbanks as it has done in other areas of the Alouette River. Treatment, if any, would need to look into the most suitable, low intrusive methods possibly, with professional help from expert groups such as the Invasive Species Council of Metro Vancouver. Planting fast-growing, competing native species to suppress the growth of knotweed is a potential option.

Although the City of Maple Ridge kindly offered us spawning gravel from the North Alouette dredging in early summer 2024, the actual gravel that was delivered was not suitable for our use in Trethewey Channel as it was mostly sand and very small pebbles. We would highly recommend finding a better source of spawning gravel for 2025 and/or future years to increase the spawning capacity area.

In addition, continued post-monitoring of the native plants that were installed will be necessary to ensure as much survivability as is possible. Beaver activity was quite active in the area, and we noticed that once we removed invasive plants like Himalayan blackberry from around the larger trees the beaver would then start to chew at them. Fencing these larger trees to protect them is highly recommended for any future invasive plant removals along the channel.

As the large woody debris sections that were placed in the pond area of Trethewey Channel were not cabled in, a couple of those sections moved downstream in the channel so we would highly recommend cabling in those sections for next year.

We also recommend continued native plants for shading along the channel bank as this is needed for shade, food drop, and bank stability. Increasing the number of in-water native plants such as sedges, rushes, and other native emergent would assist in creating more habitat for juvenile salmon to hide in away from predators.

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