

Riparian Restoration of KÉLSET Creek

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Restoration of Natural Systems Certificate

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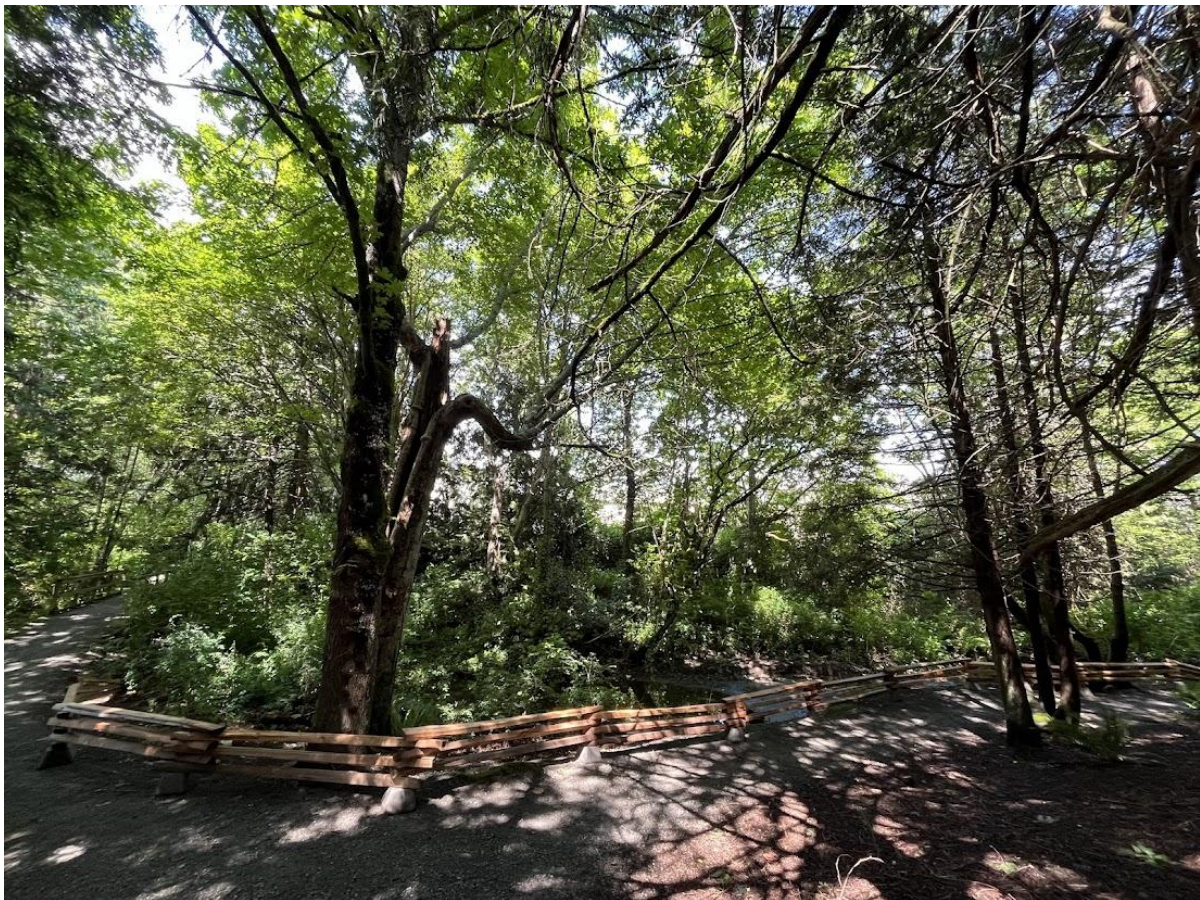


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Abstract

ÍELSET (Reay) Creek is an urban stream on the Saanich Peninsula of Vancouver Island with a long history of degradation. The focus of this report is a small section of the creek that was identified as a restoration priority by Peninsula Streams Society (PSS) due to eroding banks, sparse native vegetation cover, and dominance of invasive plants. These issues were targeted with objectives to manage invasive species, plant native species, install split rail fencing, and facilitate community engagement, with the overarching goal of stabilizing banks and enhancing riparian and stream habitat quality. Invasives management and native revegetation occurred on April 22, 2025, during a community planting event, and split rail fencing was installed soon after. New plantings were hand-watered monthly during the first dry season. Qualitative monitoring showed variable success in native plant survivorship and reasonably good success for invasives management. The presence of the split rail fence has not prevented people from accessing the restoration area. A key takeaway from this project is the importance of designing a monitoring program that will allow for quantitative evaluation of project success, which can then inform adaptive management. Future efforts at the project site could include installing educational signage, replacing plants that did not take, applying a groundcover seed mix, and continuing to manage invasives. Overall, this project achieved many elements of its objectives, but its monitoring program did not effectively answer whether the restoration actions successfully achieved the goal of enhancing the function of riparian and stream habitat.

Acknowledgements

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Introduction

The arrival of European settlers in North America has had significant impacts on the health of the continent’s freshwater systems (Waldman & Quinn, 2022). Today, most streams in urban areas are simplified, dammed, shunted through underground pipes, and suffering from poor water quality due to point- and non-point sources of pollution (Naiman & Turner, 2000; Scoggins et al., 2022). Their riparian areas are often overrun by invasive plant species, and their stream banks are eroding due to soil compaction and altered hydrological patterns (Aronson et al., 2017). These impacts have not only reduced riparian and instream habitat quality and function, but decreased the resilience of these systems to the increasingly frequent and severe weather events brought on by climate change (Crozier & Siegel, 2023). KÉLSET (Reay) Creek on the Saanich Peninsula of Vancouver Island, is one such a degraded urban stream and is the focus of this report.

The KÉLSET (Reay Creek) watershed crosses two municipal boundaries: the District of North Saanich and the Town of Sidney and is in the traditional and unceded territories of the W̱SÁNEĆ people (Figure 1). The headwaters of KÉLSET Creek begin within the Victoria International Airport flowing south-east through Reay Creek Park (1.86 hectares) until it meets the Salish Sea at Bazan Bay (Capital Regional District, 2024). The KÉLSET watershed has many groundwater springs that produce cool base flows of water that support aquatic life including populations of coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*Oncorhynchus clarkii*), prickly sculpin (*Cottus asper*), and threespine stickleback (*Gasterosteus aculeatus*) (Johnson & Plate, 2018). Located in the Moist Maritime Coastal Douglas-fir subzone (CDFmm), the area experiences mild, wet winters and warm, dry summers due to its position in the rain shadow of the Vancouver Island and Olympic mountains (Province of British Columbia Ministry of Forests, 1994).



Figure 1. Map of the KÉLSET (Reay Creek) Watershed on the Saanich Peninsula of Vancouver Island, showing the location of the KÉLSET riparian restoration project.

History of KÉLSET Watershed

Prior to colonization, the WŚÁNEĆ people, in particular the WŚÍ,ĶEM (Tseycum) Nation cared for and were supported by KÉLSET, known by settlers as Reay Creek outflowing to Bazan Bay (Elliott & School District 63 (Saanich), n.d.). KÉLSET Creek (and nearby XENTEN Creek with westward outflow to Patricia Bay) were used as portage routes between WŚÁNEĆ villages to the east and west of what are now Victoria International Airport lands (WŚÁNEĆ Leadership Council, 2020a). The village at KÉLSET (Bazan Bay) was a place for harvesting camas and purple and green sea urchins, launching canoes, and welcoming visitors from the gulf islands and beyond (WŚÁNEĆ Leadership Council, 2020a). KÉLSET Creek supported an abundance of life, including healthy populations of cutthroat trout and coho salmon (WŚÁNEĆ Leadership Council, 2020b).

Over the last century, KÉLSET Creek has experienced many hydrological alterations from developments such as the Reay Creek Pond which was created for duck farming in 1935, and the construction of the Victoria International Airport in 1939 (Macdonald & Bruce, 2015). Fish kills caused by toxic run-off and pollution events from surrounding areas, in particular the airport, have been a reoccurring issue for the watershed (Macdonald & Bruce, 2015). Concern for fish populations was what first spurred environmental stewardship efforts from the local community (particularly the Sidney Anglers Association) in the later decades of the 20th century (UVIC Community Mapping & Peninsula Streams Society, 2025). In an attempt to bolster populations, about 2,000 coho fry were outplanted from the Goldstream River Hatchery into KÉLSET Creek in 1982, but unfortunately, the pollution issues continued (Macdonald & Bruce, 2015; Peninsula Streams Society, n.d.). Finally, after much advocacy and scientific investigation into heavy-metal contaminated sediments, Reay Creek Pond was declared a Class 1 contaminated site by Environment and Fisheries and Oceans Canada in 2015, marking a new era for the area's management (Murray, 2019; UVIC Community Mapping & Peninsula Streams Society, 2025).

In the past decade, Peninsula Streams Society (PSS) has collaborated with community groups, First Nations, and government on various restorative efforts in the watershed (Peninsula Streams Society, n.d.). Some of these projects have been larger-scale, including the construction of a fish ladder to bypass the Reay Creek Dam, the construction of an upstream detention pond, and the removal of cadmium-contaminated sediments from Reay Creek Pond via dredging (UVIC Community Mapping & Peninsula Streams Society, 2025). Others have been smaller scale, involving riparian and instream habitat enhancement work along the creek (Peninsula Streams Society, n.d.). This report details the riparian restoration of a small section of KÉLSET Creek completed in the spring of 2025 and monitoring of the project site through to spring of 2026.

Project scoping

The project site was identified by PSS as a restoration priority due to highly compacted soils, eroding stream banks, and riparian areas sparse in native vegetation and abundant in invasive species (Figure 2). To mitigate these issues, it was initially proposed that the trail running directly adjacent to the target section of creek be decommissioned. By removing the impact of foot traffic, the soil could be decompact and a wider area of bank could be planted with deep-rooted native vegetation that would help stabilize the eroding bank.

Decommissioning the streamside trail was proposed as an option because park users would still have use of the vehicle access trail running parallel to the streamside trail. However, consultations with the Town of Sidney yielded the conclusion that the streamside trail must remain for accessibility reasons. The restoration plan could however move forward with planting a narrower strip of riparian area on the right bank next to the streamside trail, invasive plant removal and native planting on the left bank, and the installation of split rail fencing around the project area.



Figure 2. The project area (green box) as seen from the Frost Ave (west) entrance of Reay Creek Park relative to the vehicle access trail (left); key ecological issues identified at the project area (right). Photos taken in November 2024.

Goals and Objectives

Project goal

Improve the function of riparian areas along a small section of KÉLSET Creek to help mitigate stream bank erosion and increase habitat and water quality for fish and wildlife.

Project objectives

1. Stabilize the eroding right bank with live stakes and plant a wider area of bank with approximately 10 native plants to provide shading and allochthonous input for the stream.
2. Remove invasive plant species from the left bank and the plant area with approximately 30 native plants.
3. Install split rail fencing along the trail to prevent human and pet access to the area being restored.
4. Engage the public (including 20 park-adjacent property owners) and partners through communication and education initiatives both on site and online to build support for the project and to encourage stewardship into the future.

Methods

Project site description

The project site is in Reay Creek Park near the Frost Ave (West) trail entrance; coordinates: 48.6382827, -123.4148285 (Figure 3, left). This section of KÉLSET Creek can be accessed via a trail that loops down along the creek before reconnecting with other trails. The streamside trail runs parallel to the vehicle access trail that leads towards a pump station downstream from the project site (Figure 3, right). A foot bridge passes over the creek just upstream of the project area. The project area is approximately 20m in length and includes both right and left banks of the creek (Figure 4). Due to its proximity to the airport, airplanes can frequently be heard at the site.

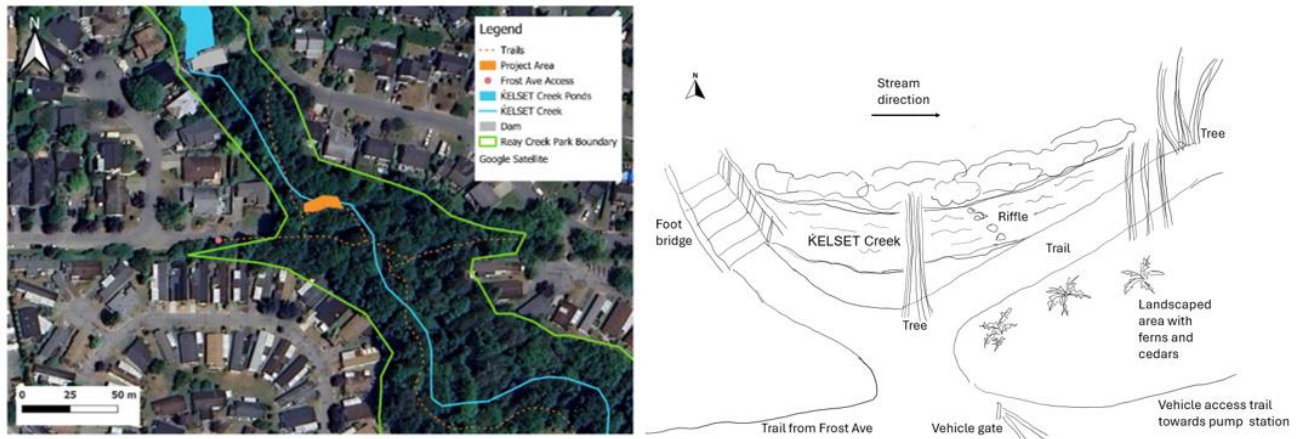


Figure 3. Map of project area within Reay Creek Park (left) and rough sketch of project area relative to connecting trails (right).

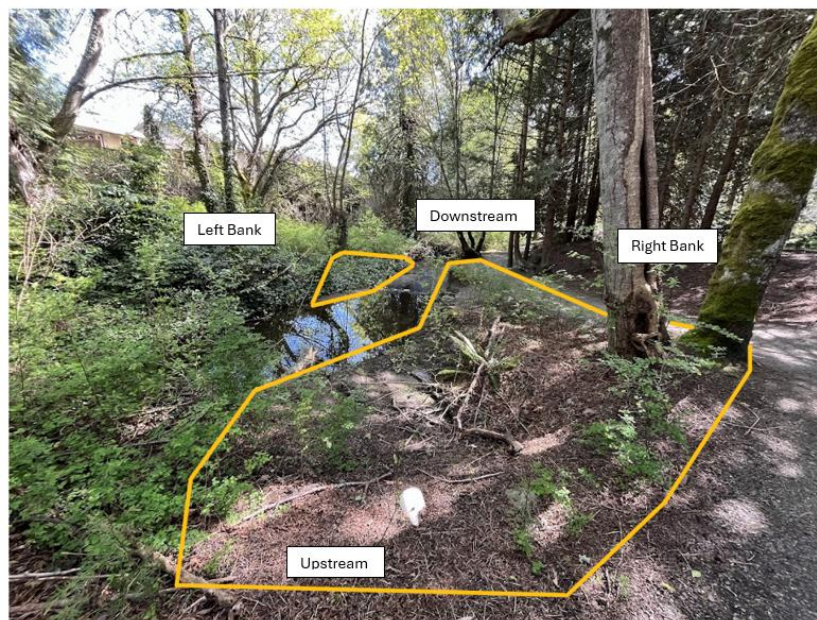


Figure 4. View of the project site from the upstream extent, looking downstream (April 2025, prior to restoration). The project area is outlined in yellow. The walking trail initially proposed for decommissioning runs along the right bank.

The trail network within Reay Creek Park is well used by pedestrians. The soils of the trails are highly compacted due to foot traffic and consist of sharp gravel. Soil compaction is ecologically undesirable because it increases runoff and soil erosion and reduces root penetration and plant growth (Jabro et al., n.d.). The presence of the trail immediately adjacent to the right bank of the project area has resulted in compaction that directly impacts the stability of the bank (Figure 5, top right). Without intervention, the right bank would likely continue to erode, impacting not only the integrity of the trail, but the quality of aquatic habitat in the creek.



Figure 5. View of the project site from the riffle looking upstream (top left) and downstream, where erosion of the right bank is clearly visible (top right) in April 2025 before restoration. Canopy cover above the project site (bottom left), and the depression at the upstream extent of the project site hosting water-loving species (bottom right).

Soil compaction on the right bank is likely a contributing factor to the sparse coverage of native vegetation. More vegetation exists at the upstream extent of the project area, with decreased coverage downstream, primarily due to the proximity of the streamside trail. Native species along the upstream portion of the right bank include snowberry (*Symphoricarpos albus*; the most dominant shrub species), sword fern (*Polystichum munitum*), and a small western red cedar (*Thuja plicata*). Salmonberry (*Rubus spectabilis*) and red osier dogwood (*Cornus sericea*) are seen in the lower, wetter areas, especially the depression at the upstream extent of the site, where herbaceous Pacific water parsley (*Oenanthe sarmentosa*) is also found (Figure 5, bottom right). Along the downstream stretch of right bank, horsetail (*Equisetum arvense*) grows along the water line and

fringe up (*Tellima grandiflora*) is seen on the edge of the trail (Figure 5, top right). Invasive species are minimal on this side of the project area, with only a small amount of English ivy (*Hedera helix*) and an English holly (*Ilex aquifolium*) near the footbridge.

In contrast, the left bank of the project area has good vegetation coverage, but is dominated by invasives, primarily English ivy but also Himalayan blackberry (*Rubus armeniacus*) (Figure 5, top left and right). *Daphne laureol* is seen on the left bank upstream of the project area. In terms of native species, snowberry is observed on the upper bank. Downstream of the project area, there is also salmon berry, osoberry (*Emleria cerasiformis*), and a single skunk cabbage (*Symplocarpus foetidus*).

The canopy cover of the project area is mixed broad leaf and conifer and is fairly open above the stream, especially in the winter (Figure 5, bottom left). Tree species include red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and western red cedar. Two trees, one on either side of the creek, look to be appropriate for wildlife habitat.

Community engagement

Once the revised project proposal was approved by the Town of Sidney, a community volunteer planting event was planned for April 22, 2025 (Earth Day). In the week prior, 40 fliers providing information about the Earth Day event were distributed to neighbouring houses (Figure 6). A handful of neighbours who were outside at the time of delivery were engaged in conversation about the work being planned. Some of the neighbours made reference to being involved in previous restoration work in the park with Ian Bruce (PSS). The event was also advertised by PSS through email newsletters and social media.



We have a handful of great spring stewardship volunteer events coming up next week, including **two Earth Day events on April 22nd!** Below, you'll find all the details and the links to register for each event.

Event 1: Earth Day Reay Creek Park Riparian Planting

When: Tuesday, April 22nd from 9:30am-12:30pm.

Where: [Reay Creek Park entrance at the end of Frost Avenue](#). There is limited street parking, *please be respectful of neighbours*.

Details: Meet us in Reay Creek Park for a morning of riparian restoration work! We'll be removing invasive English ivy and planting native species in some newly fenced off riparian areas. Come celebrate Earth Day with like-minded stewards by making a positive impact in your community!

What to bring: Water, snacks, and layers for sun/wind/rain you don't mind getting dirty. Tall rubber boots are recommended.

Figure 6. Flier delivered to neighbouring properties (left) and email newsletter advertising the planting event (right).

Riparian restoration

Riparian restoration occurred on April 22, 2025 (Figure 7). Four volunteers in addition to myself and Austin from PSS attended the planting event. The morning started by hand-pulling invasive plants, primarily English Ivy (*Hedera helix*) on the left bank.



Figure 7. Invasive species removal on the left bank of the project site (left) and the resulting plant material for disposal (right).

After the invasives had been removed, a total of 60 native plants sourced from Streamside Native Plants in Courtenay, BC, were planted across both right and left banks. Six species appropriate for riparian areas of the CDFmm zone were included: snowberry (*Symphoricarpos albus*), red flowering currant (*Ribes sanguineum*), salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), red osier dogwood (*Cornus sericea*), and Pacific Ninebark (*Physocarpus capitatus*) (Figure 8). Plants were placed on the banks according to relative drought-tolerance and to fit in with existing vegetation in the area. In particular, red-osier dogwood was planted along the water line.



Figure 8. 60 native plants including six species were sourced from Streamside Native Plants for the planting event (left). Plants were placed in the restoration area according to relative drought-tolerance and to fit in with existing vegetation (right).

Live willow stakes that had been previously planted by PSS along the right bank were checked. No budding or rooting was observed on April 22, perhaps due to being under water for too long because of low placement.

Fence installation

Split rail fencing was constructed on the right bank by Austin and Town of Sidney staff in late April, soon after the planting event (Figure 9). Installation was originally meant to happen prior to the event with signage posted to advertise the restoration project but was moved back due to delayed material delivery. Signage was not installed at the site.



Figure 9. Newly installed split rail fence around the restored area (late April 2025).

Monitoring & Maintenance

Monthly site visits were conducted from April 2025 through to March 2026, excluding October through December 2025. During each visit, repeat photos were taken at select locations around the project area. Qualitative observations were recorded relating to the physical and biological conditions of the site, particularly the integrity of the fencing, the health of new plants, and fish and wildlife incidentals. Additionally, the “Record sound” feature of the Merlin Bird Identification app was used to document birds that were present at the project site. Recordings were taken from the same location each time and lasted 5 minutes. The rationale for this was to assess riparian habitat use by birds through time.

New plants were hand-watered with a watering can during the first dry season (April – September 2025), to aid in their establishment. Invasive species resurgence was monitored during each visit and light maintenance was done as necessary.

Results

Community engagement

One of the four volunteers that attended the planting was made aware of the event from the flier. While four people is not an unusual number of volunteers at a planting event, it is on the low side. Low turnout may have been due to the high number of environmental events available to attend on Earth Day. However, the group that attended were a highly effective work force and a great group to spend time with. After the planting event, one volunteer took the group on a tour of some of the other work he had been doing in other areas, highlighting the dedicated stewardship community in the park.



Figure 10. Volunteer planting event on April 22, 2025.

Riparian restoration

Invasive species management

The removal of invasive English ivy and Himalayan blackberry from the left bank was qualitatively deemed successful. While a few shoots and vines were cut back or pulled during monitoring visits, the bank remained reasonably uninvaded, even a year after removal (Figure 11).



Figure 11. The left bank before invasives management in April 2025 (left), after invasives management in April 2025 (top right), and almost one year after invasives management in March 2026 (bottom right).

Native revegetation

Native plant survivorship varied. Plants on the left bank appear to have been more successful than on the right bank, likely due to less compact soil (Figure 12). As of March 2026, several plants on the right bank, particularly the large area of bare ground just upstream of the riffle and on the downstream stretch along the fence did not survive (Figure 13 Figure 14). Exact survivorship counts were difficult to determine due to new plants being placed in amongst existing native vegetation and poor tracking at the time of planting.



Figure 12. Native plants appear to have had better survival on the left bank. Photo taken in February 2026.



Figure 13. Native plantings in large area of bare soil on the right bank in May 2025 (left) and in March 2026 (right).



Figure 14. Native plantings along the downstream stretch of the right bank in April 2025 (left) and in March 2026 (right).

Fencing

Over the year that the fence has been in place, its integrity has remained high. However, there has been evidence that it is not preventing people from accessing the restoration area. Footprints have been observed in the mud within the fenced area and during one site visit, a group of people with fishing rods was observed actively stepping over the fence to begin fishing. This group was politely engaged in conversation and made aware that the fence was there to protect the

bank and the newly planted vegetation. The information was well-received. The group shared that they had been fishing in KÉLSET for years and that they had mostly caught cutthroat and some coho. It is possible that the installation of educational signage would help mitigate future disregard for the fencing.

Monitoring & Maintenance

Overall, the monitoring conducted for this project was not effective at quantitatively determining the success of the project objectives. However, qualitative photos and observations were informative for tracking the project site's condition over time. Photography was used to document plant health, soil conditions, and anthropogenic impacts to the site.

While monthly watering of new plants was likely a positive contributor to plant survival over the dry summer months, there is no way to know whether this was the case. Throughout the dry season, many plants appeared desiccated to varying extents and rebounded in the fall and spring to similarly varying extents.

Between April 2025 and March 2026, 23 bird species were detected in proximity to the restoration site using the sound recording feature of the Merlin Bird ID app. The highest species counts were recorded in late spring in both years, which aligns with typical bird seasonality (Environment and Climate Change Canada, 2018). Further analysis of bird data was not completed due to the inconsistent, biased, and relatively meaningless nature of the data collected. The main take-away from this monitoring effort is that many bird species are present in Reay Creek Park. No correlation can be made between bird presence and the restoration that occurred in the area. Additional wildlife incidentals include squirrels, which were frequently observed in nearby trees, and small salmonids and a crayfish observed in the stream. Site observation notes and bird species recorded during each monitoring visit can be found in Appendices A and B, respectively.

Discussion

Evaluation of project success

Many parts of the project's objectives were successfully achieved. Some of these achievements include planting a wider area of the right bank with approximately 10 native plants, removing invasive plant species from the left bank and replanting with approximately 30 native plants, installing split rail fencing along the trail, and engaging the public (including at least 20 park-adjacent property owners) through communication and education initiatives both on site and online. What have just been listed are the *action* elements to each objective. While this is great in terms of checking boxes, it cannot be said whether these actions achieved the *impact* they were designed to have. Namely, it is hard to say whether planting live stakes and native vegetation contributed to stabilizing the eroding right bank or whether they provided shading and allochthonous input for the stream (although my suspicion is that they did not). We also do not know if our communications with the public built support for the project and encouraged stewardship into the future. This is primarily due to a disconnect between the objectives outlined and the data collected during monitoring visits. One thing that can be said for sure is that the split rail fencing did not effectively prevent humans from accessing the area being restored.

In order to evaluate whether this project achieved its goal to “improve the function of riparian areas along a small section of KÉLSET Creek to help mitigate stream bank erosion and increase habitat and water quality for fish and wildlife,” the monitoring program would have needed to reflect the metrics required to answer these questions. The following section outlines possible improvements to the monitoring program that would have enabled better quantification of project success.

As a brief disclaimer, this project was in its essence a community planting event, something that has inherent value for environmental stewardship and community building. The project was not designed to be an academic study but has been treated as such for the purposes of this capstone course. The recommendations and lessons learned discussed in this section are not meant to be a critique of something designed as something else, but a series of reflections on the ways that restoration can be done, and my own learnings.

Improvements for monitoring program

Over the year since planting occurred, plant survivorship varied with many individuals not surviving. However, we do not know exact how many did or did not survive. The BC government Riparian Restoration Guidelines recommend tagging plants with their botanical name and leaving the tag on the plant after planting (Government of British Columbia, 2008). This would have facilitated survivorship monitoring, especially in areas with pre-existing native vegetation of the same species as those being planted. Furthermore, BC government guidelines recommend setting a threshold such as “planting on a given area being enhanced must be successful to an 80% take. If more than 20% die over one year, replanting is required.” A success threshold would allow for clear next steps for adaptive management.

If project objectives target bank erosion, and riparian habitat and water quality, these metrics should be reflected in the monitoring plan. Bank erosion could be monitored by periodically measuring erosion pins that have been placed in the bank, or by conducting cross-sectional surveys to track changes in the stream channel’s elevation profile (El-Khoury et al., 2024; U.S. Geological Survey, 2025). Bank erosion and water quality for aquatic life could also have been measured by sampling water turbidity, temperature and dissolved oxygen before and after restoration, as well as at a control site upstream to assess whether metrics improved due to restoration. The benthic macroinvertebrate community could also provide insight into water quality if sampled before, after, and at a control site, as different species have different tolerances to habitat disturbance (Government of Canada, 2024).

While Merlin Bird ID is a very useful tool for identifying birds by sound, it does make identification mistakes (it once detected a Canada goose that was visually confirmed to be an American crow in a nearby tree), its range is often questionable, and environmental noise (e.g. airplanes) can interfere with its ability to detect calls. Altogether, this app is not an overly reliable means of data collection for bird use of a particular area, even if the monitoring design was more consistent than the one implemented during this project. A better approach to monitoring riparian habitat quality for target wildlife species or functional groups could be a modified habitat suitability assessment based on the BC government Wildlife Habitat Rating Standards (The Province of British Columbia, 1999).

Lessons learned

With every restoration project, there is the opportunity to generate knowledge that will contribute to the advancement of this still-young field of work and research. In part, this is done through publishing reports such as this one for others to reference and learn from. There is no doubt that I personally have learned many lessons through the duration of this project, particularly related to project design and monitoring. Below are some of these lessons.

- Project scoping in an urban environment involves compromises and delays that should be considered in a project's timeline
- 40 fliers only covers about 2 – 3 streets of a single-family home neighbourhood – is this enough? Also, communities such as trailer parks with shared Canada Post mailboxes should be considered when planning outreach efforts
- Earth Day is a busy day for restoration events and may inspire more attendees or split volunteers between the many events occurring that day
- Fences don't stop people! People management is a key component to restoration, and signage would likely help
- Highly compacted soils make planting success challenging; preparing the soil via decompaction and or amending the soil would likely be beneficial
- Project goals and objectives need to be explicitly linked to monitoring metrics in order to determine restoration success, and should be considered during the project design phase

Recommendations for future work

Future work at the project site should consider focusing on continued revegetation efforts and improved communication. Key ideas are listed below. While not a focus of this project, some thoughts on instream works are listed as well.

Vegetation:

- Continued invasive species management, especially ivy and blackberry on left bank
- Continued monitoring of willow stakes through next growing season, replacing if needed
- Replanting native plants that did not take to increase vegetation density, especially on right bank
- Adding a groundcover layer to exposed patches of soil on site
 - Fringe cup (*Tellima grandiflora*) is observed in other areas of the park and is included in [Satinflower Nursery's fall-sowing woodland seed blend](#), a mix of grasses and wildflowers suitable for Southern Vancouver Island's open woodlands:
 - [Slender-foot Sedge \(*Carex leptopoda*\)](#)
 - [Thick-headed Sedge \(*Carex pachystachya*\)](#)
 - [Fireweed \(*Chamerion angustifolium* ssp. *angustifolium*\)](#)
 - [Miner's Lettuce \(*Claytonia perfoliata*\)](#)
 - [Siberian Miner's Lettuce \(*Claytonia sibirica*\)](#)

- [Vari-leaved Collomia \(*Collomia heterophylla*\)](#)
- [Blue Wildrye \(*Elymus glaucus*\)](#)
- [White Fawn Lily \(*Erythronium oregonum*\)](#)
- [Western Fescue \(*Festuca occidentalis*\)](#)
- [Large-leaved Avens \(*Geum macrophyllum*\)](#)
- [Harford's Melic \(*Melica harfordii*\)](#)
- [Alaska Oniongrass \(*Melica subulata*\)](#)
- [Small-flowered Nemophila \(*Nemophila parviflora*\)](#)
- [Self-heal \(*Prunella vulgaris* ssp. *lanceolata*\)](#)
- [Fringecup \(*Tellima grandiflora*\)](#)

Communication:

- Educational signage should be posted at the site, highlighting the work that has been done and why it is important
 - Additional information about the project area may help dissuade park users from stepping over the split rail fence to access the stream
 - Signage could also provide information for people who fish in the creek, with directions on how best to do so

Instream works:

- As a complementary effort to the rockwork already completed by PSS in the project area, anchoring large wood in the channel could further enhance fish habitat and hydrological complexity
 - If considering post-assisted log structures (PALS) as a low-tech process-based restoration approach, their position relative to stream flow should be carefully considered to avoid compromising the integrity of urban stream banks (Wheaton, 2021)

Conclusion

This project was initially proposed as a trail decommissioning effort to mitigate stream bank erosion and enhance riparian habitat along a small section of KÉLSET Creek, a stream with a long history of degradation since the late 1800s. Following consultation with the Town of Sidney, it was determined that the trail ought to be retained due to accessibility reasons. The second project iteration proposed riparian enhancement and bank stabilization through the planting of native species, invasive species management, and the installation of a split rail fence to protect the restored area from foot traffic. A volunteer planting event was organized on April 22, 2025, in which six people removed invasive English ivy and Himalayan blackberry from the project site and planted 60 native plants spread across both banks. Split rail fencing was installed along the right bank of the stream after the planting event. The new native plants were watered by hand on a monthly basis during the first dry season (April through September 2025).

The site was monitored for a year after the planting event to assess the success of the project. Monitoring included repeat photography at select locations, making notes on plant health and

success of the split rail fencing, and recording bird activity using the Merlin Bird ID app. The effectiveness of the monitoring plan was a weak point of this project. Upon reflection, the metrics monitored did not fully allow us to answer whether the restoration objectives were met; one of the key lessons learned from the project. That being said, the project achieved many of the key action elements of its objectives: native plants were planted, invasive ones managed, the community engaged, and split rail fencing installed. Additional revegetation work and installing informative signage is recommended. Ultimately, this project increased the density and biodiversity of the target riparian area, no doubt adding to habitat quality in the park. While there was room for improvement in terms of results, this project contributes to the legacy of stewardship at KÉLSET Creek.

Appendices

Appendix A: Site visit observations

Date	Weather	Activities	Observations
March 27, 2026	10:33am: 7°C H: 11°C L: 3°C Cloudy	Merlin Photos	<u>Plants:</u> Right bank plants have low survival Left bank plants look better Willow stakes still look dead
March 9, 2026	2:58pm: 5°C H: 6°C L: 2°C Partly cloudy	Merlin Photos	<u>Plants:</u> Starting to see buds on plants Pieces of ferns littered in fenced area... some ferns on the other side of the streamside trail look damaged – not sure what happened here Right bank plants have low survival Left bank plants look better Willow stakes still look dead
February 16, 2026	3:11pm: 5°C H: 6°C L: 1°C Cloudy	Merlin Photos Talked to group with fishing rods	Still lots of leaves on the ground Buds starting, especially on snowberry 1 red-osier dogwood on left bank uprooted with root ball attached... Some plants on both banks look suspiciously trampled <u>People:</u> Witnessed a group of 4 people with fishing rods step over the fence to access the stream; I let them know that it was a restoration area and it was well received; they said they'd been fishing here for 10 years, some coho, mostly cutthroat
September 30, 2025	1:59pm: 16°C H: 16°C L: 11°C Cloudy	Merlin Photos	<u>Site:</u> Lots of fallen leaves Recent rain and rain in the forecast so didn't water PSS put in some spawning gravel and rocks along both banks - looks good and will hopefully mitigate erosion <u>Plants:</u> Ferns on right bank have rallied Dogwoods look happy on left bank A bit of blackberry and ivy coming in which I pushed back into the bushes <u>Fish/wildlife:</u> Possibly saw a crayfish in the pool

September 1, 2025	12:35pm: 20°C H: 21°C L: 13°C Mostly cloudy	Merlin Photos Watering	<p><u>Site:</u> Lots of plane noise</p> <p><u>Plants:</u> Left bank plants look pretty good Dogwood on right bank trampled? Ferns on right bank look dry but ok Stakes showing no sign of life</p> <p><u>Fish/wildlife:</u> Saw a handful of baby salmonids!</p> <p><u>People:</u> Briefly chatted with a park visitor about my taking care of the plants</p>
August 1, 2025	12:58pm: 21°C H: 23°C L: 13°C Mostly sunny	Merlin Photos Watering	<p><u>Plants:</u> Leaves on willow stakes look shriveled and dry The snowberry that was in rough shape at time of planting is dead Ivy and blackberry coming back a little bit on left bank Plants closest to the water look the healthiest</p>
July 8, 2025	2:57pm: 26°C H: 26°C L: 13°C Cloudy	Merlin Photos Watering Minor invasives management	<p><u>Plants:</u> Leaves on stakes look dry Planted plants look alive and in relatively good shape Cut down some ivy and blackberry on left bank Horsetails coming in 1 sword fern on upper right bank looks especially dry</p> <p><u>Fish/wildlife:</u> Saw 2 small salmonids on stream right of gravel bar below riffle</p>
June 11, 2025	11:54am: 17°C H: 20°C L: 11°C Cloudy	Merlin Photos Watering	<p><u>Plants:</u> Stakes continue to leaf out Some invasives coming up on left bank Plants generally look good including the questionable snowberry</p> <p><u>Site:</u> Ground on right bank looking dry and cracked in some compacted/eroding spots Water levels looking lower</p>
May 17, 2025	2:07pm: 15°C H: 16°C	Merlin Photos Watering	<i>Lost notes</i>

	L: 9°C Mostly cloudy		
April 22, 2025	12:42pm: 12°C H: 14°C L: 4°C Sunny 12:42pm	Planting day! Invasives management Merlin Photos	<u>People:</u> 4 volunteers <u>Plants:</u> Stakes don't look like they took root – pulled one out to look No buds
April 13, 2025	11:31am: 9°C H: 12°C L: 3°C Partly cloudy	Baseline observations Merlin Photos	<u>Site:</u> Lots of airplane noise Slope of approx 8 degrees from pipe to riffle 2 wildlife trees (split trunks - both alders I believe), one on either side Bank is degraded, undercut Decently high percent canopy cover Did not dig hole for soil but definitely moist A depression creek side of pipe Lower/bottom of slope position <u>Plants:</u> Right bank sparsely covered in veg but mostly native except for a few bits of ivy and a holly close to the bridge Left bank almost 100% covered in ivy, blackberry shoots, daphne laurel, as well as some snowberry, osoberry, salmon berry, 1 skunk cabbage further down

Appendix B: Merlin Bird ID data

Species	Date of monitoring											Total occurrences
	13-Apr-25	22-Apr-25	17-May-25	11-Jun-25	08-Jul-25	01-Aug-25	01-Sep-25	30-Sep-25	16-Feb-26	09-Mar-26	27-Mar-26	
Time	11:20	12:36	14:12	11:54	14:51	12:58	12:36	14:01	15:16	14:59	10:34	
American crow (<i>Corvus brachyrhynchos</i>)	0	0	0	0	0	0	0	0	1	0	1	2
American robin (<i>Turdus migratorius</i>)	1	1	0	1	0	0	0	0	0	0	0	3
Anna's hummingbird (<i>Calypte anna</i>)	1	1	0	0	1	1	1	1	0	1	1	8
Bewick's wren (<i>Thryomanes bewickii</i>)	1	0	1	0	0	0	0	0	0	0	0	2
Brown creeper (<i>Certhia americana</i>)	1	0	0	0	0	0	0	1	0	0	0	2
Cedar waxwing (<i>Bombycilla cedrorum</i>)	0	0	0	0	0	1	0	0	0	0	0	1
Chestnut-backed chickadee (<i>Poecile rufescens</i>)	1	1	0	0	0	0	0	1	0	1	1	5
Darked-eyed junco (<i>Junco hyemalis</i>)	1	0	0	0	0	0	0	0	0	0	1	2
European starling (<i>Sturnus vulgaris</i>)	1	0	0	0	0	0	0	0	0	0	0	1
Golden-crowned kinglet (<i>Regulus satrapa</i>)	0	1	0	0	0	0	0	1	0	0	1	3
Great blue heron (<i>Ardea herodias</i>)	0	0	1	0	0	0	0	0	0	0	0	1
House finch (<i>Haemorhous mexicanus</i>)	1	0	0	0	0	1	0	0	0	1	1	4
House sparrow (<i>Passer domesticus</i>)	1	1	0	1	0	0	0	0	1	0	0	4
Pacific wren (<i>Troglodytes pacificus</i>)	0	0	0	0	0	0	0	0	0	1	1	2
Pine siskin (<i>Spinus pinus</i>)	0	1	0	0	0	0	0	0	0	0	0	1
Red crossbill (<i>Loxia curvirostra</i>)	1	0	0	0	0	0	0	0	0	0	0	1
Red-breasted nuthatch (<i>Sitta canadensis</i>)	0	0	0	0	0	0	0	1	0	0	0	1
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	0	1	0	0	0	0	0	0	0	0	0	1
Ruby-crowned kinglet (<i>Corthylio calendula</i>)	0	0	0	0	0	0	0	0	0	0	1	1
Song sparrow (<i>Melospiza melodia</i>)	1	1	1	1	0	0	0	0	0	0	1	5
Spotted towhee (<i>Pipilo maculatus</i>)	0	0	1	0	0	0	0	0	0	0	0	1
Western flycatcher (<i>Empidonax difficilis</i>)	0	0	0	1	0	0	0	0	0	0	0	1
White-crowned sparrow (<i>Zonotrichia leucophrys</i>)	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL	11	8	4	4	1	3	1	5	2	4	10	53

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