



Wetland Wonder

Improving the Classroom Wetland visitor experience at the Millard Learning Centre

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ER412 Design Project Report

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Overview

In this report we present an interpretive design and landscape plan for the Classroom Wetland at the Galiano Conservancy Association's (GCA) Millard Learning Centre. The project aims to improve educational value and visitor experience through signage, interactive features, and structural elements. Drawing on past restoration efforts and feedback from GCA staff, the proposed design is grounded in the site's current needs and future potential as a hub for wetland learning.

Summary

This report details an interpretive design and landscape plan for the Classroom Wetland to enhance educational value and visitor engagement. This designed wetland is located beside the classroom building on the Galiano Conservancy Association's Millard Learning Centre property, where educational programming takes place for students from grades 3-12 during the school year (September-June). It was created in 2020 with the goals of providing wetland habitat and educational opportunities. While habitat goals have been somewhat successful and the wetland is generally functioning well, the educational goals have not been met. The site is not currently being utilized by the education team for class programming and has great potential for engaging visitors and other student groups (e.g., university courses).

This design project examines the reasons behind the Classroom Wetland's lack of educational use and proposes invasive species management, landscape features and interpretive elements to offer visitors and students the opportunity to engage in this space. We recommend interpretive and directional signage as well as a simple shelter with several interactive elements including a wetland species flip-book sign, a magnifying glass post, and an audio device. We also include a reference budget.

This project builds on previous student-led initiatives and restoration efforts at the Millard Learning Centre. By revisiting original goals, assessing site conditions, and engaging with GCA staff, we aim to help bridge the gap between past proposals and current on-the-ground needs. Our hope is that this report offers practical, achievable next steps that carry forward the original intent of the liner wetland as a dynamic, educational, and ecologically meaningful space.

Table of Contents

Site Context.....	3
Goals and Objectives	5
Methods.....	5
Site Examination & Observational Findings	6
Interpretive Design Recommendations.....	9
Maintenance Recommendations	18
Conclusion.....	19
Budget	20
References	21
Appendix 1 – A. Dewar's (2021) Liner Wetland Plant List	23
Appendix 2 – “Why Wetlands?” Funding Proposal.....	24
Appendix 3 – Current Classroom Wetland Sign Ideas	27
Appendix 4 – ArcGIS Wetland Liner Plant Data	28

Site Context

Our project takes place on the shared, asserted, and unceded traditional territories of the Lamalcha, Penelakut, and Hwiltsum First Nations, other Hul'qumi'num and SENĆOTEN speaking peoples, and any others with rights and responsibilities in and around what is now known as Galiano Island, and within the ceded territory of the Tsawwassen First Nation. It is located on a site known as the Millard Learning Centre which is owned and stewarded by the Galiano Conservancy Association (GCA) (GCA, 2025a).

The Millard Learning Centre (MLC) spans 76 hectares and includes forest, shoreline, streams, and wetlands. It is a hub for ecological restoration and place-based education. One of the major projects on the property is the *Cedars for the Next Century* initiative, which aims to restore native wetland and forest ecosystems in the Chrystal Creek watershed—ecosystems historically degraded by logging, agriculture, and pasturage. The project focuses on the conservation of key species such as the northern red-legged frog (*Rana aurora*) and western redcedar (*Thuja plicata*) (GCA, 2025b; GCA, 2025c).

Another important eco-cultural restoration initiative is the Nuts'a'maat Forage Forest, a collaborative project with the Penelakut First Nation. Designed to cultivate native edible and medicinal plants, this shared space brings together ecological restoration and Indigenous ecological knowledge to rebuild relationships between people and place, while creating meaningful educational opportunities (GCA, 2025d).

In 2020, the Conservancy worked with former UVic field course and Restoration of Natural Systems Program student, Adam Dewar, to restore the compacted gravel parking area adjacent to the MLC classroom to a liner wetland. The primary goal of the project was to restore a degraded Coastal Douglas-fir area, expand wetland habitat, and create an easily accessible viewing and educational wetland feature adjacent to the classroom (Dewar, 2021). Plantings were selected based on eco-cultural value, resistance to grazing pressure, potential for habitat, and connection to other wetlands on the conservancy (Appendix 1). The GCA continues to monitor the project to this day, assessing plant health, growth rate, and deer-resistance, using the data mapping software ArcGIS. We refer to this constructed liner wetland as the Classroom Wetland in this report.

In 2022, UVic field course students Connor Rutledge and Emily Ryan proposed several improvements to the Classroom Wetland and wider area to support learning and engagement with the ecosystem. Their project focused on young visitors and included the installation of engaging interpretive signage explaining key wetland features. They also recommended building a raised viewing platform, adding a walking trail around the wetland, and designing multi-sensory signage to make the space more interactive and accessible (Rutledge & Ryan, 2022).

Our project builds on these earlier efforts. Inspired by the work of Dewar, Rutledge, and Ryan, we aim to assess current conditions at the Classroom Wetland and identify feasible next steps for interpretation. This report is meant to bridge the gap between earlier proposals and what is actionable on the ground today. The evolution of the Classroom Wetland since its installation in 2020 is pictured below (Image 1).

Classroom Liner Wetland Evolution 2020-2025



Image 1. The Millard Learning Centre Classroom Wetland has grown significantly since it's installation in 2020. Source: A. Huggins; GCA; Authors.

Goals and Objectives

As part of UVic's 2025 field course, our team set out to revisit the Classroom Wetland and propose realistic, site-specific improvements that build on previous student recommendations and support current restoration goals. Our overarching aim was to enhance the visitor experience at the Classroom Wetland by integrating ecological function, educational value, and landscape connectivity. This resulted in the following three goals:

Goal 1: Assess the ecological condition of the Classroom Wetland

Objectives:

- Evaluate plant health, survival, and habitat potential
- Identify evidence of naturalization and species diversity
- Inform interpretive content based on observed ecological function

Goal 2: Improve interpretation and education for Classroom Wetland visitors

Objectives:

- Design new signage tailored to youth audiences and school programming
- Ensure interpretive features are visually engaging, tactile, and multi-sensory
- Incorporate input from GCA educators to align content with learning outcomes

Goal 3: Enhance site navigation and landscape connectivity

Objectives:

- Review circulation patterns and signage gaps between nearby sites
- Propose clear and accessible wayfinding features
- Support broader integration with the surrounding MLC landscape

Methods

Rather than using a formalized ecological survey or structured interviews, our methodology was intentionally light-touch and design-oriented. We focused on social, cultural, and ecological aspects that were of special importance in providing a positive and informative visitor experience. Our field notes, sketches, and site photos informed a set of interpretive design recommendations presented later in this report. The following methods were used to evaluate site conditions, identify interpretive needs, and inform feasible recommendations:

1. Review of Past Projects and Site History

We reviewed documentation from previous UVic projects (Dewar, 2021; Rutledge & Ryan, 2022) and internal GCA reports to understand past recommendations and identify which ideas had been implemented or deferred. This historical review helped shape realistic and incremental proposals that build on previous work. We outlined these findings in Site Context above.

2. Consultation with GCA Staff

We consulted with GCA staff members who work closely with school groups and restoration projects on the property. Their insights provided valuable context on seasonal usage patterns and school programming needs, limitations related to maintenance, signage durability, and budget, key educational goals for different visitor demographics. We prioritized staff input over formal literature review due to time constraints and the applied nature of the project.

3. Site Walkthrough and Observational Assessment

We conducted several visits to the classroom wetland and surrounding areas in July 2025. These visits involved visual observation, informal photo documentation, and note-taking focused on: plant health and species diversity in the liner wetland, evidence of ecological function (e.g., water retention, plant survival), visitor circulation patterns, sightlines, and accessibility features. This observational data informed our assessment of habitat quality and identified areas for improving visitor experience.

4. Inventory of Existing Signage and Features

We catalogued the current signage, educational installations, and circulation routes near the classroom wetland. This allowed us to identify outdated or missing content, pinpoint locations with high visibility and interpretive potential, design new signage that fills existing gaps without overwhelming the site. This process also included consideration of appropriate sign materials and multi-sensory features based on youth engagement needs.

Site Examination & Observational Findings

Our observations and informal fieldwork were carried out in support of our three project goals: evaluating the wetland's ecological function, enhancing educational value, and improving landscape navigation. These observations directly informed our signage and interpretive design recommendations.

Consultations with GCA Staff

We met with the GCA's Restoration Coordinator, Adam Huggins, to discuss the current state of the Classroom Wetland. He confirmed that the wetland is functioning as habitat for Pacific chorus frogs (*Pseudacris regilla*), having sighted over 100 eggs in the past year. He explained that although the goal of creating northern red-legged frog (*Rana aurora*) habitat was not achieved, that goal has been reached in the Chrystal Creek wetlands down the trail, and they are happy to have the wetland functioning as habitat for the Pacific chorus frog (*P. regilla*) (Personal communication, July 10, 2025).

He also explained that the pond liner is working well. It is perfectly natural for the wetland to dry up during the summer months. On the other hand, it would be preferred to have some open water during wet months. To that end, emergent vegetation should be reduced slightly.

Top priority in this regard is the removal of non-native narrow-leaved cattails (*Typha angustifolia*) which are filling the centre of the wetland. This community is providing a source for the spread of narrow-leaved cattail into the Chrystal Creek wetlands where it may hybridize with the native broadleaf cattail (*Typha latifolia*) which is still prevalent there (Pers. comm., July 10, 2025).

He explained that due to high rainfall soon after installing the pond-liner, a greater than expected amount of soil was deposited by the GCA on top of the liner to keep it from floating. This has caused the wetland to be more susceptible to overgrowth and ‘cattailification’, with all the low-slope and toe area more likely to fill in with rushes and cattails, as it has done (Pers. comm., July 10, 2025).

Another species of concern is common St. John’s wort (*Hypericum perforatum*), which has recently appeared on site. This plant is worth removing at this early stage before it starts to dominate. On the other hand, the large number of thistles (*Cirsium spp.*) is not a priority for removal as the site was dominated by them prior to the wetland installation and there is likely a large seedbank. Adam is hopeful that shade from the successfully planted alders will keep these and other invasive field plants under control over time (A. Higgins, pers. comm., July 10, 2025).

We also spoke with Ria Okuda, Education Coordinator, who confirmed the Classroom Wetland is underutilized due to the lack of interactive educational material and desirable areas for learning. She would love to see the site act as a first stop for her youth programs, before walking to the further Chrystal Creek wetland project site, located near Chrystal Cove, where the kids get in the water with nets and buckets to catch and identify species. She shared the “Why wetlands” funding proposal that outlines a budget and goals for signage that aligns with her ongoing youth programs (Appendix 2). She described her preference for signage that is engaging and accessible to children. She would like to see a limited amount of text alongside illustrations, and especially interactive elements. She was especially excited about the possibility of installing a magnifying glass, so long as it can be made fire-safe (Pers. comm., July 8, 2025)

We then spoke with Chessi Miltner, Executive Director, who confirmed that additional directional signage would be helpful to aid visitors in guiding themselves to areas of interest on the property, especially from the classroom to Chrystal Creek via trails. He also confirmed Ria Okuda’s “Why Wetlands?” project funding lies within a larger project aimed at improving access to the Chrystal Creek wetland with wheelchair-accessible trails and signage. (Pers. comm., July 10, 2025)

Lastly, we spoke to Sarah Fleming, Education Coordinator, who is currently responsible for coordinating signage design with the GCA’s graphic designer. She shared existing ideas for signage that align with the grab-bag activity she hosts with K-12 school programs, where kids are prompted to think about wetlands features with metaphorical objects: a sponge (wetlands soak up water), a filter (they filter sediment), a crib (a safe nesting place), a pillow (a place to rest and recharge), and a jar of charcoal (carbon sequestration) (Appendix 3). She confirmed her sign idea is not final and is open to ideas (Pers. comm., July 10, 2025).

This staff insight informed the key elements to observe in the field, and goals to achieve in our signage messaging. These discussions helped ensure our project is aligned with the GCA's on-the-ground aspirations.

Site Walkthrough and Observational Assessment

To fill gaps in knowledge about existing signage messaging, wetland plant health, specie presence, and to visualize some ideas that were proposed by GCA staff, we set out for a site survey.

Our site survey took place on July 9 and July 10, 2025. It was approximately 20 degrees Celsius, full sun, no wind. It was hot. Using classroom liner wetland data on ArcGIS provided by GCA staff, we confirmed monitoring results which showed that the plantings have been somewhat successful, with several species vigorous and thriving (Appendix 4). The alders especially have been thriving, which increases the likelihood that thistles and other invasive plants will be shaded out eventually. We also observed the density noted by Adam Huggins and agreed that removing some cattail and rush would be advisable.

While assessing the Classroom Wetland, we also noted there were no clear access points to enter the site, only a narrow pathway around the back, no signage, or indication that the site was a liner wetland. A first-time visitor would likely walk by this dense patch of vegetation, unaware of its significance in restoring wetlands and at-risk species on Galiano Island.

In the Chrystal Creek wetland ponds near Chrystal Cove, the place where the K-12 education programs currently take place, we observed a northern red legged frog (*R. aurora*), Pacific chorus frog tadpoles (*P. regilla*), Eight-spotted skimmer dragonflies (*L. forensis*), blue dasher dragonfly (*D. longipennis*), and common garter snake (*T. sirtalis*).

Inventory of Existing Signage and Features

The interpretive sign at the Chrystal Creek wetland titled "Cedars for the Next Century" provides historical information about the site, and the relevance of ecological restoration to protect the Western red cedar, as well as the Pacific tree frog and Northern red-legged frog (Image 2). However, the small font, text-heavy sign is not appropriate for K-12 youth or elders, and it lacks information about other important species and wetlands functions.

Existing directional signage worked well to point us back to the classroom. These wooden signposts pointing to areas of interest at key intersections along trails are both aesthetically pleasing and highly effective with the inclusion of a trail map of the wider property.

Existing GCA Signage



Image 2. A copy of the interpretive sign at the Chrystal Creek Wetland



Image 3. Functional directional signage with trail map

Our interviews and field work helped identify a need for our educational messaging to answer 3 questions – *What are wetlands? Why are wetlands important? Who lives there?* – to introduce wetlands to visitors, especially K-12 youth program, who are visiting the Galiano Conservancy for educational or leisurely purposes. These questions emerged from educational expertise found in GCA staff consultations, and our assessment of gaps found in current signage contrasted against the GCA's interpretation and education goals and aspirations.

In the following section, we recommend interpretive signage, features and messaging that will directly improve the potential interpretation and education for Classroom Wetland visitors and enhance site navigation and landscape connectivity.

Interpretive Design Recommendations

Building on previous restoration and engagement efforts, our interpretive design recommendations are grounded in on-site observations and feedback from GCA staff. They aim to enhance educational value, accessibility, and user experience for visitors of all ages, with a particular focus on youth.

1. Educational Signage and Features

Sign #1: What are Wetlands?

This sign would be targeted for all demographics but presented at a grade-school level understanding of wetlands and their components. A diagram of a wetland, highlighting key wetland functions associated to symbolic imagery, inspired by Sarah's grab-bag activity. A

sponge as a symbol for water absorption, a pillow (or a lunch box as Yeats suggested) as symbol of a place to recharge, a crib as a symbol of a safe nesting place, a water filter for sediment filtration, carbon molecules in a jar for carbon sequestration, which each of these symbols and key words pointing to features illustrated in the wetland diagram (Image 4). The wetland diagram can be designed by local artists or graphic designers contracted by GCA to make it original and representative of the local and designed liner wetland ecosystem. The sign would be text-light and focus on the ecological components and services of the wetland that it provides to human and ecological communities, preparing students in identifying the same features at the Chrystal Creek watershed and other wetlands.

“What are Wetlands?” Sign

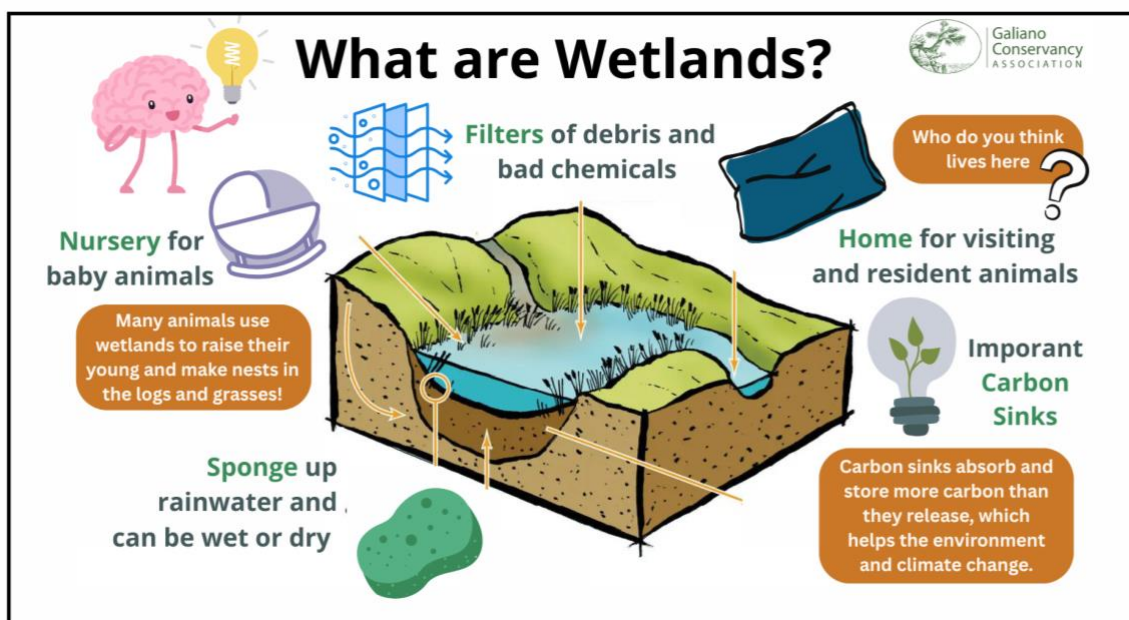


Image 4. Proposed sign #1 - Aimed at K-12 student audiences and programming outlining wetland functions through symbolic imagery such as pillow, sponge, crib, etc. Image adapted from Ducks Unlimited Canada, retrieved August 2, 2025. <https://www.ducks.ca/our-work/wetlands/what-is-a-wetland/>

Sign #2: Why Wetlands?

This sign would be targeted to an older audience such as visitors and university student retreat groups providing messaging on the cultural and community value of wetlands in our local and landscape geographies (Image 5). The text would be accompanied by an evolutionary timeline of the liner wetland from its construction to its current state (Image 1). The sign would provide a larger scale context as to why wetlands are important and human relationship with the ecosystem and why this designed wetland exists today.

“Why Wetlands?” Sign



Image 5. Proposed sign #2 - Eco-cultural background on wetlands and purpose of designed wetlands in a larger community and ecological landscape. Source: Authors, 2025.

Feature #1: “Who lives here?” Species Flipbook

The Who Lives Here Flipbook sign is an interactive interpretive element that can engage elementary to adult groups in exploring the wetland and identifying the different plant and animal species that live in wetlands. The sign would have a permanent flipbook with species

of interest that can be identified during the fall and spring months and would complement K-12 student programming.

It will contain species found in the liner wetland as well as other species of special interest to look out for in the Chrystal Creek wetlands down the hill, such as the northern red-legged frog (*R. aurora*). We selected the following species based on interviews with GCA staff and our own observations of the wetland that we noticed were thriving and doing well. This list is not exhaustive and can be added onto or condensed:

- Pacific chorus frog (*P. regilla*)
- Red-legged frog (*Rana aurora*)
- Violet-green swallow (*Tachycineta thalassina*)
- Rough-skinned newt (*T. granulosa*)
- Blue Dasher dragonfly (*D. longipennis*)
- Common garter snake (*T. sirtalis*)
- Alligator lizard (*Elgaria coerulea*)
- Long-toed salamander (*Ambystoma macrodactylum*)
- Hardhack (*Spirea douglasii*)
- Red alder (*Alnus rubra*)
- Pacific Crabapple (*Malus fusca*)
- Red-flowering currant (*Ribes sanguineum*)
- Oceanspray (*Holodiscus discolor*)
- Salmonberry (*Rubus spectabilis*)

Example of “Who Lives Here?” Species Flipbook



Image 6. Example of species ID flipbook installed to a permanent structure outdoors. Source: Delugeau Nardis, Pinterest. Retrieved

on July 30, 2025.

<https://fr.pinterest.com/pin/1079245498179941839/>

Feature #2: Magnifying Glass Posts

To enhance the learning experience of the Who Lives Here flipbook, 2-3 magnifying glasses (Image 6) and an audio device (Image 7) would accompany the sign in a shady area, under a proposed shelter ideally. The magnifying glass post is of particular interest to educational programming for younger grades. It is a great way to engage children, spark their interest in the wetland by allowing them hands-on experience, and offering opportunities for wonder.

Example of Magnifying Glass Posts



Image 6. An example of a magnifying glass fixed on a post for children. Source: Pinterest on July 30, 2025.

<https://ca.pinterest.com/pin/125397170871500385/>

Hazards - We recognize that magnifying glasses may pose a fire hazard, especially during the summer months when the weather is sunny and dry, and so have compiled some suggestions to fire-proofing the installation in an outdoor setting.

1. Installing them under a shaded structure such as a shelter or roof, making them accessible during wet and sunny weather and preventing sunlight from concentrating on the magnifying lenses.
2. Installing a plastic cover overtop the magnifying glasses that would be held down by small springs on either side (like a covered compass) that will hold down the cover unless visitors or students are handling and holding open the cover to use the magnifying glass.
3. Opting for portable hands-free magnifiers that can be brought out during class programming for student use and under staff supervision only.
4. Using plastic instead of wood viewing platforms under magnifiers to decrease flammability during summer months.

Sourcing - Below are two options for sourcing, with costs and links provided.

- A. Carson Optical Magnifiers: BugLoup™ 4.5 Pre-Focused Stand Magnifier Loupe, Kids Hands-free Magnifier. Pros: budget-friendly at \$13/magnifier. Cons: portable and would need to be attached to permanent structure
<https://www.carson.com/product/hu-55-en>
- B. Caledonia Play: MagPost: Large or Small options available. Pros: high quality permanent outdoor feature that includes scientific quality magnifying glass mounted onto a hardwood post. Cons: expensive and UK brand, shipping cost not included
<https://caledoniaplay.com/product/magpost-large-3/>

Feature #3: Audio Device

The audio device would be a hand-crank or solar powered speaker with two frog recordings: the pacific chorus frog (*P. regilla*) which breeds in the liner wetland, and the red-legged frog (*R. aurora*) which breeds in the Chrystal Creek wetlands. This would provide great interactive wetland interpretation which showcases the differences between the two frog songs, the second of which cannot normally be heard but which was recorded using underwater monitoring techniques. This info and brief biographies of the frogs could be included on the top of the audio device. Two examples and a potential provider are found in Image 7.

Example of Audio Device

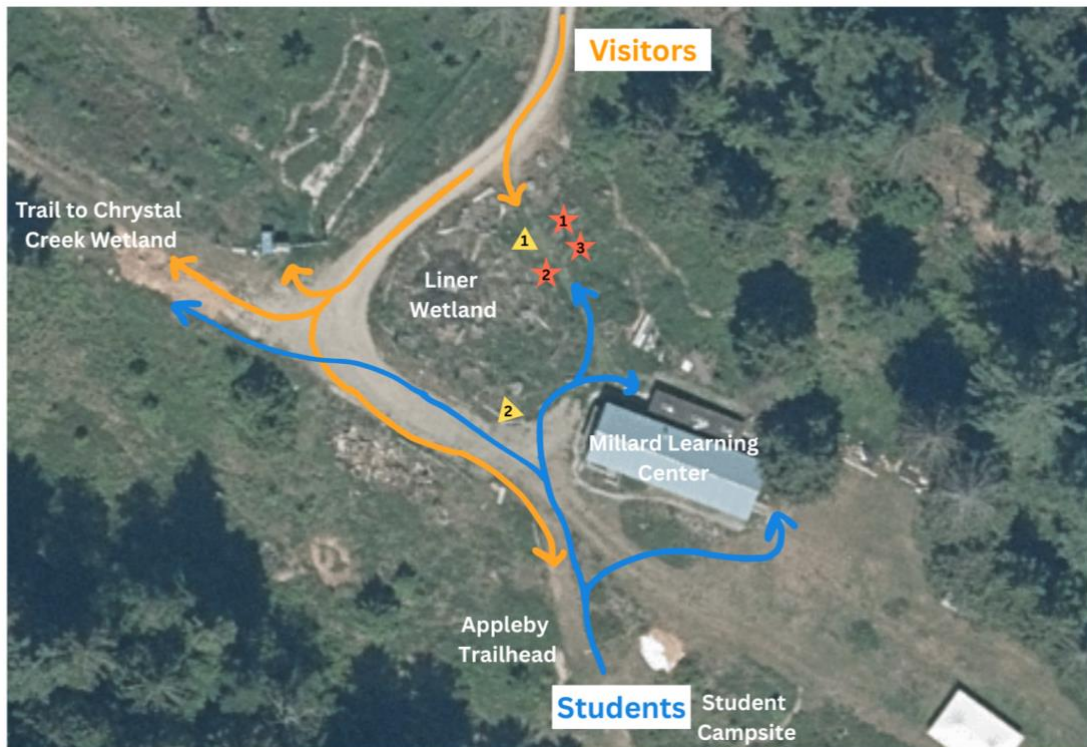


Image 7. Eco-box (left) and solar-powered listening station (right) are eco-friendly audio devices from Tour-Mate Outdoor Interpretive Technologies.

<https://tourmate.com/solar-eco-post-tap-listen/>

The flow map below highlights pedestrian traffic flows and indicates where interpretive signs and features discussed above should be installed (Map 1).

Flow Map and Interpretive Signage Design Plan



*Map 1. This map shows the flow of GCA visitors and students and where their paths intervene for best signage placement. Signs are shown in **yellow triangles** and features are shown in **red stars**. The learning hub for student programming would occur where visitor and student paths meet in the wetland and where the interactive features are located. CRD 2021.*

2. Structural Feature

In addition to the educational interpretative element of the proposal, we also suggest installing structural features and directional signage to enhance the visitor and learning experience of the liner wetland.

Shelter with Picnic Tables

Purpose - The shelter and picnic tables are an important element for increasing the interpretive potential of this wetland. It offers shelter from sun and rain as well as a focal point for visitors to experience the wetland. With a shelter and seating in place it could become a favoured lunch or snack spot for students and visitors alike. This could encourage a more lasting relationship between visitors and the wetland, shifting it from a place encountered in passing to one where moments can be shared and remembered with friends and classmates. It also provides a sheltered area for some of the more interactive and engaging elements of the design.

Size and location - The shelter would be located on the path between the road and the classroom. We recommend widening the current path to accommodate a 12 ft x 20 ft shelter that would cover the pathway, as well as the area behind it towards the blackberry bushes. We want to invite visitors who want to sit to retreat behind the path to allow traffic and others to stand and explore the wetland. This size would comfortably accommodate two 6 ft x 5 ft picnic tables, with ample space for groups to gather and move around out of the sun. The size will depend on restricting ground features such as boulders, slope, flooding area. Our understanding is that there is no flooding on this side of the wetland. Image 9 illustrates the layout of the shelter outlined in orange, picnic tables in blue, and interpretive signage in red.



Image 9. Example of post and beam shelter with metal roof (left) and location for shelter (right). The 12 ft x 20 ft shelter is outlined in orange - Picnic tables in blue - Interpretive signage in red. Source: Pinterest <https://ca.pinterest.com/pin/29554941290973716/>; Google Earth 2025.

Cost and Sourcing - This post-and-beam structure with a sloped corrugated metal roof could cost between \$4,000 and \$9,000, including 2 days of labour (OpenAI, 2025). This quote was provided by OpenAI based on BC material and labour costs, however, it may not be accurate, so local professional quotes would be more appropriate. Less expensive options include prefab models offered by home and hardware stores, ranging between \$2,000 and \$4,000 for a 12ft x 16ft gazebo (The Home Depot, 2025). The latter being quick to install but less durable materials. Picnic tables are available in large quantities at the Millard Learning Centre, we recommend moving two of them before opting to purchase or build more.

3. Directional Features

Directional features are key to help visitors find their way around the property and provides an opportunity to highlight the classroom liner wetland as an area of interest. The existing directional signage below works well to direct people and highlight key areas of interest on the trail map. We propose adding 3 more of these posts at the locations indicated by yellow stars (Image 8).

Directional Sign #1: Visitors arriving from the GCA office will notice at first a directional sign pointing towards the Classroom Wetland hub where the shelter and interpretive signage is located. Another arrow sign will point in the other direction to the Nuts'a'maat forage forest.

Directional Sign #2: The second sign is located at the end of the road, an intersection between trailheads on the left, and wheelchair accessible chip trail towards Chrystal Creek Wetlands on the right (to be added when this trail is completed). We find this point to be a natural focus area for visitors, it's where we naturally gathered when exiting our cars on our first day. Therefore, including a map of the larger GCA property and trails with current location as seen in Image 8 would be beneficial to visitors in navigating and orienting themselves at this point.

Directional Sign #3: The third is located at the exit of the Appleby Trail. It would be helpful to direct hikers to the GCA main office, to the classroom, or the forage forest. We noted the campsite is not open to the public, therefore should not be listed on directional signage.

Cost and sourcing: We hope these posts are easily accessible and easy to assemble on the property. We were unable to gather this information during our site visit - we will leave this budget line-item blank.

Proposed Layout of Directional Signage



Image 8. Directional signage post (left) and 3 proposed locations (right). Source: Authors, 2025; Google Earth, 2025

Chip Path: A chip path between the road and the classroom, underneath the picnic tables and shelter, would make for an attractive feature that promotes wheelchair accessibility to wetland interpretation. The entire path from the road to the washrooms is approximately 25 meters long, and 3 meters wide. To avoid weeds a liner cloth can be used with chip depth of 10 cm deep. Extensive chips are available from tree and brush work on Galiano Island for relatively low cost.

Maintenance Recommendations

Our hope is that our Classroom Wetland interpretation plan is relevant, functional, and attractive for years to come. We recommend that the GCA staff integrate a monitoring and maintenance schedule into their annual workflow to ensure the wetland remains a good home for the species highlighted above.

We recommend that ongoing plant monitoring (using the existing ArcGIS monitoring layer for the wetland) to track what native species do and don't do well in this designed ecosystem and how it can further educate the public and GCA restoration team on wetlands during a time of rapid climate change. Bi-annual monitoring and data collection would be ideal to compare growth before spring and end of summer or fall months to notice the changes in composition and plant vigour.

We also recommend that all non-native *T. angustifolia* be removed from the wetland as it can be invasive by hybridizing with native cattail (*T. latifolia*) and outcompeting the native population through genetic resilience and adaptation (Steward et al. 2023). Hybrids are highly competitive and can also be difficult to identify and thereby dominate wetland habitats if not managed early on. Studies show that advanced-generation hybrids are more common than first generation hybrids and significantly taller than native cattails, indicating heterosis, or superior hybrid traits (Steward et al. 2023). Active management and preservation of native cattail should therefore be maintained as a priority in the maintenance of the liner wetland to prevent hybrid dominance.

Native, Non-native and Hybrid Cattail Species Identification

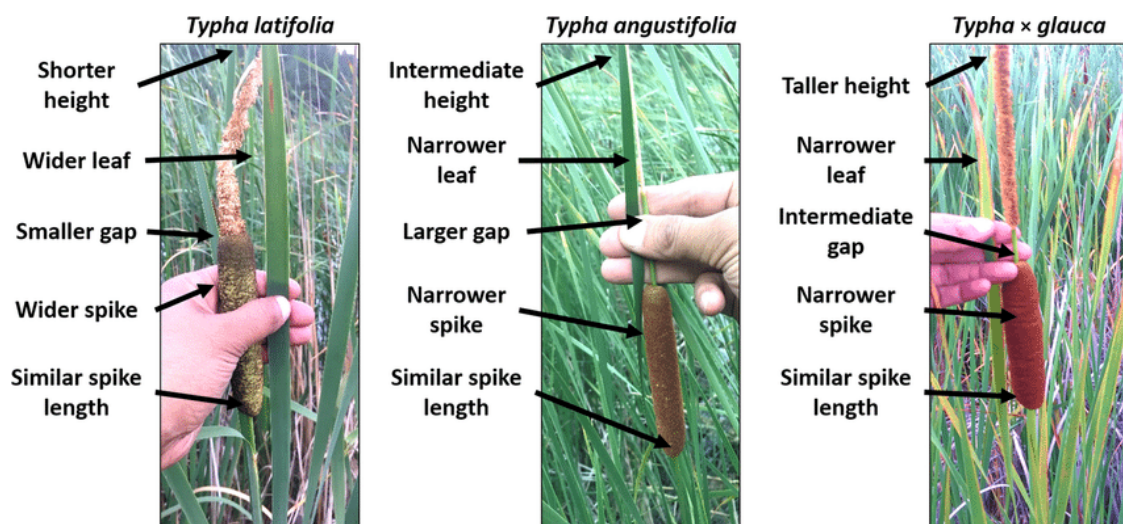


Image 10. Photos (images from the U.S. Geological Survey) depicting the morphologic characteristics of *Typha latifolia*, *T. angustifolia*, and *T. x glauca*. Retrieved from *Wetlands Ecology and Management* (Tangen et al. 2022).

We assessed the feasibility of removal, discovering that *T. angustifolia* can be removed quite quickly with a small amount of effort. We could not assess whether this removal would make a practical year-over-year difference as we cannot at this time assess regrowth. Our

experience has indicated that removing of non-native cattail (*T. latifolia*) during the early summer months when soil is still loose and not entirely dried up would be an ideal time for annual maintenance; school groups visit outside the summer months and there are more staff to assist with *T. angustifolia* removal.

There is also a large population of Creeping thistle (*C. arvense*) which is a noxious invasive species that is highly competitive and difficult to eradicate. We recommend that some measures are implemented to control the spread of thistle and allow for native species to grow. Because of its extensive root system and prolific seed production, complete removal may not be feasible but the population can be managed and controlled by a combination of methods; *i*) planting perennial forage plants and winter cereal plants and native grasses to effectively inhibit *C. arvense* growth *ii*) repeated cultivation/removal every 21 days, especially before flowering, to deplete *C. arvense* root reserves and prevent seed spread *iii*) introducing biological agents such as the stem-boring weevil (*H. litura*) which attacks thistle plants at the flowering stage and feed off roots (USDA 2006).

As mentioned above, maintenance of the woodchip path will aid in keeping the area attractive to visitors and functional for long-term use. Over time, chips will decompose and compact, so we recommend adding chips 1-2 per year during the spring or fall to help maintain the appearance and manage drainage where areas are uneven. Weed control within and around the edges of the path will also prevent overgrowth and promote longevity and public use of the area.

Conclusion

This interpretive design proposal is rooted in the lived realities and capacity of the Galiano Conservancy Association (GCA), shaped through direct site investigation and interviews with restoration and education staff. These methods helped us understand the ecological condition of the Classroom Wetland and the logistical barriers that currently limit its educational potential.

We built on prior UVic student contributions and current staff feedback to identify realistic, site-specific interpretive enhancements that support diverse users—from K–12 learners to adult visitors. Key staff voices emphasized the need for accessible, interactive, and clearly visible features. Our designs reflect those insights and aim to create a more inviting and intuitive space.

All recommendations are scalable and supported by example suppliers, cost estimates, and installation notes. By aligning with the GCA's existing "Why Wetlands?" initiative and current monitoring practices, this project offers immediate implementation potential without overextending resources. Features such as flipbooks, magnifying posts, and shade structures can be added as funding allows, and suggestions for maintenance fit naturally into seasonal workflows.

Feedback from our presentation confirmed that GCA staff see this wetland as a space of high potential. We hope this report supports their goals—ecological and educational alike—and serves as a helpful tool for implementing upgrades and applying for future funding.

Budget

Estimated budget for proposed installations using prices from Open AI, Home Depot, New Print Designs, and GCA resources.

Item	Estimated Cost (Individual)	Quantity	Total
Interpretive Signs	\$300	2	\$600
Who Lives Here Flipbook	\$500	1	\$500
Magnifying Glass	\$20	3	\$60
Wood posts and anchors (for Flipbook & Magnifying glasses)	\$70	4	\$280
Audio Device	\$400	1	\$400
Directional Signposts with Trail Map	N/A	3	N/A
Shelter	\$5,000	1	\$5,000
Chip path	\$100	1	\$100
Total			\$6,940

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Appendix 1 – A. Dewar’s (2021) Liner Wetland Plant List

We compared this list to the GCA’s monitoring data in ArcGIS to assess plant health and inform the messaging on our interpretive signs.

Table 3: The final plant selection list

Common Name <i>scientific name</i>	Planting location (polygon)	Caged (Y/N)	Pollinator Friendly? (Y/N)
SHRUBS			
Yerba buena <i>Clinopodium douglasii</i>	Green	NO	NO
Fireweed <i>Chamaenerion angustifolium</i>	Green	NO	YES
Salal <i>Gaultheria shallon</i>	Green Blue	NO	YES
Yarrow <i>Achillea millefolium</i>	Green (septic field)	NO	YES
Stinging nettle <i>Urtica dioica</i>	Green (septic field)	NO	YES
Dull-Oregon grape <i>Berberis nervosa</i>	Green Blue	NO	NO
Evergreen huckleberry <i>Vaccinium ovatum</i>	Green	NO	YES
Baldhip rose <i>Rosa gymnocarpa</i>	Green	YES	YES
Red-flowering currant <i>Ribes sanguineum</i>	Green	YES	YES
Salmonberry <i>Rubus spectabilis</i>	Green	YES	YES
Sword fern <i>Polystichum munitum</i>	Green	YES	NO
Red elderberry <i>Sambucus racemosa</i>	Green	YES	YES
TREES			
Arbutus <i>Arbutus menziesii</i>	Green	YES	NO
Douglas-fir <i>Pseudotsuga menziesii</i>	Green Red	YES	NO
Western hemlock <i>Tsuga heterophylla</i>	Red	YES	NO
Red alder <i>Alnus rubra</i>	Green Around wetland	YES	NO
Western redcedar <i>Thuja plicata</i>	Green Red	YES	NO
Scouler’s willow <i>Salix scouleriana</i>	Green Around wetland	YES	YES
Oceanspray <i>Holodiscus discolor</i>	Green	YES	YES

Appendix 2 – “Why Wetlands?” Funding Proposal

This document was shared with us as an email attachment on July 8, 2025, from Ria Okuda. This is the funding that has been secured for signage and education around the Classroom Wetland.



Why Wetlands?

What?

The Galiano Conservancy Association (GCA) is developing an interactive wetland conservation education project, “Why Wetlands?”, to increase awareness surrounding the importance of wetland ecosystems and their role in addressing critical water sustainability issues.

The project will involve the creation of permanent, interactive signage installed in our restored wetland areas across the Galiano Conservancy’s Millard Learning Centre (MLC), along with the development of a wetland focused education program aimed at engaging youth from grades 3-12. The signage and educational efforts will highlight key questions such as “What is a wetland?” and “Why are wetlands important?” and “Who lives here?”. The signage will serve to educate both passively, to public visitors recreating on MLC trails, and actively when used by our Educators with organized student groups; the signs will offer understanding into the functions of wetlands in our ecosystem, with a specific focus on their role in freshwater conservation, biodiversity, and ecosystem restoration.

The pilot wetlands program will target 15 organized student groups between April and June 2025, aiming to foster an understanding of wetland habitats, groundwater conservation, and the importance of wetland restoration projects in today’s climate. We will collect qualitative and quantitative data from program participants to assess the effectiveness of the program.

Why?

As climate change continues to impact weather patterns in the Pacific Northwest, the region is experiencing shorter, more intense wet seasons and prolonged dry summers. This fluctuation places pressure on freshwater resources and heightens the need for sustainable water management. Healthy wetlands play a critical role in collecting, holding, and filtering freshwater, replenishing groundwater reserves, and providing essential habitat for numerous species. The GCA Restoration Team is spearheading an incredible watershed restoration project on Crystal Creek, and this conservation education initiative aligns with the restoration

efforts, expanding public knowledge and awareness surrounding wetlands and their significance.

Through this project, students and visitors will learn to appreciate wetlands as not only ecological hotspots, but also as a vital element in the water cycle. Educating future generations about water conservation is critical in mitigating the effects of climate change, ensuring that future generations can implement sustainable practices to preserve our freshwater resources.

How does it address Keta Foundation's priorities for conservation education?

The Interactive Wetland Conservation Education project aligns perfectly with the Keta Legacy's Foundation mission to "educate people on the values provided by the mountains, forests, and waters of the Pacific Northwest" by connecting youth to their local environment, specifically through the exploration of wetlands. Through hands-on, immersive learning, students will gain a deeper understanding of the vital role these ecosystems play in water conservation and biodiversity. By fostering this connection to their natural surroundings, we aim to instill a sense of stewardship in the next generation, inspiring them to protect and preserve these essential habitats for the future. This initiative fosters a deeper understanding of the ecological integrity of the Pacific Northwest's landscapes, which is at the heart of the Keta Foundation's mission.

Expected Outcomes

Permanent Interactive Signage: We will design and install 10 interactive signs throughout our restored wetland ecosystem. These signs will be designed to engage both the public and visiting school groups. The signage will cover key topics such as wetland ecology, biodiversity, and water conservation.

Pilot Program: 15 groups (each consisting of approximately 15-30 participants) will participate in the "Why Wetlands?" education program. The program will build on concepts covered in the signage and will deepen participants knowledge and understanding of wetland ecosystems. An engaging worksheet will be developed to gauge program success and assess participants' understanding of the content.

Knowledge Transfer: The public and visiting families, groups, and schools will benefit from hands-on learning experiences at the MLC's restored wetlands. The project will foster stewardship of the land, inspiring participants to act in their own communities and day-to-day lives.

Who?

This project will be spearheaded by two experienced educators from the GCA. The Education Coordinator, Ria Okuda, has over 12 years of experience in environmental education. Born and raised on Galiano, Ria has a strong connection to the land and community. She holds a BSc in Biology and uses her creative thinking and experience to develop unique and effective educational programs. Sarah Fleming, Environmental Educator, holds a BA in Biology and Environmental Studies. She brings 8 years of experience working with youth in environmental education, facilitating programs that inspire hands-on learning about nature and conservation. The GCA has over 20 years of experience developing and delivering educational programming to students K-12. Currently, the GCA Education Team delivers more than 100 days of programming to over 1,500 students each year. Together, Ria and Sarah will collaborate on curriculum development, program

facilitation, and the creation of interactive, informative signage for the wetlands. Their deep-rooted knowledge of the region's ecosystems and years of experience in environmental education ensure a high level of program success.

Project Schedule/ Progress Reports:

January – March 2025: Development of signage content and pilot program outline

March – April 2025: Signs printed and installed. Pilot program content finalized

April – October 2025: Deliver pilot program to 15 student groups

October – November 2025: Evaluate program effectiveness and success

November 2025: Final project completion. Submit final report with survey/worksheet results from participants.

Budget

EXPENSES					
Category	Description	Quantity	Time (hrs)	Cost (\$/hr)	Total
Signage	design and development	10	15	\$32	\$4,800
	printing	10		\$150	\$1,500
	installation materials	10		\$70	\$700
	installation labour	10	2	\$50	\$1,000
Programming	unit development	10	14	\$32	\$4,480
	program delivery	15	7	\$64	\$6,720
Program Materials	ID books	4		\$35	\$140
	water monitoring equipment	1		\$150	\$150
	digital microscope	2		\$200	\$400
	measuring sticks	4		\$70	\$280
	data collection materials	15		\$10	\$150
	underwater monitoring camera	1		\$250	\$250
	nets	12		\$15	\$180
Administration	admin fees @ 10% of cost				\$2,075.0
TOTAL EXPENSES					\$22,825.0
REVENUES					
Program fees	15 students/group	15		\$32	\$7,200
Supporting Grants	Victoria Foundation - program development		35	\$32	\$1,120
In-Kind	GCA admin, overhead and materials				\$3,000
TOTAL REVENUES					\$11,320
FINAL REQUEST	expenses - revenues				\$11,505.0

Appendix 3 – Current Classroom Wetland Sign Ideas

Sarah Fleming provided this document on July 10, 2025. She is currently in communication with a graphic designer to discuss ideas for signage development.

Wetland Signs

1. INTRODUCTION

- a. Brief overview of wetland restoration work across the Millard Learning Centre
- b. More info to come on this (UVic Field Course currently working on ideas for this sign)

The following signs will flip to give the information on the underside, so students have the chance to “guess” as to what each item has to do with wetlands.

2. SPONGE

- a. Wetlands act as sponges by absorbing excess water from rainfall and then slowly releasing it back into the environment.

3. FILTER

- a. Wetlands can filter debris and pollutants in our environment. They can also filter soil to help prevent erosion

4. PILLOW

- a. Wetlands are a great resting place for many resident animals and even migratory birds!

5. CRIB

- a. Wetlands offer shelter and protection, making them great nurseries for many animals to rear their young.

6. JAR OF CARBON

- a. Wetlands are carbon sinks! Carbon sinks are important ecosystems that absorb and store more carbon than they release. Carbon sinks help combat climate change!

Other sign ideas....

7. RED LEGGED FROG

- a. Small sign that has a button to play-back red legged frog mating call.
 - i. We have an existing sign that mentions the RLF, so this can be a small piece that goes next to this sign where kids can press the button to hear their call.
 - ii. How would something like this be powered?
 - iii. Can it be weather proofed?

8. MAGNIFYING GLASS

- a. Who lives here? Take a closer look!
- b. Sign has a built-in magnifying glass
 - i. The magnifying glass component would need to be covered/sheltered in some way that doesn't start a fire
 - ii. Could the magnifying glass move up and down?
 - iii. Idea came from seeing this:
<https://caledoniaplay.com/product/magpost-large-2/>

Appendix 4 – ArcGIS Wetland Liner Plant Data

Data was exported by Sylvie Hawkes and received as an email attachment - July 10th, 2025.

Class	Date Establ	Browse Pro	Stem Prote	OBJECTID	GlobalID *	Created Us	Created Da	Last Edited
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Perfume / S	10/23/2020	None	<Null>	528	{ab6a7037-	restoration(10:45.1	restoration(
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Red Alder (10/23/2020	Cage	<Null>	687	{fedf03c1-	restoration(00:17.7	fergus the
Gumweed (10/23/2020	None	<Null>	688	{d584e254-	restoration(00:19.0	restoration(
Scouler's W	10/23/2020	None	<Null>	689	{e0e47917-	restoration(00:20.5	fergus the
Pearly Ever	10/23/2020	None	<Null>	690	{891b0638-	restoration(00:21.6	fergus the
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Gumweed (10/23/2020	None	<Null>	780	{064bcc0c-	restoration(02:09.4	restoration(
Coastal Sag	10/23/2020	None	<Null>	781	{da1c1b53-	restoration(02:11.3	restoration(
Other	10/23/2020	None	<Null>	782	{75696887-	restoration(02:12.5	restoration(

Evergreen I	10/23/2020	Cage	<Null>	783	{1c265d0f-	restoration(	02:13.9	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	784	{687a17a0-	restoration(	02:15.1	restoration(
Sword Ferr	10/23/2020	None	<Null>	785	{aa132c2b-	restoration(	02:16.7	restoration(
Evergreen I	10/23/2020	Cage	<Null>	786	{12ac9dab-	restoration(	02:18.3	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	787	{59109db8-	restoration(	02:19.7	restoration(
Oceanspray	10/23/2020	Cage	<Null>	788	{d9cd69a0-	restoration(	02:21.2	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	789	{7a7cde0b-	restoration(	02:22.6	restoration(
Salal (Gaul	10/23/2020	None	<Null>	790	{eaf116b7-	restoration(	02:23.9	restoration(
Snowberry	10/23/2020	Cage	<Null>	791	{7bb12ad4-	restoration(	02:25.2	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	792	{5bbae424-	restoration(	02:26.3	restoration(
Evergreen I	10/23/2020	Cage	<Null>	793	{705094f4-	restoration(	02:27.7	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	794	{0a76c0d4-	restoration(	02:29.3	restoration(
Red Alder (	10/23/2020	Cage	<Null>	795	{2e136038-	restoration(	02:30.5	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	796	{7b235a65-	restoration(	02:31.7	restoration(
Wild Goos	10/23/2020	Cage	<Null>	797	{32af39b0-	restoration(	02:33.1	restoration(
Oceanspray	10/23/2020	Cage	<Null>	798	{49d8ee92-	restoration(	02:35.1	restoration(
Other	10/23/2020	None	<Null>	799	{6408c4af-	restoration(	02:35.8	restoration(
Other	10/23/2020	None	<Null>	800	{014cf0ff-5	restoration(	02:36.5	restoration(
Oceanspray	10/23/2020	Cage	<Null>	801	{6a6f7ac8-	restoration(	02:39.4	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	802	{fb26e0df-	restoration(	02:40.9	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	803	{7f9f9372-	restoration(	02:42.2	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	804	{8b6e8ae0-	restoration(	02:43.3	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	805	{a8674f4e-	restoration(	02:45.7	restoration(
Sword Ferr	10/23/2020	Cage	<Null>	806	{95992b9c-	restoration(	02:46.8	restoration(
Baldhip Ro	10/23/2020	Cage	<Null>	807	{1b1c0d24-	restoration(	02:47.8	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	808	{b171ba7c-	restoration(	02:48.8	restoration(
Western Re	10/23/2020	Cage	<Null>	809	{58afe28f-f	restoration(	02:50.0	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	810	{c7037ce9-	restoration(	02:51.3	restoration(
Saskatoon I	10/23/2020	Cage	<Null>	811	{202cc358-	restoration(	02:52.6	restoration(
Red-Flowe	10/23/2020	Cage	<Null>	812	{f01c480e-	restoration(	02:54.4	restoration(
Wild Goos	10/23/2020	Cage	<Null>	813	{920e859a-	restoration(	02:55.6	restoration(
Saskatoon I	10/23/2020	Cage	<Null>	814	{07d37ee8-	restoration(	02:56.8	restoration(
Pearly Ever	10/23/2020	Cage	<Null>	815	{43c51a7b-	restoration(	02:57.7	restoration(
Western Re	10/23/2020	Cage	<Null>	816	{d809c15f-	restoration(	02:59.0	restoration(
Western Re	10/23/2020	Cage	<Null>	817	{0c5b3c5a-	restoration(	03:00.3	restoration(
Western Re	10/23/2020	Cage	<Null>	818	{cb0fc056-	restoration(	03:01.5	restoration(
Western Re	10/23/2020	Cage	<Null>	819	{71fefa80-	restoration(	03:02.5	restoration(
Western Re	10/23/2020	Cage	<Null>	820	{bbf8d54e-	restoration(	03:03.5	restoration(
Red Alder (	10/23/2020	Cage	<Null>	821	{c847cac3-	restoration(	03:04.5	restoration(

