

Graduate Internship Opportunity

Summer 2025

PROJECT TITLE

Beaver Wetlands as Nature-Based Climate Solutions: Exploring GHG Dynamics

ORGANIZATION

Galiano Conservancy Association

Project Background

Wetlands cover 14% of Canada's landmass, totaling approximately 5.28 million hectares in British Columbia. Unfortunately, 98% of these wetlands have been impacted by land use changes. Growing awareness of the ecosystem services and carbon storage potential of wetland habitats has spurred widespread efforts to protect and restore these critical ecosystems.

Over the past five years, the Galiano Conservancy Association (GCA) has successfully restored around 5 hectares of degraded wetland to mimic beaver wetlands on Galiano Island. A new priority for the GCA is to investigate how restoration affects greenhouse gas (GHG) exchange rates between water, soil, and the atmosphere—known as GHG flux—in these reconstructed beaver pool wetlands. While the carbon dynamics of some wetland habitats have been extensively studied, others remain unexamined. In British Columbia, we still lack a comprehensive understanding of how the restoration of beaver pool habitats impacts climate regulation and resilience. The following steps on Galiano are to investigate GHG flux across degraded and restored beaver wetland habitats, monitoring and comparing four distinct sites that are at different phases of restoration and degradation. These results will help to inform current and future wetland restoration projects.

Project Description

The project aims to better understand greenhouse gas (GHG) flux across degraded and restored beaver wetland habitats. This will involve deploying static non-steady-state chambers to collect gasses across four study sites.



The first site is an agriculturally degraded wetland at Quadra Hill, which the Galiano Conservancy Association (GCA) plans to restore in 2026. The second site is a recently restored area within the Chrystal Creek Watershed, where the GCA has implemented soil decompaction, excavation, and the distribution of coarse woody debris, followed by replanting to create a diversity of wetland types that mimic beaver pool habitats. The third site is along the riparian zone of Greig Creek, upstream of Laughlin Lake, located in Bodega Ridge Provincial Park. This site has experienced impacts from logging, ditching, and road building but is currently being recolonized by North American beavers, who are aiding in its restoration. The fourth site is a theoretically undisturbed beaver wetland within the Galiano Island Ecological Reserve and can serve as a reference for a healthy and functioning beaver wetland.

Gas samples will be collected once per season from each site, to account for seasonal fluctuations. Collected samples will be analyzed using gas chromatography to measure methane (CH_4) and carbon dioxide (CO_2) levels. Additionally, vegetation type, soil organic carbon, soil saturation, above-ground carbon stores, and root density will be assessed at each site, providing a comprehensive perspective on each site's role in climate resilience. The scholar will assist in the analysis of CO_2 and CH_4 response to the biogeoclimatic variables listed above, and the degradation level of each site.

This project aims to enhance local understanding of wetland restoration as a climate solution. Results will be communicated to support land managers, restoration practitioners, and community partners in implementing science-informed wetland management strategies, particularly in the context of climate change. We plan to make this information accessible and engaging to the public.

Scope of Work

The scholar will contribute to the larger-scale study described above by contributing to data collection, analysis, and science communication throughout the length of the program.

Primary activities will include soil organic carbon sample collection, above-ground carbon assessment, root density sample collections, and soil saturation sample collection from all pre-established collection sites.

Dissolved organic carbon sample collection will also be conducted in the spring at relevant sites and the scholar will complete the spring and summer flux gas sample collections, outlined further in section 6.

The scholar will clean and begin analysis of collected data and contribute to science communication throughout the length of the program.

The key questions the scholar's work will contribute to are:



SUSTAINABILITY SCHOLARS PROGRAM

Does ongoing degradation of wetland habitat lead to net GHG emissions? And can restoration, by human interaction or that of *Castor canadensis*, halt or reverse the emission from degraded wetland habitat sites?

Key Deliverables

- 1. Report summarizing methods and analysis of data collected during the program term.
- 2. Create a minimum of four science communication outputs in the form of social media posts, blogs, or infographics describing the research and its local significance.

Time Commitment

May to August 2025.

- May 1st: Start date.
- May 5th-9th: Spring collection of gas flux data from all sites.
- May-June: Soil saturation & dissolved organic carbon data collection.
- Data cleaning and analysis of gas flux data (time permitting).
- May 14th: 1st science communication output publication.
- June: 13th: 2nd science communication output publication.
- July-August: Root density sample collection and above-ground carbon assessment.
- July 14th: 3rd science communication output publication.
- August 4-8th: Summer collection of gas flux data from all sites followed by cleaning & analysis (time permitting).
- August 14th: Final science communication output publication.
- August 15th: Final day of the program, completion of a summary report.

Preferred Skills & Background

- Excellent research and writing skills
- Demonstrated interest in sustainability
- Experience conducting stakeholder engagement events, including facilitation skills, is an asset
- Familiarity with research methodologies and survey techniques
- Statistical analysis
- Excellent public speaking and presentation skills
- Community engagement experience
- Familiarity conducting focus group research



- Strong analytical skills
- Ability to work independently
- Deadline oriented
- Project management and organizational skills
- Programming skills
- Familiarity with WordPress, or other website content tools
- Strong technical and drafting skills
- GIS training or experience
- Familiarity with benchmarking methods and tools

Additional Project Requirements

The position is part remote and part on-site on Galiano Island (one week per month onsite preferred). Relocation is preferred but not required. Candidates must have access to a personal vehicle and secure their own accommodations, though GCA can help connect the candidate with potential leads. Camping options at the Millard Learning Centre may be available. Ferry costs are covered, and limited vehicle reimbursements may apply.

Program Information

Dates: May 1—August 15, 2025

Compensation: Scholars are paid approximately \$31.80/hr for 250 hours of work (based on UVic Research Assistant pay rate)

Application Deadline: January 31, 2025

Contact: Laurel Currie (sustainability-scholars@uvic.ca)

Visit our website to learn more about eligibility and application requirements.