SUSTAINABILITY SCHOLARS PROGRAM

Fall 2020

The UBC Sustainability Initiative (USI) is pleased to offer current UBC graduate students the opportunity to work on funded sustainability internship projects. Successful candidates work under the mentorship of a partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region.

Note: Projects must be completed remotely during the COVID-19 pandemic.

- Visit the Sustainability Scholars Program website to learn how the program works and to apply.
- Be sure to review the application guide to confirm your eligibility before applying.

Applications close at midnight on Sunday September 20, 2020.

Quantifying the climate mitigation benefits of nature-based flood control solutions and associated ecological restoration in British Columbia

Sustainability Goal or Operations Plan objective

Sustainable Cities and Communities and *Climate Action*: The specific goal area/sustainability objective is to quantify the climate mitigation benefits of nature-based flood control solutions in comparison to traditional "grey" infrastructure.

Project description

Overview:
To address the climate crisis, the Province of BC launched CleanBC, a plan to grow the use of clean and renewable energy and reduce carbon emissions. The plan remains a priority during the current unprecedented conditions created by the COVID-19 pandemic. To lessen the economic impact of COVID-19 control measures, the provincial and federal governments are planning public spending on economic stimulus projects. Watershed Watch Salmon Society and many other organizations have been calling for "green" stimulus spending in line with CleanBC and other sustainability-related government priorities.

The BC Government's *Preliminary Strategic Climate Risk Assessment* projects the risk of severe riverine flooding to increase five-fold by 2050. Many areas of B.C. have aging and undersized flood control infrastructure that needs to be upgraded to reduce climate change related flood risks from increased seasonal flooding and sea level rise. Required flood control upgrades in BC are expected to cost over $1B and flood protection has been identified by government officials as a likely candidate for economic stimulus spending.

Since 2016, Watershed Watch Salmon Society has been promoting fish-friendly flood control solutions through our Connected Waters initiative. We have made great gains in promoting awareness of the issue. A new associated initiative, Resilient Waters, is assessing and prioritizing potential infrastructure upgrades and associated habitat restoration work to help guide future infrastructure and restoration priorities. The research team has so far identified and scoped 22 projects in the lower mainland that would require approximately $100M to implement.

The benefits of fish-friendly, nature-based flood control include climate change adaptation, restoration of salmon habitat and the associated benefits of increased salmon populations, removal of invasive species, improved water quality, and creation of urban green spaces for passive recreation. Restoration of these habitats and removal of salmon migration barriers has been identified as a priority by First Nations, the BC Government's Wild Salmon Advisory Council, local governments, and many others.

"Natural assets" and nature-based solutions are increasingly understood to be more adaptive, and often less expensive, than traditional grey infrastructure, while providing multiple benefits. Examples of nature-based solutions include living dikes, setback dikes, and fish-friendly pumps and floodgates. A significant benefit of some forms of green flood control infrastructure is the potential to mitigate climate change. This can be achieved through carbon sequestration, and/or lower life cycle greenhouse gas emissions as compared to grey infrastructure solutions.

The climate mitigation benefits of green flood control infrastructure are not well documented, because green flood control is a relatively new field of practice. The limited existing literature typically pertains to stormwater management infrastructure, where smaller-scale green infrastructure solutions have a longer history of deployment. Watershed Watch believes that it is possible to estimate the climate mitigation benefits of green flood control infrastructure by comparing specific green and grey flood control options proposed for the Fraser Valley, and by using general literature on the carbon sequestration potential and life cycle emissions of each.

New estimates of the carbon mitigation potential of green flood control infrastructure (and associated habitat restoration) will be used in our Connected Waters initiative, to promote the implementation of nature-based and fish-friendly flood control solutions, and in the Resilient Waters project, to help with the prioritization of infrastructure and restoration projects. These estimates will also be informative and influential on a global scale, for all jurisdictions seeking to better understand the potential climate mitigation benefits of green vs. grey flood control solutions.

Purpose of the Project

Watershed Watch Salmon Society and our partners would like to quantify, to the extent possible, the climate mitigation benefits of green flood control solutions and associated habitat restoration. The outcomes of this project will inform the prioritization and planning of flood infrastructure upgrades and aquatic habitat restoration in BC's lower mainland, and the global practice and promotion of nature-based flood control.

Scope of Work:

- Become familiar with the Connected Waters initiative, the Resilient Waters project, and the literature that demonstrates the benefits of green infrastructure and nature-based solutions

- Work with Watershed Watch and Resilient Waters staff to identify candidate project types and locations for which estimates of lifecycle greenhouse gas emissions and carbon sequestration can be developed, for both green and grey infrastructure types.
- Locate and review all available literature that can be used to support the analysis. We expect that most of this literature will be general in nature rather than specific to green flood control infrastructure.
- Interview subject matter experts to ensure that all relevant information has been collected and to receive advice on a methodology for analysis.
- In consultation with Watershed Watch and Resilient Waters staff, develop a methodology to quantify and compare the lifetime greenhouse gas emissions/sequestration of green and grey infrastructure solutions.
- Incorporate habitat restoration (e.g. riparian, floodplain and streambank restoration) into the methodology and benefits.
- Develop a report that clearly explains the methodology and its limitations, describes the climate mitigation properties of the selected green and grey infrastructure, and describes opportunities for follow-up work.
- Time permitting, apply the methodology to selected case studies drawn from the priority projects identified by the Resilient Waters project.

Deliverables

The Scholar will deliver a final report containing a summary of their completed work complemented by a final presentation to Watershed Watch staff and selected partners and allies. The report should include:

- A summary of existing information collected.
- A summary of the methods of analysis and their limitations.
- Estimates of the climate mitigation potential for selected green flood control options, with comparison to life cycle emissions to a traditional grey flood control option for the same locations.
- A general summary of the climate mitigation benefits of green flood control options and associated habitat restoration.
- Recommendations for further research and analysis.
- A final report [or Executive Summary] for the UBC Sustainability Scholars online project library.

Time Commitment

- This project will take **250** hours to complete.
- This project must be completed between October 19, 2020 and March 12, 2021
- The Scholar is to complete approximately 12 hours per week, on their own schedule.

Required/preferred Skills and Background

☐ Excellent research and writing skills
☐ Demonstrated interest in sustainability
☐ Familiarity with research methodologies and survey techniques

☐ Strong analytical skills
☐ Ability to work independently
☐ Project management and organizational skills
☐ Comfortable interacting with other scientists to obtain information and advice
☐ Background or familiarity with biological sciences an asset
☐ Understanding of aquatic ecosystems and habitats an asset

Applications close **midnight Sunday September 20, 2020**.
Apply here: http://sustain.ubc.ca/scholarsapply
Contact Karen Taylor at sustainability.scholars@ubc.ca if you have questions

Useful Resources

Below are some links to useful resources to help you with your resume and cover letter (there are many more online). Some of these resources also provide information on preparing for your interview.

Resume workshop for prospective Sustainability Scholars: https://www.eventbrite.ca/e/resume-workshop-for-prospective-sustainability-scholars-tickets-117422877989

https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae

https://www.grad.ubc.ca/current-students/graduate-pathways-success

https://www.grad.ubc.ca/cover-letter-cv-resume-templates-ubc-career-services