



Introduction

Living Lakes Canada trains citizen scientists and community-based monitoring because citizens are concerned and want to ensure that their lakes, rivers, wetlands and watersheds remain healthy and that their communities are climate resilient. They want to be involved in the decisions that affect their local watersheds including source water protection, drinking water quality, resource development and sustainable water use. Indigenous communities have been monitoring or “watching the land and water” for generations by collecting observations combined with traditional knowledge passed on from Elders. Both indigenous and non-indigenous community-based water monitoring present enormous and cost-effective opportunities to empower communities to work collaboratively with governments and industry for holistic water management.

CABIN (Canadian Aquatic Biomonitoring Network) collects benthic macroinvertebrates at a site location and uses their counts as an indicator of the health of that water body. Benthic macroinvertebrates are aquatic, bottom-dwelling animals without backbones, that are generally visible to the naked eye. They include worms, crustaceans, molluscs and the larval stages of many insects.

Macroinvertebrate communities have many advantages as biological indicators:

- They reflect conditions at specific locations and also show cumulative impacts
- They are sensitive to a variety of disturbances
- They are present in all fresh water ecosystems
- They are a key part of aquatic food webs
- Their assessment methods are well-developed

CABIN helps scientists study Cumulative Effects through Biological Monitoring, allowing them to assess the combined impacts of all upstream pressures on watersheds using meaningful baseline conditions.

- CABIN shows users an Integrated Ecological Condition; a single CABIN sample represents effects on aquatic biota over time and can capture evidence of multiple disturbance events.

CABIN provides a very cost-effective approach to aquatic health monitoring, especially in remote locations in Canada, where resource development is occurring.

The field assistant certification course provides participants with an introduction to the CABIN program and hands-on field skills. It does not give the student access to the online tools. Students have the opportunity to upgrade their field assistant certification to field technician by paying the necessary fees and completing the online modules with the Canadian Rivers Institute.

CABIN and eDNA

Living Lakes Canada and partners including Environment and Climate Change Canada, University of Guelph and WWF-Canada are field testing the use of Environmental DNA (eDNA) for benthic invertebrates. eDNA is an emerging tool for monitoring present biodiversity. It uses gene sequencing linked to DNA/RNA barcode libraries to allow for faster, more complete profile of biodiversity content from very small samples. Internationally, countries like Australia, the EU and Scotland are exploring working with eDNA. This is a made-in Canada technology and now has the opportunity to move beyond proof of concept to demonstrating the possible. This will make benthic invertebrate analysis faster, more accurate and more affordable for community groups water quality monitoring initiatives.

Living Lakes Canada can incorporate the eDNA field collection protocols into the modified Field Assistant, 2-day field practicum for community groups.

CABIN and Indigenous Knowledge

Living Lakes Canada's on-the-ground experience working with First Nation communities, recognizes the CABIN protocol as a holistic approach to investigate watershed health that aligns closely with Indigenous Knowledge. Living Lakes Canada trains community members in the CABIN water quality monitoring protocol, and the opportunity to use the protocol as a tool to engage in a collaborative water monitoring, language preservation project. This project will work towards Reconciliation in Action through Indigenous Knowledge and traditional language preservation.

Each CABIN field practicum will be treated as a prototype, unique to the level of sharing, permission for recording, documenting and later preservation based on the communities needs and values. Each workshop will follow confidentially guidelines that are agreed upon by the communities. The field practicum will engage the community in

all aspects of the process, directing the research goals, indigenous knowledge sharing and facilitating an active part in protocol development.

Using a community-based approach, Living Lakes Canada will use the CABIN protocol to provide a platform for the integration of place-based, hands-on learning. The project will simultaneously integrate traditional western science by using the standardized CABIN protocol with the inclusion of traditional language as a cultural preservation project. The project will fill knowledge gaps and integrate IK and western science for joint watershed health evaluation and stewardship to support informed decision-making.

Living Lakes Canada in partnership with Environment and Climate Change Canada will collaborate with the community to work towards evolving the CABIN protocol to benefit the community through the inclusion of Indigenous Knowledge and stream names. Living Lakes Canada will provide a presentation to community members about previous language preservation work in the Columbia Basin and around BC, case studies of Western Science and IK projects and opportunities moving forward.

Costs

\$125/person for 2 day field practicum.

Additional Information

For more information the CABIN website can be found at <http://ec.gc.ca/rcba-cabin>

For more information on Living Lakes Canada and Indigenous Language Preservation visit the [Living Lakes Canada website](#).

CABIN Training: Field Certification Agenda

Location: Smithers

Date: October 11 and 12, 2018

What to bring: waders, rain/snow gear, field notebook, pencil, calculator, clipboard, lunch

Meeting Location: TBD

Transportation: Participants are responsible for their own transportation. We will meet to discuss carpooling to other field locations at the initial tubing take out location.

Day 1

8:30 Welcome (Location TBD)

Introduction to CABIN regional activities
Roundtable of participants and biomonitoring activities
Review Agenda and logistics of workshop
Health & Safety, Waivers, Q&A
Make way to first field location

9:30 Demonstration (LOCATION TBD)

On-site review of equipment
Review of Safety Considerations
Group Review of Field Sheets

12:00 Lunch: (bring your own)

1:00 Practice Site #1 (LOCATION TBD)

Participants will be paired up to practice each step of protocol
Each participant will be given a set of field sheets to complete
Protocol will be divided into 2 stations
Pairs will rotate through each station
Each member of the pair will complete the activity at each station

4:30 Q&A for certification

5:30 Arrange Meeting location for Day 2

Day 2

9:00 Practice Site #2 (LOCATION TBD)

Lunch: (bring your own)

12:30 Certification (LOCATION TBD)

Participants will be paired up to demonstrate each step of the protocol
Each participant will be given a set of field sheets to complete and hand back to the station instructor to be marked.

4:30 Wrap –up and Certificate presentation