

CLEAN RESOURCES

ENVIRONMENTAL INNOVATION

WATER INNOVATION PROGRAM

FUNDING DETAILS

Integrating DNA-based testing into an Alberta-wide community-based water monitoring and research program

Community-based monitoring (CBM) has been gaining momentum worldwide as a legitimate and inexpensive approach for water monitoring. By engaging stakeholder and community members, the scope and scale of water monitoring projects can be expanded while reducing costs and advancing scientific and water literacy. Community-based monitoring has the potential to increase capacity to inform and contribute to our understanding of biological, chemical and ecological parameters of risk in our water. This project addresses research priorities related to recreational water and storm water for the Province of Alberta while building regional capacity and confidence in a DNA-based CBM monitoring system that will be the first of its kind in the world.



RECIPIENT:

**University of
Alberta**



TOTAL BUDGET:

\$1,163,424



AI FUNDING:

\$660,454



PARTNERS:

**Alberta
Environment and
Parks, Alberta
Health, eDNA
Metagenomics,
Alberta Lake
Management
Society, Inside
Education**



PROJECT DATES:

**JANUARY 2020 –
APRIL 2023**

APPLICATION

Monitoring for the DNA of organisms of interest in water can unify testing for biological health hazards, invasive species and species at risk around a single method. DNA-based testing traditionally is found only within central laboratory facilities, however, advances in technology has made this approach to water monitoring more accessible than ever. The long-term vision for this project is to establish a community and school-based network that utilizes DNA-based testing to survey for priority water borne and water based targets that are relevant to the freshwater resources of Alberta.



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PROJECT GOALS

The overarching objective of this project is to identify how to most effectively operationalize community-based monitoring using DNA-based monitoring (qPCR) into existing water monitoring programs for health, environmental and invasive species monitoring. Specifically, the project will:

- Utilize CBM to expand the scope and frequency of cyanobacterial monitoring in Alberta to collect more comprehensive data on bloom dynamics and facilitate development of three new toxin tests relevant to bloom toxins found in Alberta.
- Expand the range of monitoring for aquatic invasive species using DNA-based CBM and increase the number of organisms included in the program by developing novel tests that target specific priority organisms.
- Develop and implement a high school-based curriculum that integrates water literacy and DNA-based testing methods into storm water surveillance efforts targeting enteric bacteria.

BENEFITS TO ALBERTA

Successful use of the knowledge generated from this project could result in a streamlining of water monitoring efforts across Alberta due to the integration of a CBM surveillance network. Centralizing this project around qPCR allows the process of water monitoring to be optimized by assessing for the presence of multiple target organisms from a single water sample. This means greater cost efficiency, and less redundancy being introduced due to the existence of multiple monitoring programs that prioritize organisms relevant to health or the environment. Additionally, this CBM approach allows for far greater coverage of natural water bodies in Alberta. This allows research questions to be developed that build from a spatial and temporal scale that has not been achieved by past monitoring programs.



7 Publications to date



8 Students Trained



5 Project Jobs

CURRENT STATUS

APRIL 2020

The project team is busy recruiting community partners to begin the process of training and implementing the CBM water monitoring network.