



ALBERTA INNOVATES

# AGRICULTURE AND ENVIRONMENT

ENVIRONMENTAL INNOVATION

WATER INNOVATION

## FUNDING DETAILS

### Early detection and rapid response to aquatic invasive species and species at risk using environmental (e)DNA and metabarcoding

Detection of aquatic invasive species (AIS) and species at risk (SAR) is frequently hindered by the low abundance of these organisms in the environment and sporadic distribution. Utilizing environmental DNA (eDNA) to detect these rare organisms is emerging as a way to overcome these challenges. This project will develop methods and tools to implement eDNA detection panels based on quantitative polymerase chain reaction (qPCR) and metabarcoding to rapidly and sensitively detect relevant AIS and SAR. Completing this research will arm Alberta with world-leading tools to combat invasive animals and plants - even those that have not arrived to our Province.



#### RECIPIENT:

University of Alberta

Patrick Hanington



#### PARTNERS:

Parks Canada; Alberta Environment and Protected Areas; City of Calgary; Alberta Lake Management Society; North Saskatchewan Watershed Alliance, University of Alberta (Hanington), Papaschase Securities (as a representative of Papaschase First Nation)



#### TOTAL BUDGET:

\$1,953,842



#### AI FUNDING:

\$708,322



#### PROJECT DATES:

MAR 2023 –  
DEC 2026



#### PROJECT TRL:

N/A  
N/A



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## APPLICATION

Developing q/dPCR panels to rapidly and sensitively detect aquatic invasive species and species at risk relevant to North America will provide Alberta with world-leading tools to combat invasion by animals and plants.



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## PROJECT GOALS

This project aims to address the primary limitations of an eDNA-based aquatic invasive species and species at risk program by:

1. Developing and validating novel eDNA tests using a digital PCR platform for priority aquatic invasive species and species at risk in North America.
2. Comparing dPCR-based eDNA surveillance with metabarcoding results from the same water sample, targeting bacteria, autotroph, heterotroph and invertebrate/vertebrate organisms.
3. Developing protocols for drone-based eDNA sampling through partnership with Papaschase First Nation.

## BENEFITS TO ALBERTA

This project may result in the following benefits to Alberta:

- Prevention/reduction of costs to manage invasive species and costs to repair damaged infrastructure. Estimated annual costs of invasive species in Canada was recently estimated to range between \$95.8 million and \$400 million.
- Protection of species at risk and other sensitive species. Protection of healthy aquatic ecosystems.
- Metabarcoding could help establish biodiversity profiles, supporting conservation efforts.
- Protection of recreational waters. Enables/supports a more inclusive, equitable and effective freshwater monitoring program (community-based participation).
- Training of at least 2 students in growing technical field (eDNA).
- Supports AEPA (and other) invasive species monitoring program.

### CURRENT STATUS

#### OCT 2025 - IN PROGRESS

The project has collected 1,238 environmental DNA samples throughout Alberta and developed/validated eDNA assays for 36 unique aquatic invasive species and species at risk. Applying these tests to the samples has allowed testing for 9,306 priority organisms in Alberta. This data serves to guide future sampling and prioritizing of metabarcoding efforts to complete the second objective of the project related to comparing q/dPCR and metabarcoding approaches to AIS/SAR detection which is underway.