

# CLEAN RESOURCES

ENVIRONMENTAL INNOVATION

WATER INNOVATION PROGRAM

## FUNDING DETAILS

### Assessing historic patterns and future trends of anthropogenic impacts on shallow groundwater quality in southern Alberta

The 3-year study will be conducted in southern and central Alberta. The project driver is to support groundwater quality management by investigating how and where regional changes in groundwater quality have occurred, which indicators track these changes, whether changes have resulted from human activities, and which indicators in shallow groundwater (<50m) serve as early warnings for changes to deeper (>100m) high-quality groundwater sources.



**UNIVERSITY OF  
CALGARY**



#### RECIPIENT:

**University of  
Calgary – Professor  
Bernhard Mayer**



#### PARTNERS:

**Alberta  
Environment &  
Protected Areas,  
Alberta Geological  
Survey, Alberta  
Biodiversity  
Monitoring  
Institute**



#### TOTAL BUDGET:

**\$1,685,600**



#### PROJECT DATES:

**APR 2023 –  
APR 2026**



#### AI FUNDING:

**\$540,000**

## APPLICATION

The anticipated outcome is the development of an accurate approach to identify past, current, and future anthropogenic and natural factors that impact the quality of groundwater, and by extension surface water, in large and partially water-restricted watersheds in Alberta. This will improve the understanding and inform the management of the cumulative landscape and climate change impacts on shallow groundwater quality.

# ALBERTA INNOVATES CLEAN RESOURCES

## ENVIRONMENTAL INNOVATION

### WATER INNOVATION PROGRAM

#### PROJECT GOALS

- Determine temporal trends since the 1950's for key groundwater quality indicator parameters and identify anthropogenic or natural causes for the observed trends.
- Investigate potential links between groundwater quality and past changes in land use practices using human footprint, crop inventory, and manure/fertilizer data.
- Explore how climate change and water use scenarios may alter hydrological conditions and groundwater quality.
- Assess how past and predicted trends in groundwater quality may affect the surface water quality in southern Alberta.

#### BENEFITS TO ALBERTA

- Increased understanding and management of cumulative landscape level impacts on groundwater (cross-sector water management)
- Understanding the cumulative effects of land use practices and climate change on groundwater quality and quantity has direct environmental benefits, including protection of ecosystems and human health.
- Outcomes will help address issues related to the management of climate change impacts by developing new understanding and management strategies for impacts on groundwater quality and quantity and by using novel remote sensing techniques.



**8 Publications**  
(planned)



**3 New Policies**  
Informed/Influence



**8 Students**  
Trained (planned)



**2 Project Jobs**

#### CURRENT STATUS

##### JAN 2024

In year 1 of the project, all sub-agreements with project partners and supporting organizations were finalized and research staff and highly qualified personnel were hired. Considerable progress has been made with evaluating temporal trends in select groundwater quality indicators and with microbial groundwater analyses. Research on land use change, climate change modeling, groundwater modeling and groundwater surface water interactions has also commenced.