

## Advancing Use of Beavers as a Nature-Based Solution to Manage the Impacts of Climate Change

Beavers keep water on the landscape, leading to landscape stability and resiliency, which benefits ecosystems, landowners, and land managers. As a result, beavers are gaining recognition as a climate change adaptation tool. Two key challenges to identifying where and when to promote the use of beavers to mitigate the effects of climate change addressed by the project are 1) determining how beaver dam networks can capture spring runoff and store flows as groundwater for release during the drier summer months over life cycles of beaver occupancy, and 2) establishing effective and sustainable mitigations to manage issues arising from human-beaver interactions.

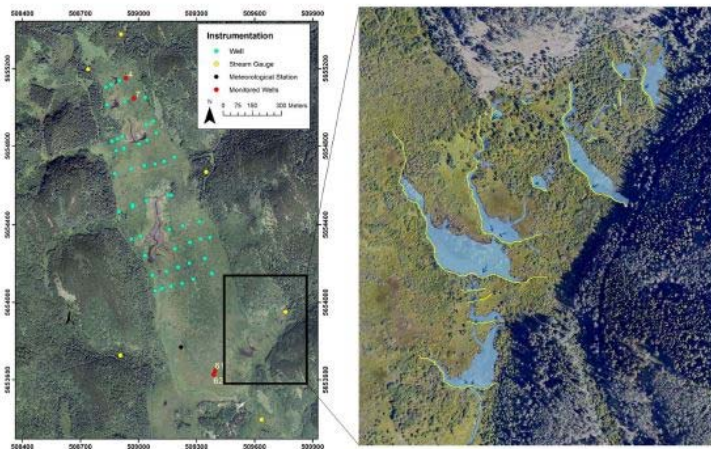


Figure 1: Map of Bateman Creek and its associated Sibbald Fen wetland (from Streich and Westbrook 2020; left) with ortho-image (acquired September 2022 with a drone) of the proposed research site (southwest portion of the Bateman Creek valley bottom; right) showing the location of the beaver dam network being actively maintained by a colony (family) of beavers. Beaver dams (20+) are depicted by yellow lines and surface water is shaded blue. Blue arrows depict general direction of flow.



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**TOTAL BUDGET:**  
\$785,338



**AI FUNDING:**  
\$391,338



**PROJECT DATES:**  
MAY 2023 –  
APR 2027



**PROJECT TRL:**  
Start: N/A  
End: N/A

### APPLICATION

The project will: 1) Develop knowledge that helps the Government of Alberta achieve its Water for Life Strategy objectives, specifically, how to work with beavers, including managing issues arising from human-beaver interactions, to maintain and support healthy aquatic systems which are vital to reliable, quality water supplies for a sustainable provincial economy into the future; 2) Develop knowledge and tools needed to support new water policies, and develop standards of practice incentive programs for use of beaver as a nature-based solution; 3) Share and mobilize knowledge with other academics, the provincial government, municipalities, and with Albertans related to beaver ‘engineering’ of waterways, and effective and sustainable mitigations to manage issues arising from human-beaver interactions; and 4) Develop HQPs who will be the future natural resource management leaders of Alberta.



## PROJECT GOALS

The overarching objective of the project is to form an evidence base for understanding the potential for, and the potential costs/challenges of, using beavers to mitigate the impacts of climate change on stream and wetland functioning. Four key questions will direct the research to achieve the project's overarching objective.

- 1) How do beaver dams built in a network pattern capture spring runoff and store flows as groundwater for release during the drier summer months?
- 2) Knowing that beavers cyclically abandon and reoccupy their ponds over time, what are the key determinants of site occupancy and the environmental feedbacks that help maximize beaver dam network persistence and their hydrological impacts?
- 3) How does the location of a pond-leveling device within a beaver dam network affect ponding, downstream connectivity, channel-floodplain connectivity, and beaver activities?
- 4) How can resource managers crowdsource hydrological and ecological data suitable for addressing pressing management challenges in beaver-dominated landscapes?

## BENEFITS TO ALBERTA

The project will:

- a) develop new knowledge of how beavers influence hydrological processes throughout their site occupancy cycles at a spatial scale consistent with the watershed scale of stream management and restoration goals.
- b) assess ecohydrological impacts of pond levelers as a management tool, and provide guidance on best practices for their deployment.
- c) develop a low-cost community-based program for monitoring landscape change by beavers, and an associated early warning system to quickly identify and deploy beaver impact mitigation tools.
- d) educate ecohydrologists and ecologists ready to fill the provincial demand for scientists and professionals able to advance ecosystem-based climate adaptation initiatives. Additionally, research outcomes can be used to inform development of locally and provincially appropriate beaver management policy, standards of practice, and incentive programs.

CURRENT  
STATUS

**APR 2023**

Project starts in May 2023.