

# From the Mountains to Our Tables: Freshwater Security in Three Canadian Eastern Rocky Mountain Watersheds



We respectfully acknowledge that we conduct our research on Treaty 6, 7, and 8 territory, traditional lands of First Nations and Métis people.



# Climate change is the most pressing issue facing the critical water resources that originate in mountains!

## OBJECTIVES of our research program include:

- 1) Quantifying seasonal, interannual, and spatial patterns in proglacial freshwater chemistry and quality;
- 2) Identifying microbial functional groups and their productivity across these same riverine gradients;
- 3) Characterizing algal and insect productivity in glacier-fed riverine systems; and
- 4) Determining temperature tolerance of mountain river fish.

Meeting these objectives will result in the most comprehensive freshwater quality and lower food web biodiversity datasets ever collected in the headwaters of three important Albertan glacial-fed rivers, setting a baseline from which to compare all future changes.



# 2019/20 Research Team and Training

## Principle Investigators:

- **Dr. Vincent L. St.Louis:** Dept. Biological Sciences, University of Alberta
- **Dr. Rolf Vinebrooke:** Dept. Biological Sciences, University of Alberta
- **Dr. Suzanne Tank:** Dept. Biological Sciences, University of Alberta
- **Dr. Maya Bhatia:** Dept. Earth and Atmospheric Sciences, University of Alberta
- **Dr. Martin Sharp:** Dept. Earth and Atmospheric Sciences, University of Alberta
- **Dr. Craig Emmerton:** Government of Alberta (Environment and Parks)
- **Dr. Colin Cooke:** Government of Alberta (Environment and Parks)

## Training (University of Alberta):

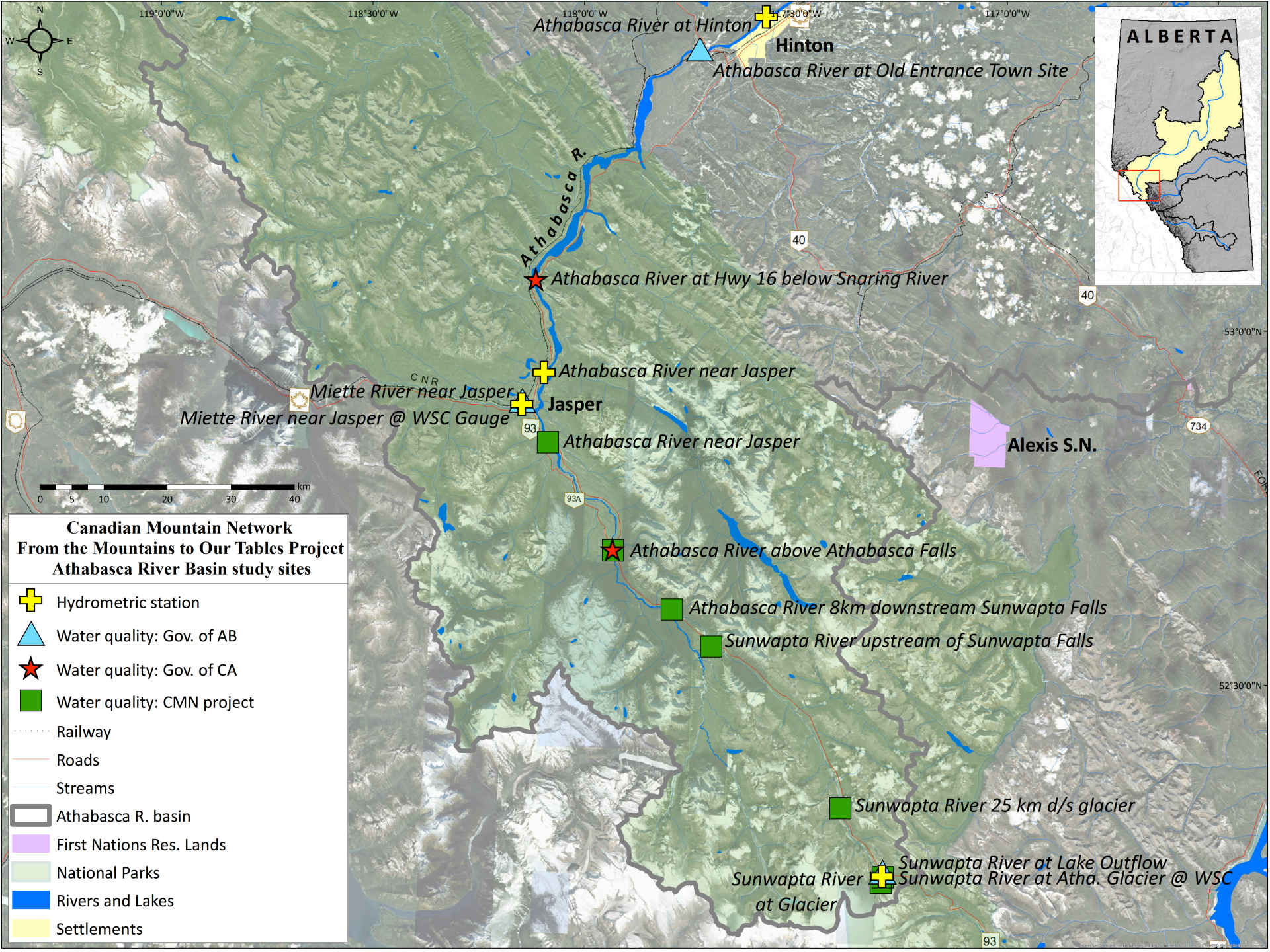
- **Jessica Serbu:** **PhD graduate student**, Dept. Biological Sciences
- **Shelby Stenerson:** **PhD graduate student**, Dept. Biological Sciences
- **Blake Stuparyk:** **PhD graduate student**, Dept. Biological Sciences
- **Sydney Enns:** **BSc undergraduate student**, Dept. Biological Sciences
- **Jill Lightbrown:** **BSc undergraduate student**, Dept. Earth and Atmospheric Sciences
- **Tamika Nagao:** **BSc undergraduate student**, Dept. Biological Sciences

## Support (University of Alberta):

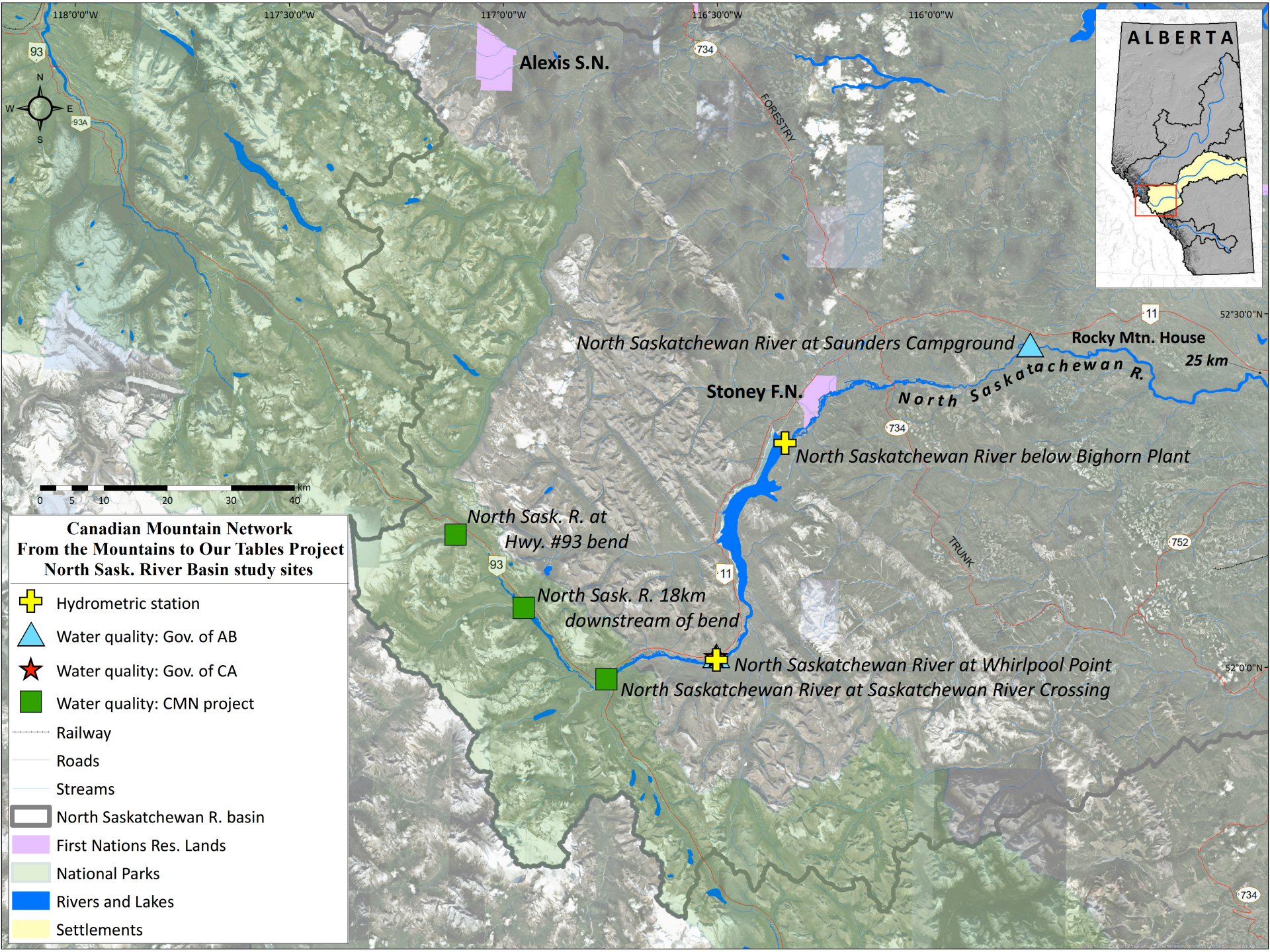
- **Maria Cavaco:** **Research technician**, Dept. Earth and Atmospheric Sciences
- **Joanna Li Yung Lung:** **Laboratory analyst**, Dept. Biological Sciences
- **Biogeochemical Analytical Service Laboratory:** Dept. Biological Sciences

2020/21 Research Team and Training will grow!

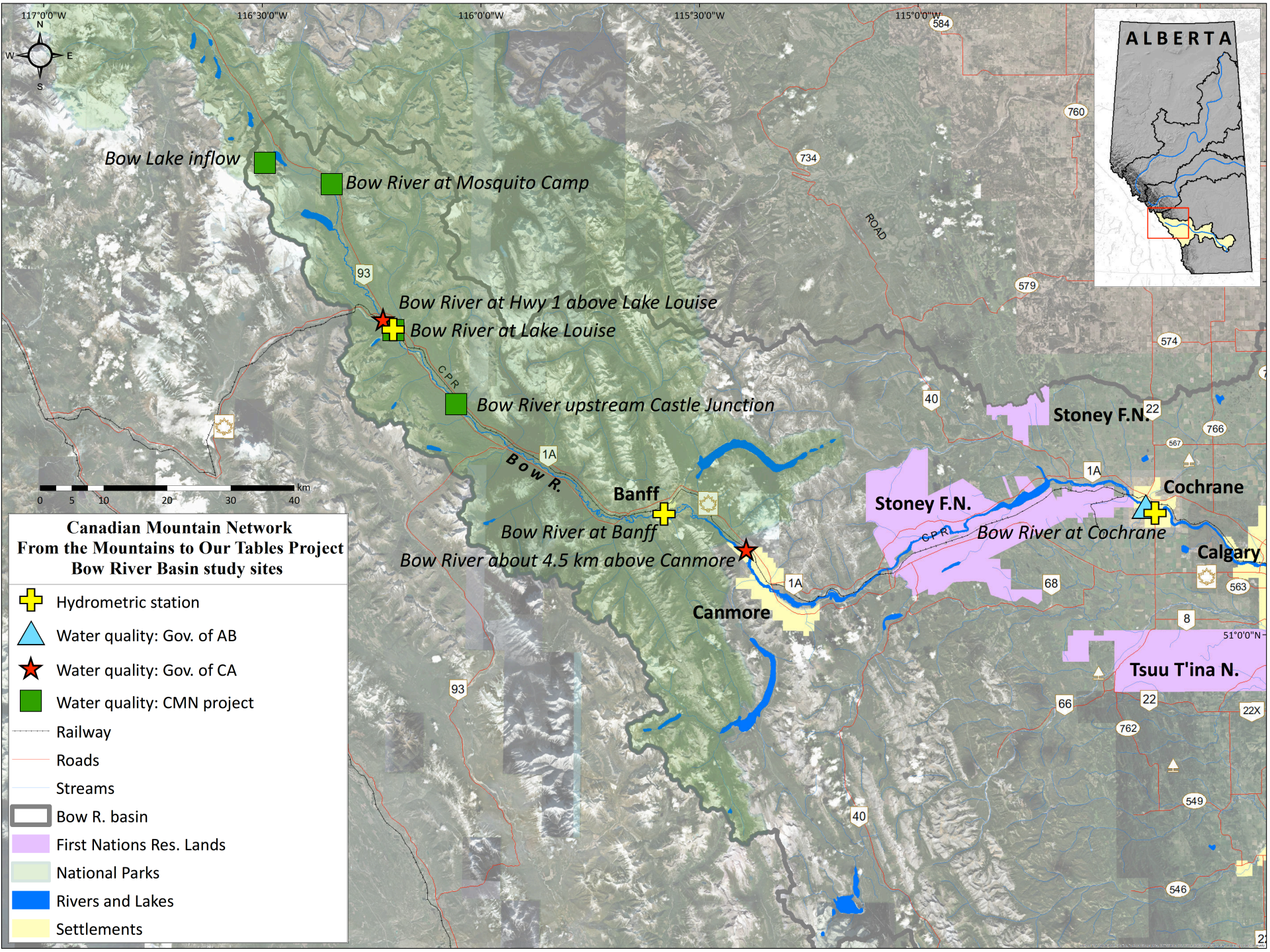






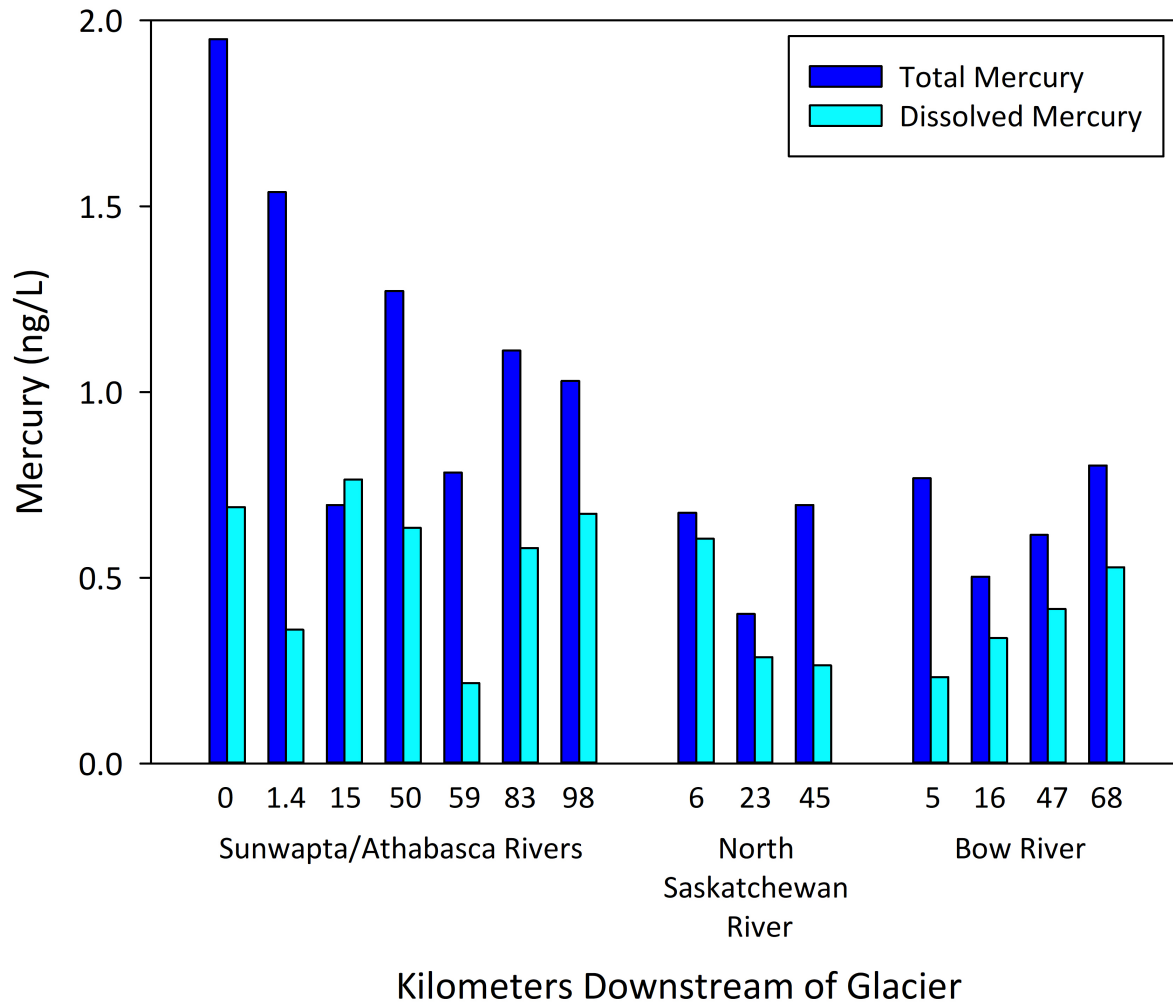








# Mercury concentrations in glacial river water



Sampling mercury

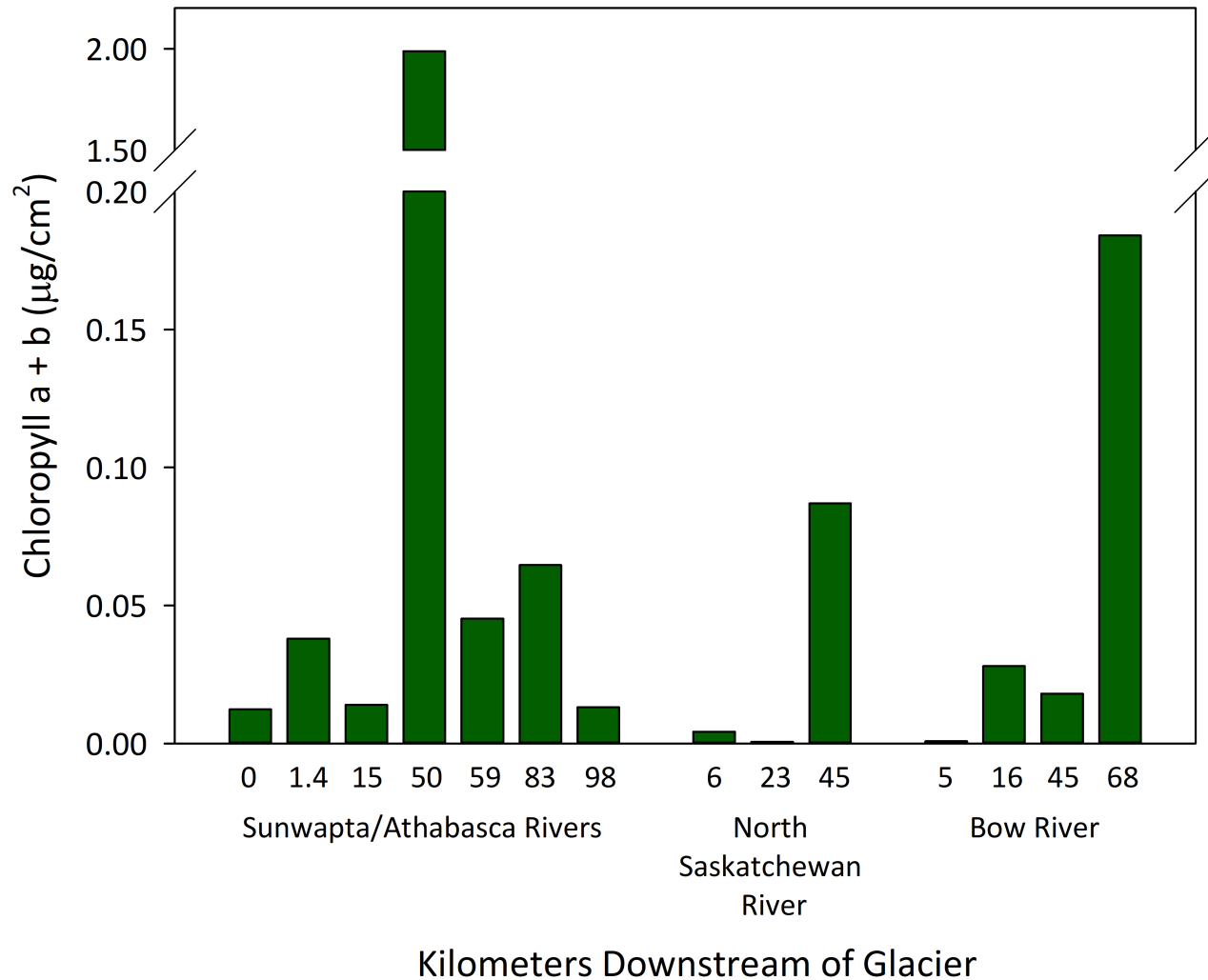


Preserving mercury in the field lab





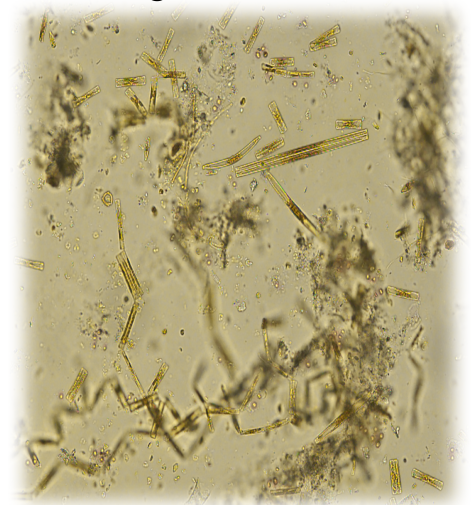
# Algal production on rocks in the glacial rivers



Rock scraping

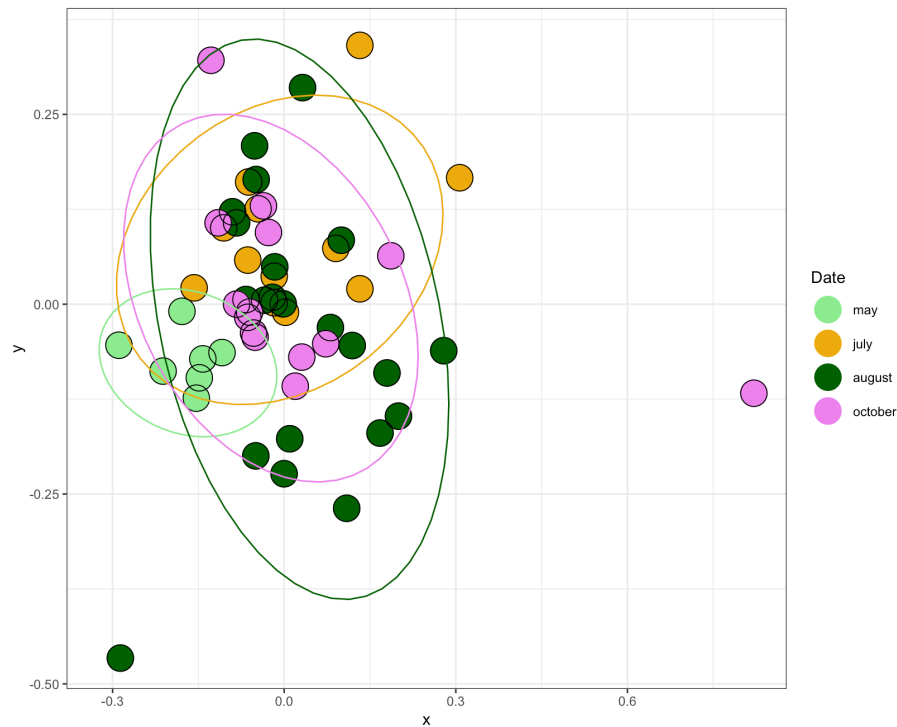


Algae on rocks

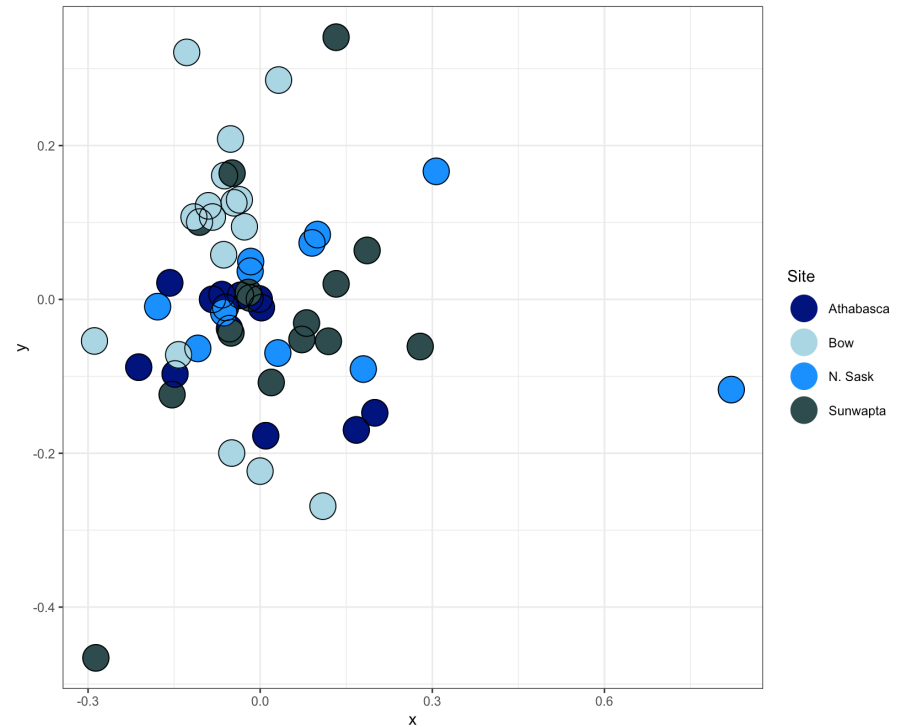


# Microbial diversity in glacial river water

Significantly different communities according to month (95% C.I.)



Communities similar across site type





# Knowledge/Technology Exchange and Community Engagement

## 2019:

- Focused on establishing field sites and getting our research program running.
- Hired Sydney Enns (Undergraduate Research Assistant), Métis First Nations status.

## 2020:



- Funding program to hire a First Nations or Métis Environmental Sciences undergraduate student for research programs in the Athabasca River watershed, designed to provide experiential learning and contribute to Indigenous communities' combat of climate change.
- Public presentations and open forums in First Nations communities downstream of sampling sites to improve knowledge co-production.
- Knowledge co-production will be led by PhD students, providing an opportunity for them to work in a collaboration with, and understand the concerns of, Indigenous communities.

For questions or suggestions regarding community engagement,  
please contact **[serbu@ualberta.ca](mailto:serbu@ualberta.ca)**

# Added value to the Canadian Mountain Network

Due to funding constraints within the CMN, the collection and analysis of ice-cores from the Columbia Icefields was not funded.

However, through partnerships, we have now raised a further ~\$425,000 to collect ice-cores to quantify atmospheric deposition of pollutants to the Columbia Icefields over time, and determine how rapidly these pollutants might melt out into downstream glacial rivers due to climate change.

