Engaging Indigenous Communities in Alberta's Regional Lake Monitoring Program – a Pilot Study

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"I think the project is very successful. When the data is gathered and shared with the community, we know that our drinking water condition and fish habitat is normal. Now that I have participated in the project, I am actually confident about the water. I can now peacefully drink the water, and I know the horses, fish, frogs – the biodiversity - can all enjoy the water."

---- Gilmen Cardinal, Bigstone Cree Nation

"Water is essential to our culture, which is why our people always camped by the water. Without the land and water, there is no people. Without the water, there are no rights, as it states in our Treaty with Canada. 'As long as the sun shines, grass grows and the rivers flow'. Therefore it is in the best interest of our people now and the people of the future to secure our water."

----- Troy Stuart, Lands Manager, Bigstone Cree Nation

"Local knowledge provided by Gilmen was critical to understanding potential influencing features of the lake basin and assisted in sampling site selection."

"In my 14 years working for the Government of Alberta, this is the first time we collaborated with an indigenous community in the Regional Lake Monitoring Program."

----- Dr. Ron Zurawell, Environmental Monitoring and Science Division

A Shared Journey

Fall 2015 — Fall 2017

Relationship Building

2015 Environmental Monitoring Technician Program Pilot

Common Interest

Diseased walleye brought to scientists by Gilmen Cardinal, Bigstone Cree Nation

Data Collection

Bigstone Cree Nation's Concerns

Gilmen's local knowledge informed site selection

Report

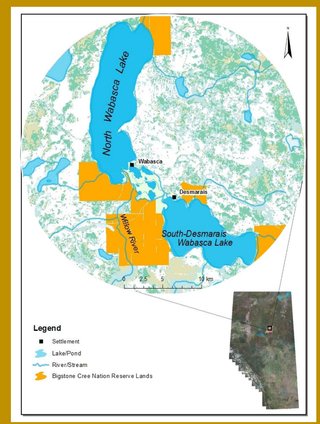
Water sample collected from North Wabasca Lake

Project Drivers

Data gap in the Alberta Regional Lakes Monitoring Program - **North Wabasca Lake[1].**

Key features:

- The 15th largest (101.45 Km^2) lake in Alberta;
- A large, moderately deep, weakly stratified boreal lake.



Shared Objective

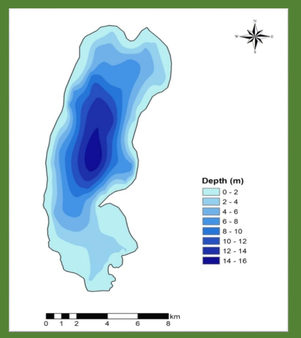
Alberta Regional Lakes Monitoring Program - Objectives

Objectives supported by Leadership

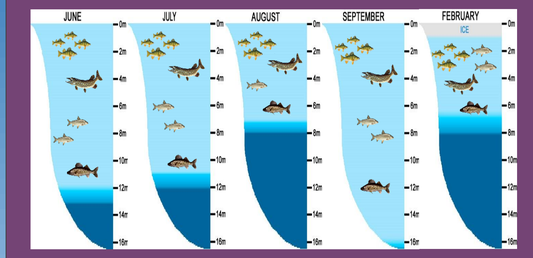
- Build a comprehensive understanding of regional and local water quality;
- Fill in a data gap for North Wabasca Lake;
- Provide information that can respond to community concerns; and
- Support local initiatives including stewardship and planning.

Data Analysis

Coarse bathymetry of North Wabasca Lake[1]



Dissolved oxygen availability for North Wabasca Lake, 2016[1]



What We Did and Why

- In Alberta and across Canada, Community-Based Monitoring and Indigenous participation in monitoring is gaining momentum. There are few formal relationships where Indigenous peoples are working alongside provincial government scientists to design and deliver programs.
- Our objective was to create more opportunities for Indigenous and public participation in environmental monitoring to gather data that is relevant and credible.
- The Environmental Monitoring and Science Division (EMSD) piloted a process with Bigstone Cree Nation (BCN) using water quality testing as a focal point.
- In 2016/2017, chemical, physical and biological data was collected on North Wabasca Lake.

How We Achieved Our Objective

- Identified common objectives.
- Open and timely communication.
- Acknowledged local knowledge.
- Respected cultural and scientific protocols.
- Individual passion and commitment.
- Obtained support from Leadership.

Outcomes

- Successful collaboration on the lake monitoring project resulted in:
  - relevant and credible data;
  - increased technical capacity of a BCN technologist;
  - deeper understanding and trust in the scientific data; and
  - an enhanced relationship.

Next Steps

- Lessons learned through this project are being applied to other lake monitoring efforts with Indigenous communities in Alberta; and
- AEP will evaluate the Indigenous Lake Monitoring Program with participating Indigenous communities to determine a long-term vision.

Water Monitoring Results[1]: Highlights

- North Wabasca Lake receives nitrogen and phosphorus from its nutrient-rich watershed. Due to its moderate depth, polymictic conditions may cause significant internal phosphorus loading from sediments.
- The lake is 'typical' of other boreal lakes and the degree of eutrophication is natural. There does not appear to be real human impacts on the lake (no real watershed disturbances causing impacts).
  - Like other eutrophic boreal lakes, the summer phytoplankton community was largely dominated by *Aphanizomenon flos-aquae,* a large, colonial, nitrogen-fixing cyanobacteria. Although toxin-producing cyanobacteria were present, microcystin was only detected at trace levels.
  - Growths on adult walleye are due to *Lymphocystis* virus, which commonly affect fish in boreal lakes.
  - Concentrations of (total recoverable) metals were not significantly or unusually high and did not exceed guidelines for the protection of aquatic life.

Acknowledgements

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References

[1]Zurawell, R., Adams, R. and Emmerton, C. 2018. Wabasca Lake Monitoring Project Report. In Prep.