

North Wabasca Lake Monitoring Project

How Healthy is North Wabasca Lake?

The lake is in good health and comparable to other boreal lakes of similar depth and nutrient enrichment.

Background

The North Wabasca Lake Monitoring Project is part of the Indigenous Lake Monitoring Program embedded in the Provincial Lake Monitoring Program delivered by Alberta Environment and Parks (AEP). The project was initiated in response to Bigstone Cree Nation's (BCN) interest in water quality and concern for fish health, and was carried out in collaboration with the Lands Department of Bigstone Cree Nation and Alberta Environment and Parks.

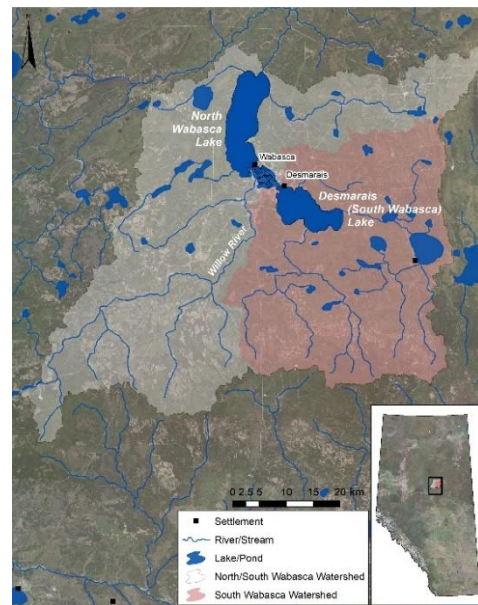
Working Together

This project provided an opportunity for the cross transfer of skills and generation of scientifically valid information through the sharing of knowledge and technology.

The goals of the project were to address lack of water quality information for North Wabasca Lake, and provide aquatic monitoring training in scientific sampling methodology to Bigstone Cree Nation.

North Wabasca Lake & Watershed

The name Wabasca originates from the Cree word 'wapuskau', meaning 'white rapid' and referring to the Wabasca River flowing out of the lake basin. North Wabasca Lake provides subsistence fishing, water for treated drinking water and recreational use for the hamlets of Wabasca and Desmarais and Bigstone Cree Nation.



North Wabasca Lake is located in the Peace River Drainage, 300 km north of Edmonton.

North Wabasca Lake is the 15th largest lake in Alberta with a 101 km² surface area and a large drainage basin covering 3,819 km². The lake receives several surface water inflows, including South Wabasca Lake (also known as Desmarais) and Willow River. Wabasca River is the main outflow from the lake flowing northward to Peace River.

Sampling & Results

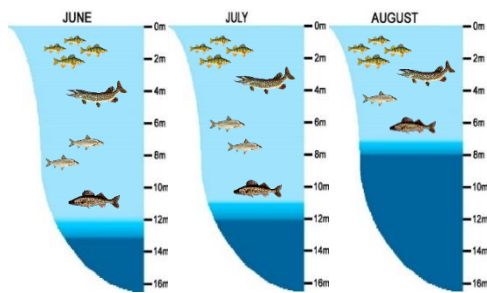
Water quality was sampled monthly from June to September in 2016 and under ice in February 2017. Fisheries Biologists from AEP conducted fish surveys independently in 2006, 2010, and 2013. A summary of results for selected lake parameters is presented below.

Nutrient Status, Alkalinity and pH

The lake is somewhat nutrient-rich with moderate levels of nitrogen and phosphorus common in boreal lakes. The pH is mildly basic (mean pH 7.9), similar to other lakes in the region, and sufficiently alkaline to buffer acid rain or snowmelt.

Dissolved Oxygen

Dissolved oxygen concentration, which is critical for survival of fish and other aquatic organisms, is sufficient to support healthy fish populations through spring and summer.



Depiction of dissolved oxygen availability for North Wabasca Lake in 2016. Light blue represents sufficient oxygen and dark blue too little oxygen for fish survival.

Fish Community and Health

Fish surveys in 2006, 2010, and 2013 indicate that overfishing has occurred in Wabasca Lake for Walleye and Northern Pike, with small improvements observed in 2017 for Walleye, but not for Pike. Overfishing results in too many mature fish being removed to sustain the population long-term.

Skin tumors on recently caught walleye were caused by the Lymphocystis virus, which is a common viral disease of fish. This virus is not typically fatal to fish, nor does it affect humans and other mammals.



Skin tumors on walleye. Source: Bigstone Cree Nation

Zooplankton Community

North Wabasca Lake supports a diverse zooplankton community that is important in the food web – zooplankton feed on phytoplankton including algae and cyanobacteria (commonly called blue-green algae) and provide food for fish in the lake.

Phytoplankton Community

Like other moderately nutrient-rich Alberta lakes, North Wabasca supports a diverse phytoplankton community early in the season, which becomes less diverse and largely dominated by blue-green algae during summer.

Algal Toxins

Some dominant species of blue-green algae can produce toxins that may negatively affect water quality and human health. In 2016, toxins (i.e., microcystin) only occurred at trace levels in North Wabasca Lake indicating low health risk to recreational users.

Invasive Species

There was no evidence of invasive mussels (at the larval stage) or spiny water flea in North Wabasca Lake during sampling in 2016.

Metal Concentrations

Metal concentrations were generally low indicating there is no significant metal contamination from human activities.

Next Steps

Lessons learned through this project are being applied to other lake monitoring efforts with Indigenous communities in Alberta.

Full Report

The full report, associated data, and more information on the Indigenous Lake Monitoring Program can be found at:

environmentalmonitoring.alberta.ca

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