

Monitoring Water Quality In the Lake Huron-Georgian Bay Nearshore

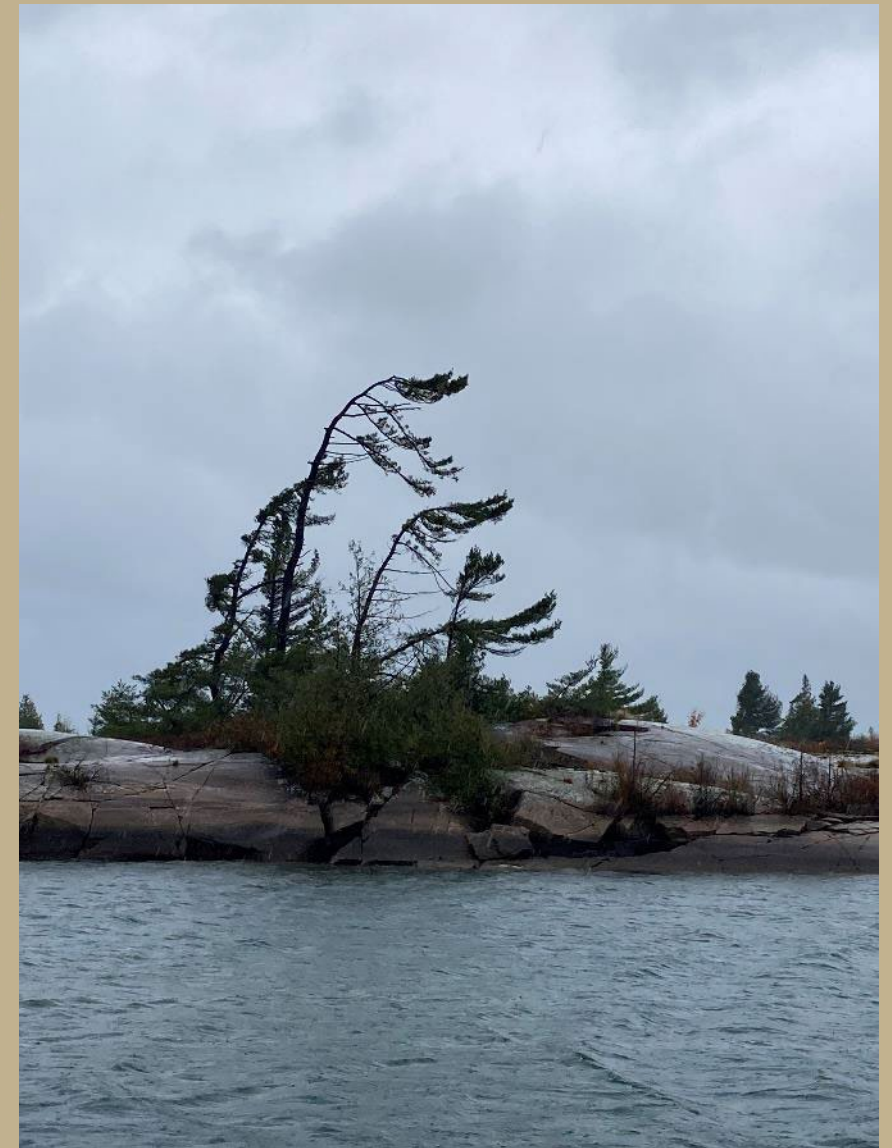
Presented to:

Lake Huron – Georgian Bay Community Action Summit

March 30, 2023

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Environmental Monitoring and Reporting Branch



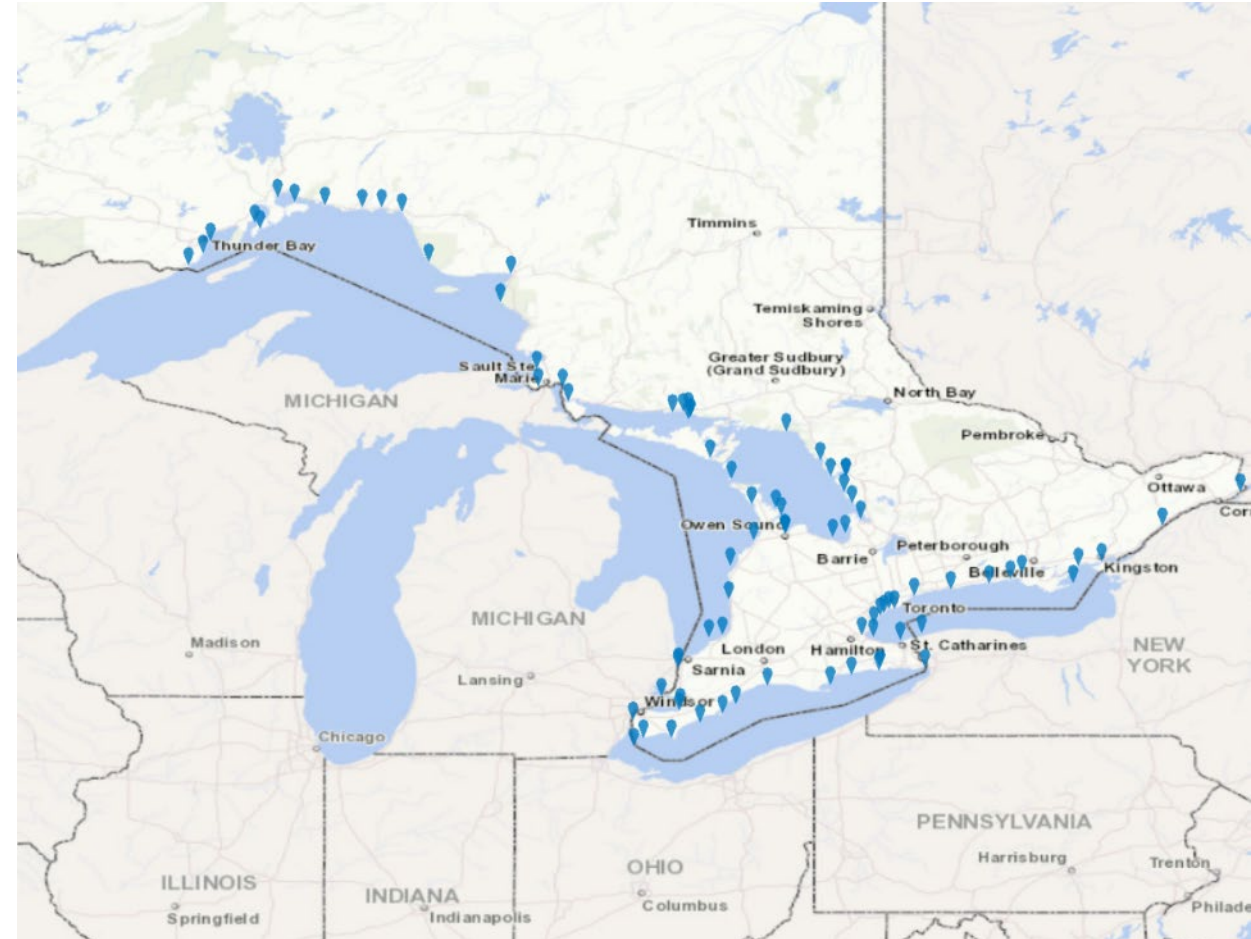
Outline

Long-Term Monitoring Programs

- 1) Lake Huron Georgian Bay – Great Lakes Nearshore Monitoring Program
- 2) Provincial Water Quality Monitoring Network

Background - Great Lakes Nearshore Monitoring Program

- Started in 1994
- Approximately 80 stations
- Upper Great Lakes surveyed approximately every 6 years
- Lower lakes surveyed every 2 to 3 years

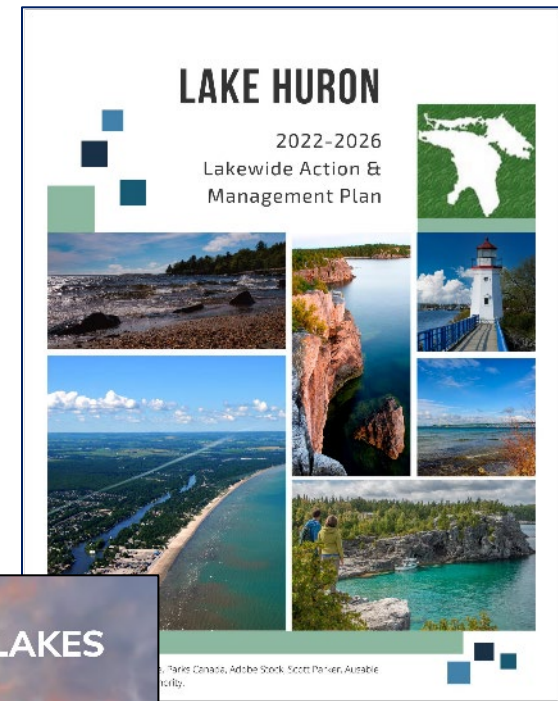


Program Objectives

- To **provide information** on where and how **ambient water quality** conditions are changing over time
- To provide information on **major trends in environmental conditions** that are essential background for the management of water quality on local to regional scales
- To **identify the onset of anomalous patterns or conditions** that may signal changes **due to stressors** with unknown or unanticipated impacts

How are the data used?

- Great Lakes management programs
- Evaluating progress in meeting program objectives
- Assessing the success of programs designed to restore or protect environmental quality in the Great Lakes.
- Responding to changing conditions
 - initiating cause-effect research or
 - providing supporting information for developing remedial actions



Approach:

Monitor for selected indicators over time:

Level of contaminants present in the aquatic environment

→ Persistent contaminants in surficial sediment and in suspended particulate material

Biological indicators of environmental conditions and habitat integrity

→ Composition of benthic invertebrates

Physical measurements

→ Thermal and optical profiles of the water column and physical characterization of the lake bottom

Types of Stations:

Reference Stations - Locations with typical background conditions

Index Stations - Locations arbitrarily selected because of special feature/integration of stressors

Methodology:

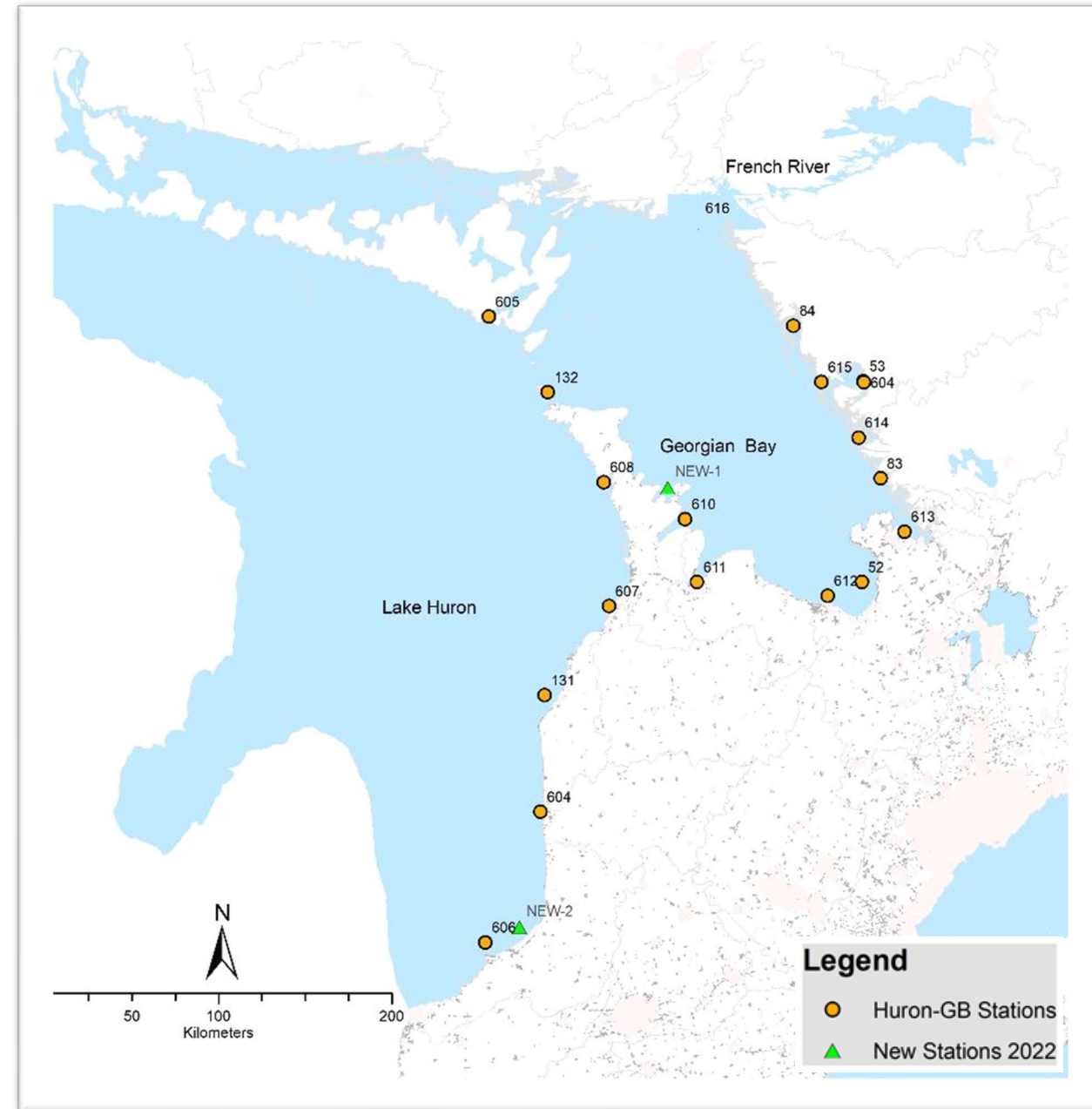
MECP methodology and sampling protocols

Data collection of some analytes with ECCC methods (ISOMET, SRP)

New methods (e.g. microplastics)

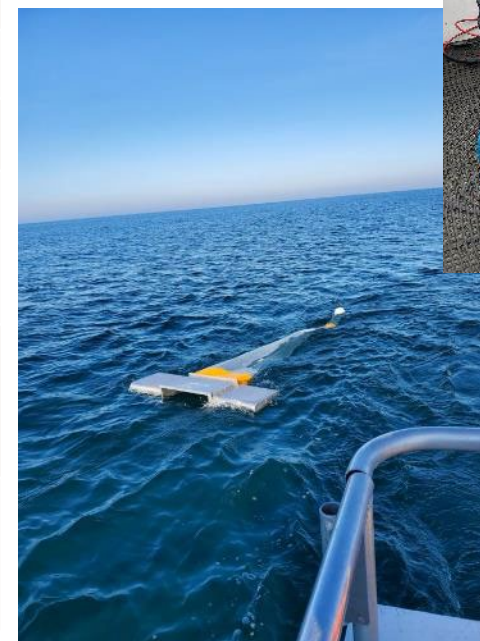
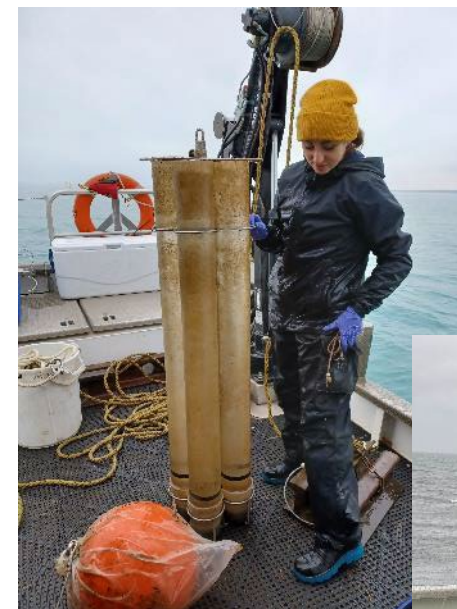
2022 Survey Year

- Three surveys (spring, summer and fall)
- 21 stations
- **2 new stations** – Grand Bend and Cape Crocker area



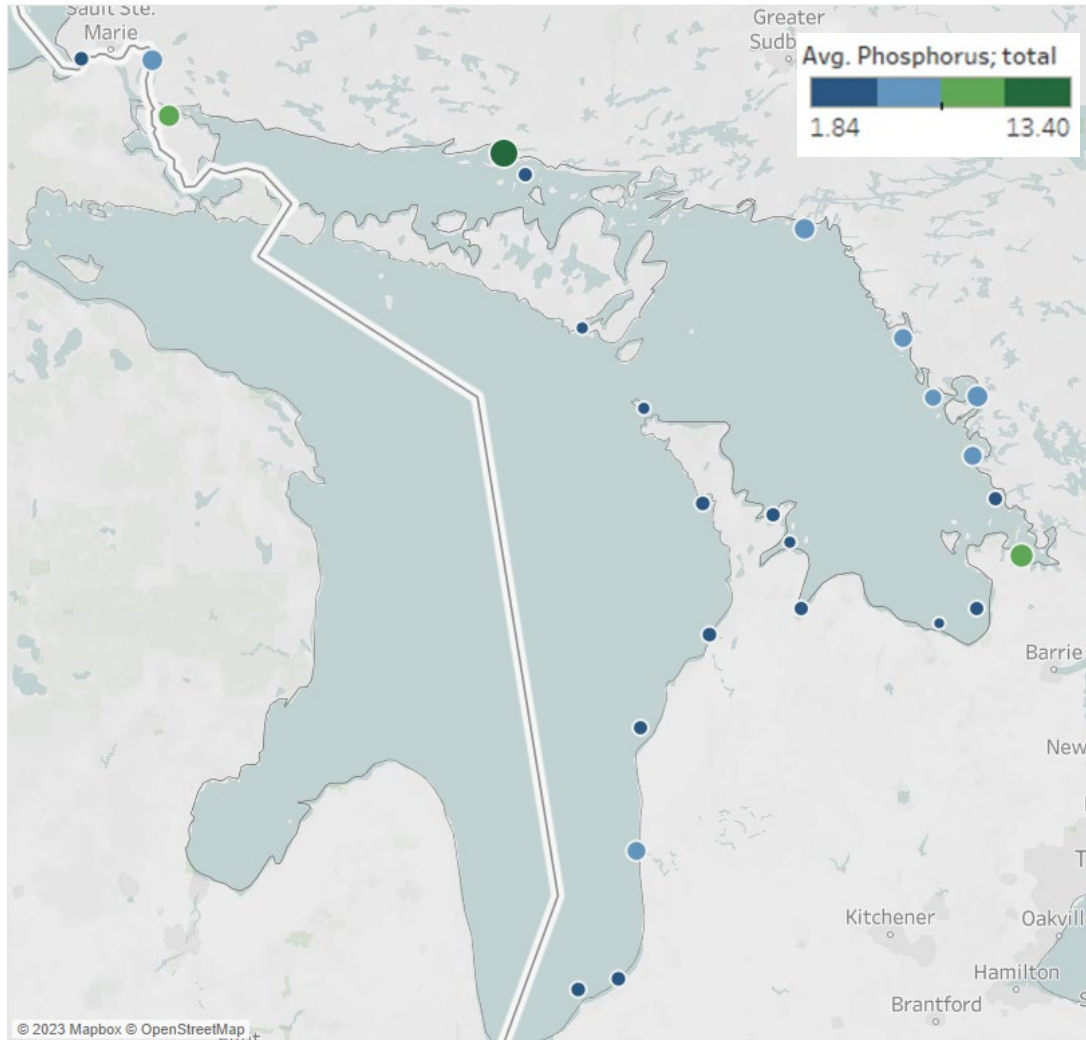
What Gets Sampled?

	Sample Type	Spring	Summer	Fall
Physical Measurements	Water Depth	X	X	X
	Secchi Depth	X	X	x
	D.O. Conductivity pH	X	X	X
	Light Profiles	X	X	X
Water Chemistry	Depth Integrated	X	X	X
	Near Bottom	X	X	X
Sediment	Bottom Sediment		X	
	Suspended Sediment	Deploy		Retrieve
Biotic Components	Benthic Invertebrates		X	
	Zooplankton (Background sites and AOCs)	X	X	X
	Phytoplankton (Background Sites and AOCs)	X	X	X
Other	Microplastics/passive samplers (selected locations)	X	X	x



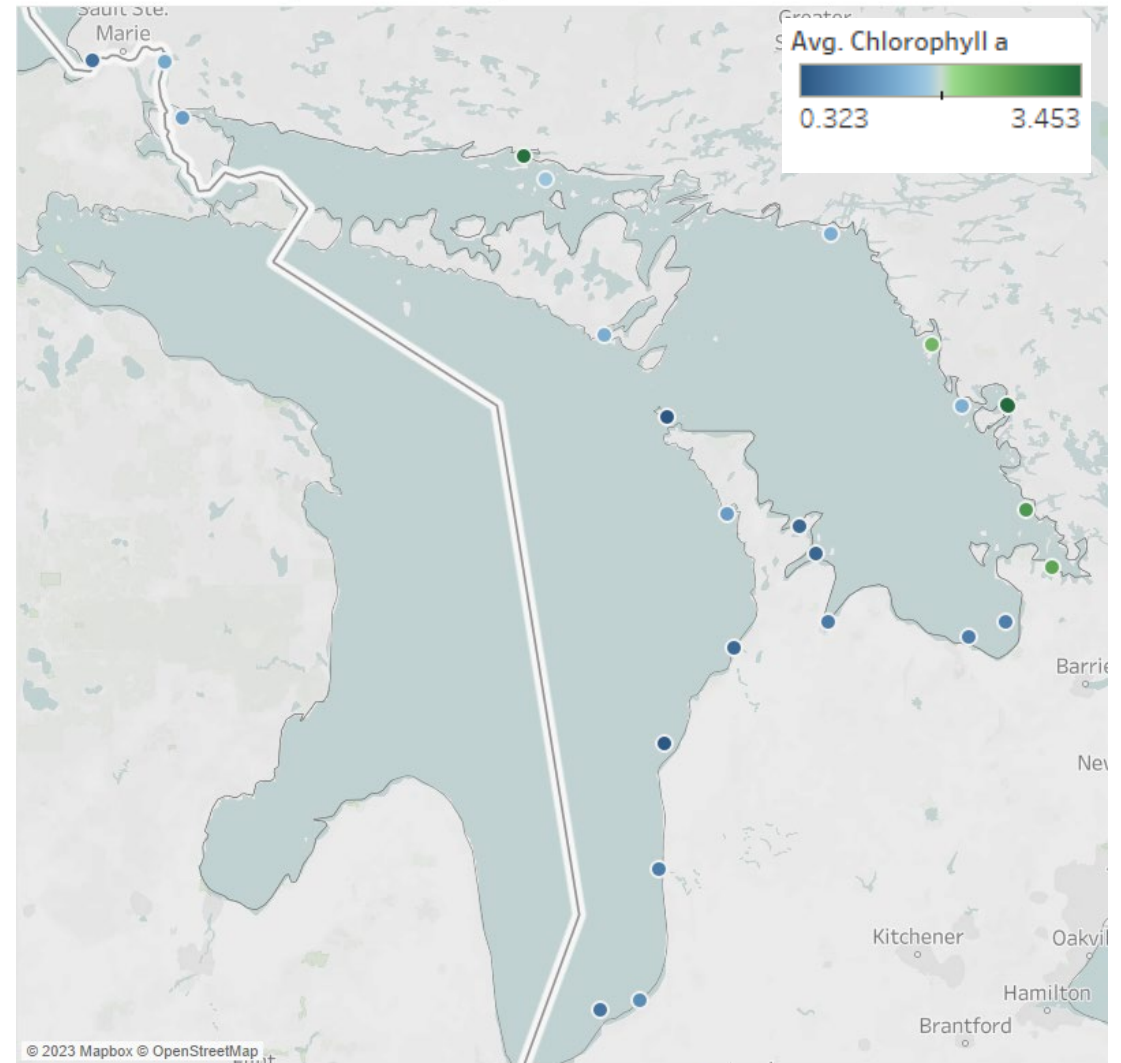
Lakewide Overview of Nearshore Conditions

Average Phosphorus (Spring survey)



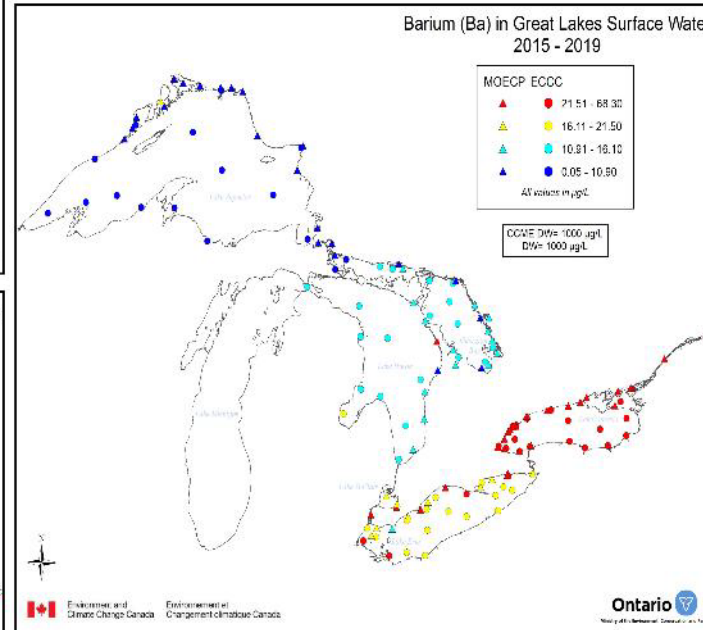
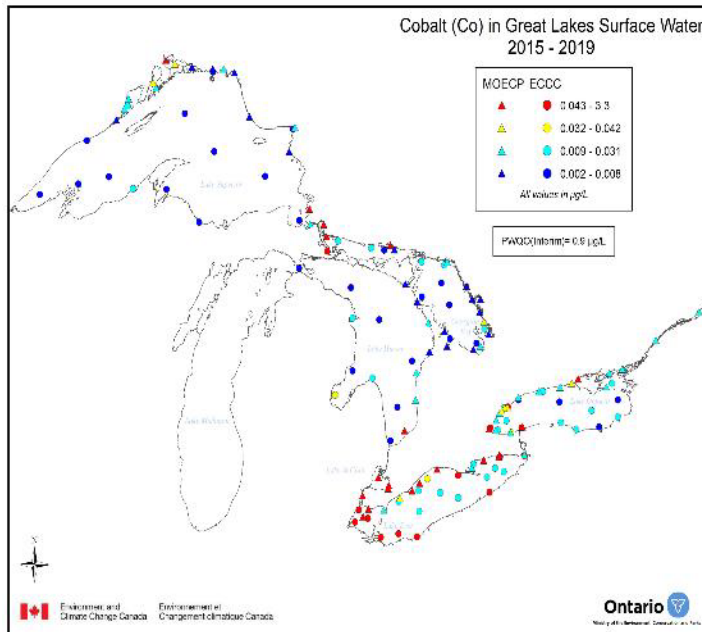
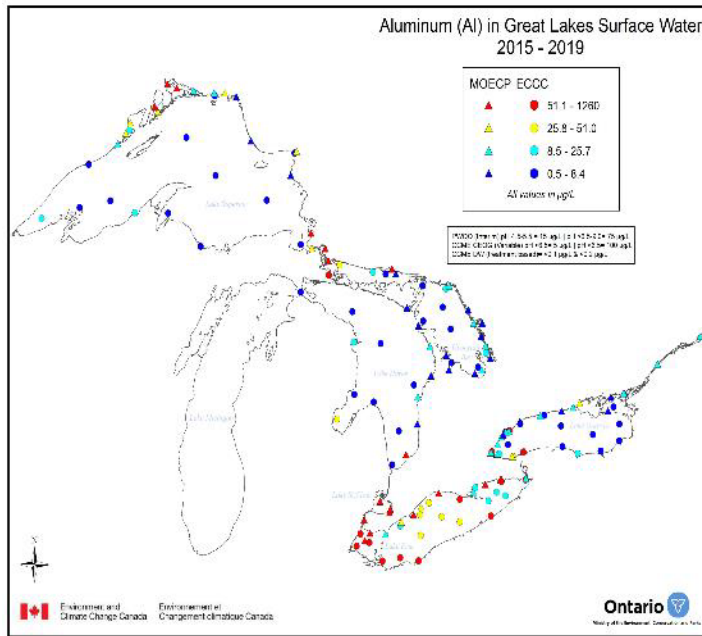
Map based on Long and LAT. Colour shows average of Phosphorus; total. Size shows sum of Phosphorus; total. The data is filtered on Date, which keeps Jun and May.

Average Chlorophyll (Summer survey)



Map based on Long and LAT. Colour shows average of Chlorophyll a. The data is filtered on Date, which keeps Aug, Jul, Jun and Sep.

Ultra-Low Trace Metal Analysis - Collaborative Monitoring



- ECCC methods
- ECCC analysis
- Cross-linkage between nearshore and offshore
- Great Lakes basin overview

Where To Find Data?

Open Data Catalogue

<https://data.ontario.ca/dataset/water-chemistry-great-lakes-nearshore-areas>

<https://data.ontario.ca/dataset/sediment-chemistry-great-lakes-nearshore-areas>

<https://data.ontario.ca/dataset/benthic-invertebrate-community-great-lakes-nearshore-areas>

[Dataset](#)  [Groups](#)  [Activity Stream](#)

Water chemistry (Great Lakes nearshore areas)

Data is collected each year, according to the lake-by-lake cycle.

Information includes:

- water chemistry
- approximately 60 index and reference stations throughout the Great Lakes basin

For more information

Contact Environment, Conservation and Parks

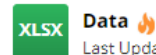
Data



Data Available

The data described here is available for you to use. [\[Learn more\]](#)
[\[See the licence for how you're allowed to use this data.\]](#)

2000 - 2018



Last Updated: April 14, 2021 | [English](#)

[About](#)

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The Provincial Water Quality Monitoring Network (PWQMN)



- Started in 1964
- Over 2,000 locations have been monitored in Ontario
 - Of which ~430 are currently active
- Samples analyzed for a wide range of constituents such as nutrients, chloride, alkalinity, conductivity, pH, DO, temperature, carbon, metals
- 37 partner agencies including conservation authorities & Severn Sound Environmental Association
- > 3,000 samples collected annually across the province
- Limited winter sampling introduced ~3 years ago
- For more information contact:

Georgina.Kaltenecker@ontario.ca or
PWQMN@ontario.ca

Interactive Map and Open Data

Map: Provincial (Stream) Water Quality Monitoring Network

Search for and view stream water chemistry data from sampling sites that are part of the Provincial (Stream) Water Quality Monitoring Network (PWQMN).

Full dataset is available in the [Open Data Catalogue](#).

Search the map

You may search by **stream**, **station ID**, **address** or see help for advanced options.

Search

Related

[How to use a Ministry of the Environment, Conservation and Parks map](#)

[Technical documentation: Metadata record](#)

↑ Top

<https://www.ontario.ca/page/map-provincial-stream-water-quality-monitoring-network>

Data



Data Available

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2020

XLSX **2020** 🔥
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2019

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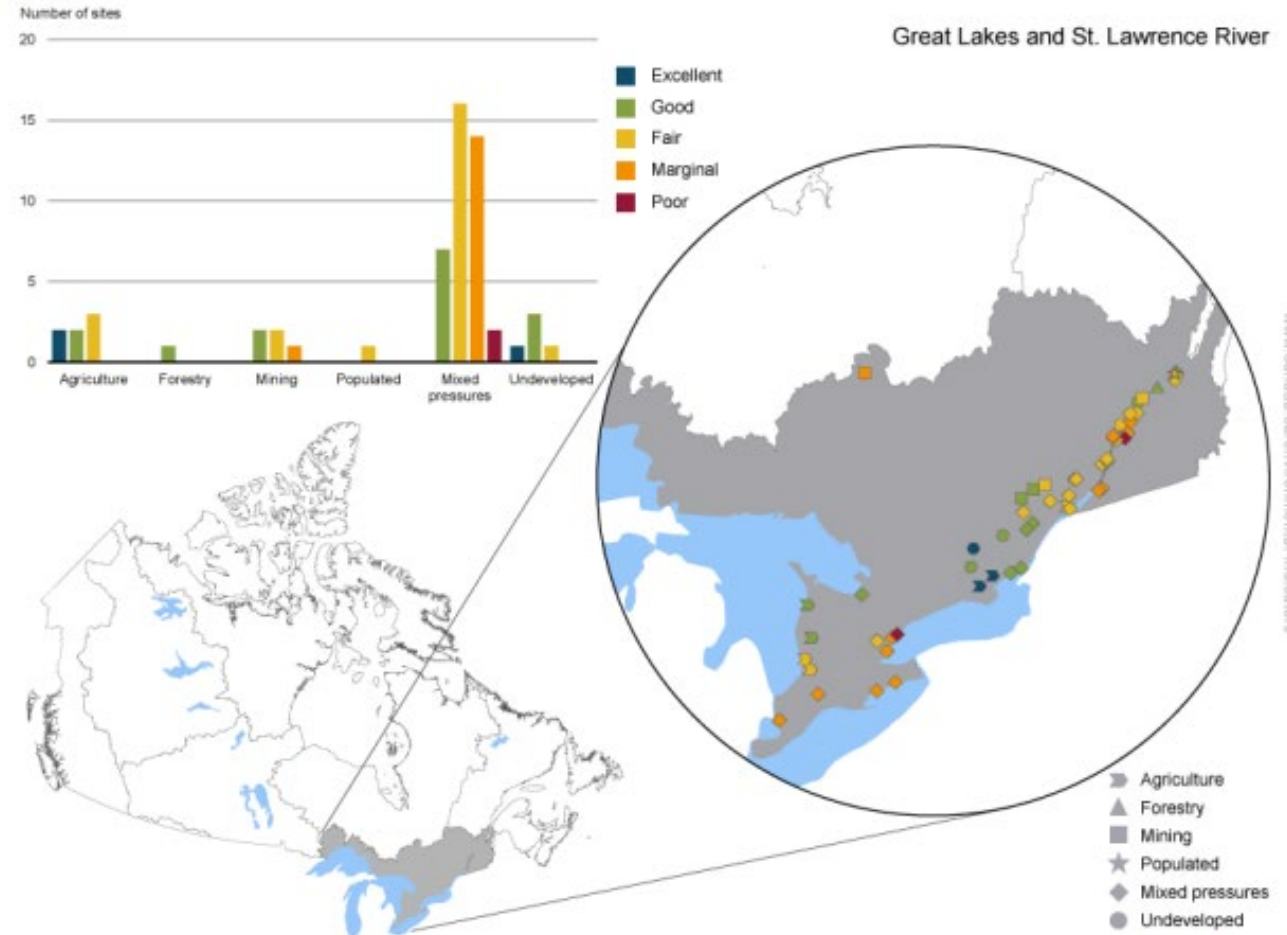
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<https://data.ontario.ca/dataset/provincial-stream-water-quality-monitoring-network>

WATER QUALITY IN CANADIAN RIVERS

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

Figure 5. Water quality by land use category, Great Lakes and St. Lawrence River region, 2018 to 2020 period



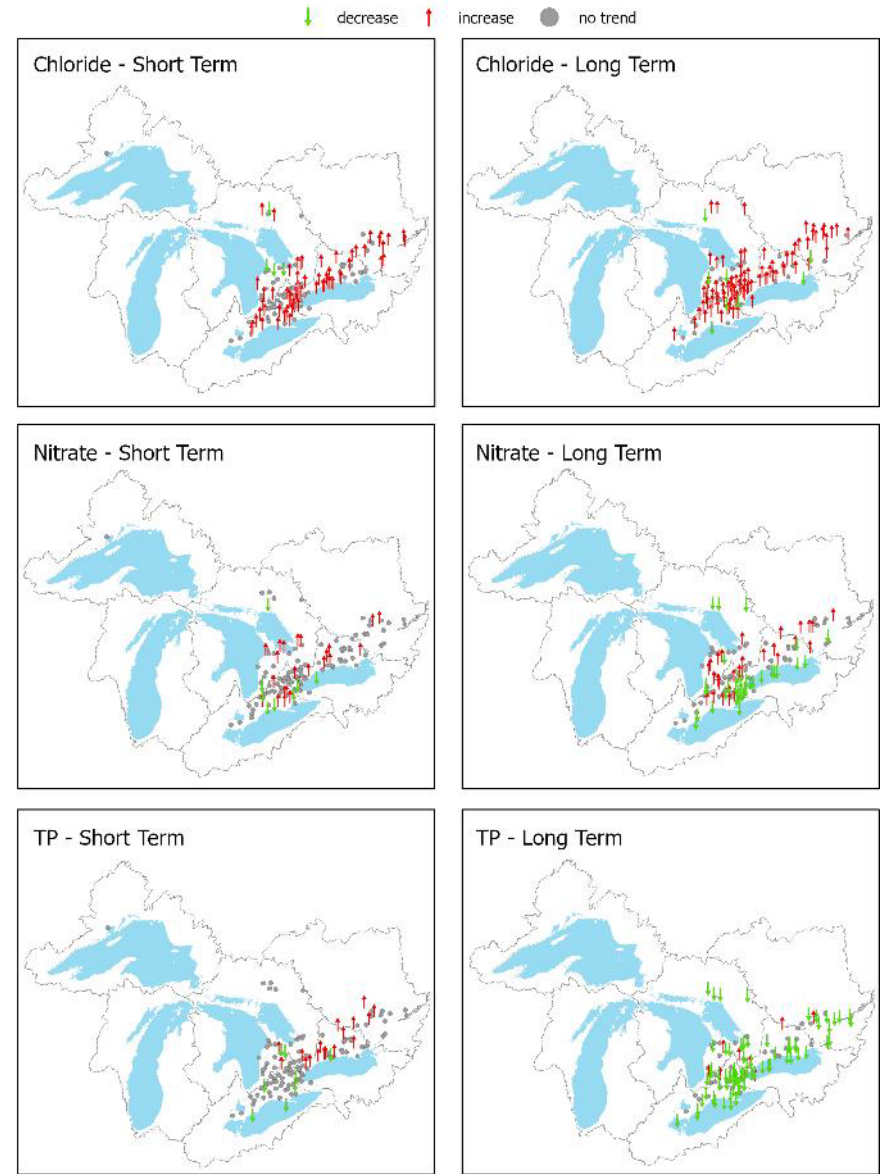
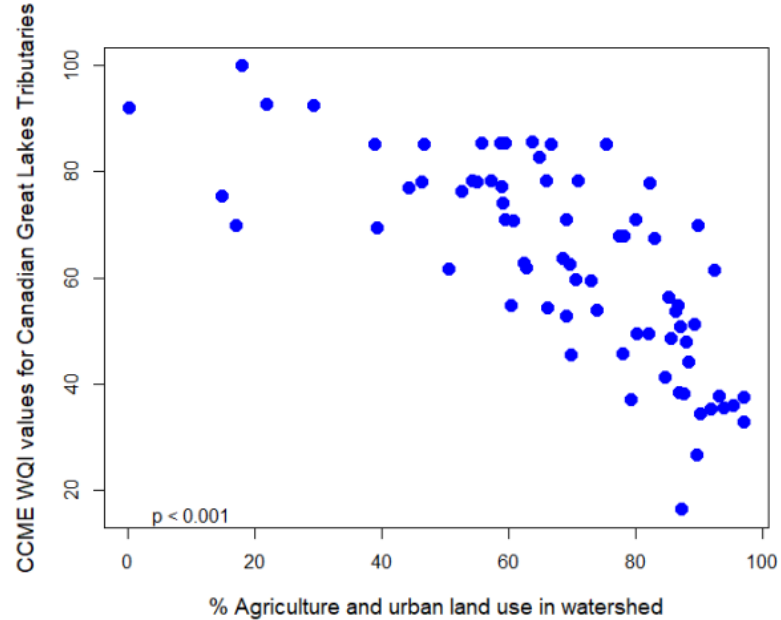
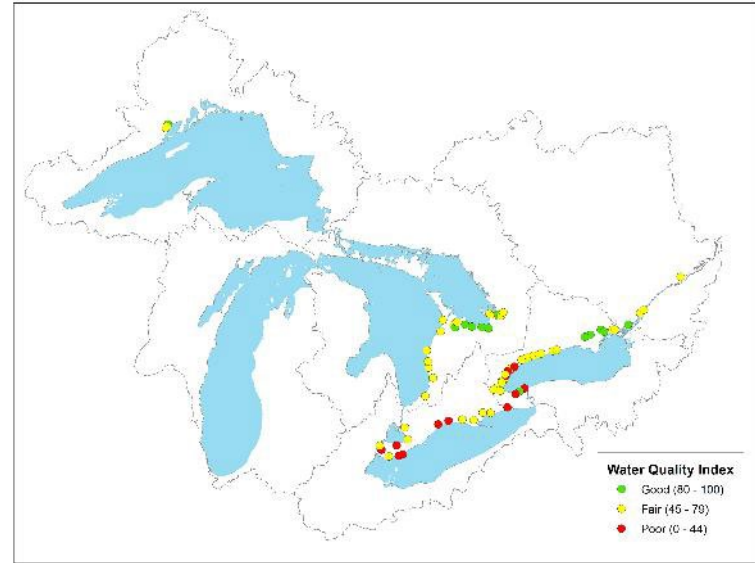
Data for Figure 5

<https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/water-quality-canadian-rivers.html>

PWQMN data
in action –
Canadian
Environmental
Sustainability
Indicators
report

PWQMN data in action – State of the Great Lakes report

Sub-Indicator: Water Quality in Tributaries



Acknowledgements

MECP Great Lakes Field Crew

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