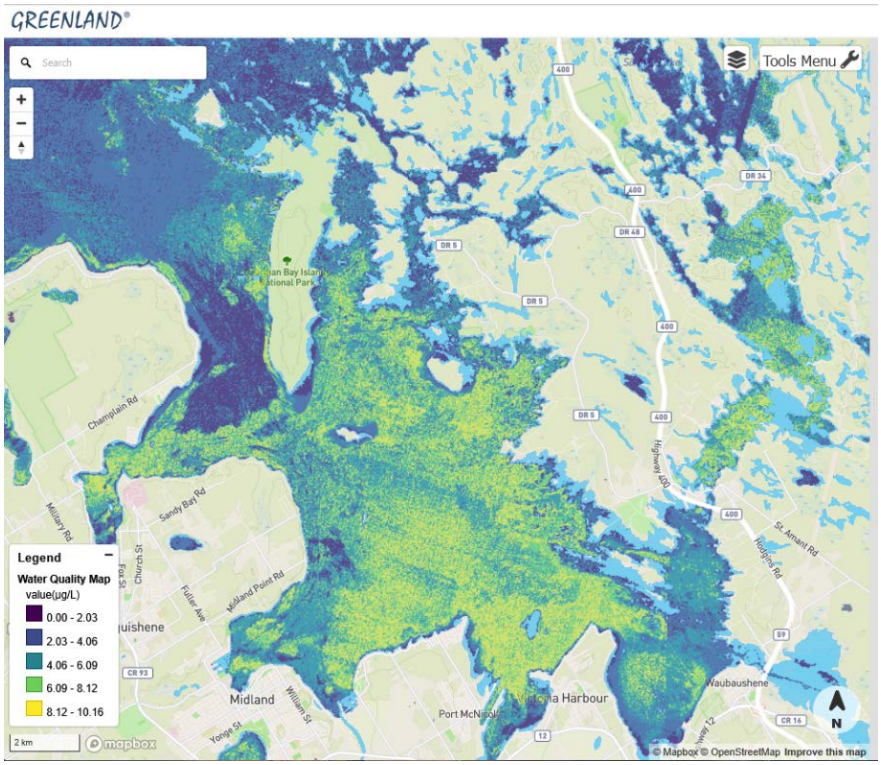
Township of Georgian Bay Water Quality Monitoring Program / Platform (2025)

Project Overview

GREENLAND® International – Consulting Engineers was retained with project partners to develop a water quality program for the Township of Georgian Bay, Ontario. **It was also the first project to integrate remote sensing (satellite) open data with Artificial Intelligence technology and involving the University of Guelph.** The program, with advanced Machine Learning tools by GREENLAND®, was also designed to monitor, assess, and protect water quality across inland lakes and Georgian Bay nearshore waters. Monitoring locations included twenty (20) inland waterbodies and fifteen (15) Georgian Bay nearshore areas, with multiple sampling stations at each location. Physical, chemical and biological parameters were also measured to assess water health.



THREATS™ Map Output Details: Chlorophyll-a Concentrations (Sept. 18, 2025)

Key stressors addressed were development pressures, failing septic systems & wastewater discharged from boats. The tool does this on a **real-time basis** by establishing a framework for data collection, analysis and targeted adaptive management responses and where also *volunteers played a pivotal role with as-required data collections, every year.*

Proposed next steps (pending Township Staff and Council approvals) includes long-term implementation and continued access to the new (custom) THREATS™ AI remote sensing data acquisition platform. This technology can be expanded for other "inland waterbodies" within the Muskoka Region and more areas of concern within the Great Lakes Basin.

Key Components

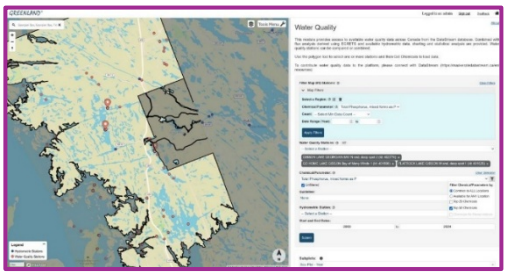
Integrated Monitoring Framework: Combines traditional field sampling with satellite-derived water quality data to provide spatial and temporal coverage.

Tiered Monitoring Approach: Prioritizes sampling locations based on known water quality issues (Priority A) and reference sites (Priority B).

Collaborative Structure: Engages stakeholders through a Water Quality Stakeholder Committee and a Water Quality Science Advisory Committee.

Data-Driven Decision Making: Utilizes the THREATS™ platform to visualize and analyze water quality data, enabling evidence-based policy development.

Cumulative Effects Framework: Implements a tiered adaptive management approach with established thresholds and triggers for mitigation actions.



Implementation Structure

The program will leverage a collaborative approach involving:

- Township staff coordination and oversight;
- Trained technicians conducting field sampling;
- Volunteer citizen scientists supporting monitoring efforts;
- Scientific advisory committee providing technical guidance; and,
- Stakeholder committee ensuring community engagement.

Expected Outcomes

The implementation of the water quality monitoring program is expected to achieve several objectives including:

- Early detection of water quality issues through regular monitoring;
- Enhanced understanding of cumulative effects on water quality;
- Evidence-based policy development for watershed protection
- Increased stakeholder awareness and engagement; and,
- Improved capacity for adaptive management responses to emerging issues.

GREENLAND® consulting engineers

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