CITIES INITIATIVE ONTARIO REGIONAL MEETING

PRESENTATION FROM GREENLAND CONSULTING
Great Lakes Freshwater Ecosystem Initiative:
Supporting Technology Overview

Great Lakes Basin Focus
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R. Mark Palmer, P.Eng.
Email: mpalmer@grnland.com

Email: tboston@grnland.com
Niche Consulting Engineering Brand / Experience

"ESwSS" = "Engineering Services with Software Solutions"

Environmental, Infrastructure & Urban Land Services
- Civil Engineering and Landscape Architecture
- Attainable Housing Community Design Development

“Technology Enabled Services” to Enable a Durable (Science and Evidence-based) Competitive Advantage

- www.grnland.com
WE ARE TECH HUB NORTH
- Municipal Infrastructure
- Water Resources
- Landscape Architecture
- Watershed Monitoring Strategies
- Internet IP Geospatial Platforms (With ML & Remote Sensing Analytics)

- Urban Land Engineering
- Design & Construction Management
- Site Level Asset/Facility Monitoring
- Environmental Site Assessments

- ‘SMART’ Product Technologies
Partial Public Sector & FN Clients

Toronto
Collingwood
Barrie
City of Vaughan
Conservation Ontario
Grey County
Owen Sound
Peterborough
Simcoe County

Town of The Blue Mountains
Ottawa
Innisfil
County of Simcoe

Grand Council Treaty #3
Municipality of Meaford

Environment and Climate Change Canada
Ontario

Ministry of the Environment, Conservation and Parks
Ministry of Natural Resources and Forestry

Township of Essa

Mikisew Cree First Nation

Metrolinx

Township of Adjala-Tosorontio

Aei

Six Nations Grand River

Wampanoag
Our Niche ESwSSBrand

- GREENLAND® identifies critical paths forward, “what-if” scenarios and mitigation strategies (climate risks, etc.).

- **This leads to supplementary engineering work in order to design low risk / sustainable solutions.**

- As we continue to advance our in-house “Machine Learning Toolbox”, compliance monitoring and data efficiencies will increase ROI in value chain activities.

- **We now envision new market opportunities globally for ESG analysis & reporting with our corporate brand!**
THREATS Platform: Quick

Overview

The Healthy Rivers Ecosystem Assessment System (THREATS) is a web-based platform that advances watershed and cumulative effects management by facilitating:

• Data access
• Analytics
• Visualization
• Integrates complex spatial and time-series data

THREATS can be customized to address specific stakeholder interests and needs.

Used to assess project concepts, drive sustainable practices and safeguarding ecosystems.

It’s a vehicle to deliver innovative decision support and analysis tools.
THREATS Platform: Recent Advances & Applications

- **EPCOR**: watershed information dashboard and analysis platform for the North Saskatchewan River Basin watershed.
  - Alberta Water Council: Alberta-wide platform provision and piloting.
  - IRAP supported ISWMS development: HEC HMS/RAS real-time flood forecasting platform.
  - ECCC: CANWET powered by SWAT Module for calibration and visualization of watershed models applied in Lake Erie basin for Benefit / Cost Analysis.

- **Mitacs** supported research:
  - AI-based models for stream flow forecasting and early warning system integration to update ISWMS module – currently ~600 live stations across Canada.
  - New funding received to advance satellite imagery access and analysis (flooding, HABs, land cover, change analysis) and with multiple applications across Canada.

- **MNRF**: API Runoff Model re-development to support Ontario-wide flood forecasting **
Lake Erie Focused Studies and Modeling

- Evaluation of Policy Options to Achieve Nutrient Reductions from Canadian Sources to Lake Erie (ECCC, 2016)
- Impact of Climate Change on Policy Options (ECCC, 2016)
- Evaluation of Economic Instruments to Achieve Phosphorus Reductions to Lake Erie (ECCC, 2017)
- Implementing the Canada Ontario Lake Erie Action Plan: Cost / Benefit Analysis (ECCC, 2021)
- Stormwater Green Infrastructure: Benefit / Cost Analysis for Lake Erie Municipalities (MECP, 2024)
The Great Lakes Freshwater Ecosystem Initiative (RFP Process) to Support Public Engagement through Community-Based Science

- Leverage community-based monitoring data and public satellite imagery.
- Address water quality, stream health, and data challenges.
- Develop a long-term monitoring strategy and public data platform.

Blue Mountains Subwatershed Health Check Report – NVCA, 2023
Supportive Organizations
Technology Development to Support Project (& Other Partnerships)

- Development of remote sensing and ML methods to classify and quantify water quality (Greenland, U of Guelph, Mitacs);

- ML algorithms to forecast hydrometric flows, extreme conditions, and fill gaps in historic hydrometric station records;

- Remote sensing and ML methods to classify and quantify flooding extent and depth, snow cover, ice cover, algal blooms, land cover change; and,

- Integration of modeling and data analysis modules in THREATS platform including the Water Quality module accessing DataStream data.
Remote Sensing Technology Development (Greenland with University of Guelph and Mitacs)

Algal bloom area extraction from satellite imagery
Remote Sensing Analysis Module:
Algal Bloom Indicator – Loafers Lake, Brampton
Flow Forecasting

Flow forecasting system uses existing conditions, watershed characterization and forecast weather data to predict up to 10 days of flow conditions that can be compared against normal.