# Science by the People, For the Lakes

Frank Figuli – Program Coordinator
Jack Scott – Water Quality Coordinator

WOODLANDS & WATERWAYS EcoWatch

U-LINKS
CENTRE FOR COMMUNITY-BASED RESEARCH

# U-Links Centre for Community-Based Research

**Who We Are**

- A part of the Haliburton County Community Co-Operative
- Not for Profit – Contributing to Haliburton County since 1999
- Broker Research Opportunities between Haliburton County organizations and post-secondary students
- Research in Cultural, Social, Economic and Environmental Sectors
- ~3000 students have participated in more than 600 Research Projects (www.ulinks.ca)

**Research is Driven from the Bottom Up within the Community**

# U-Links Centre for Community-Based Research

**Examples of Past Projects**

- **Shoreline Evaluation** research on the Kennisis Lakes (2010/2011) led to **Watersheds Canada** offered **Love Your Lake** program, executed locally by the **C.H.A.**
- **Benthic Biomonitoring Research** on Kushog Lake led to development of WWEW Program, unique to Haliburton County
- **Microplastics** in Haliburton County Lakes
- **Light Pollution** on Cottage Lakes
- **Wetlands** research to investigate **Provincially Significant Wetland** status eligibility for Grace Lake Association
- **Illegal Dumping** in Haliburton County, led to **Online Reporting and 'hot spot' signage**
- **Machine Learning Model** to Identify **Critical Tributaries** in Harcourt Park

# Water Quality Monitoring in Haliburton County

**Why Aquatic Monitoring is Critical for Haliburton County**

- High Lake Density with Limited Baseline Data
- Limited Stewardship Capacity
- Cumulative Impacts of Development and Climate Change
- Headwater Lakes Require Greater Sensitivity
- Local Data with Broader Applications
- Community Engagement as a Strategic Tool

# Woodlands and Waterways EcoWatch (WWEW)

**Developed to fill an environmental data gap in Haliburton County**

## Water Quality Monitoring

- Benthic Biomonitoring – Using Benthic Macroinvertebrates as biological indicators
- Testing the Waters – Using physical and chemical indicators to evaluate the lake health

## Terrestrial Monitoring

- Long-term monitoring for changes in forest health over time (disease, pests, effects of climate change)

WOODLANDS & WATERWAYS EcoWatch

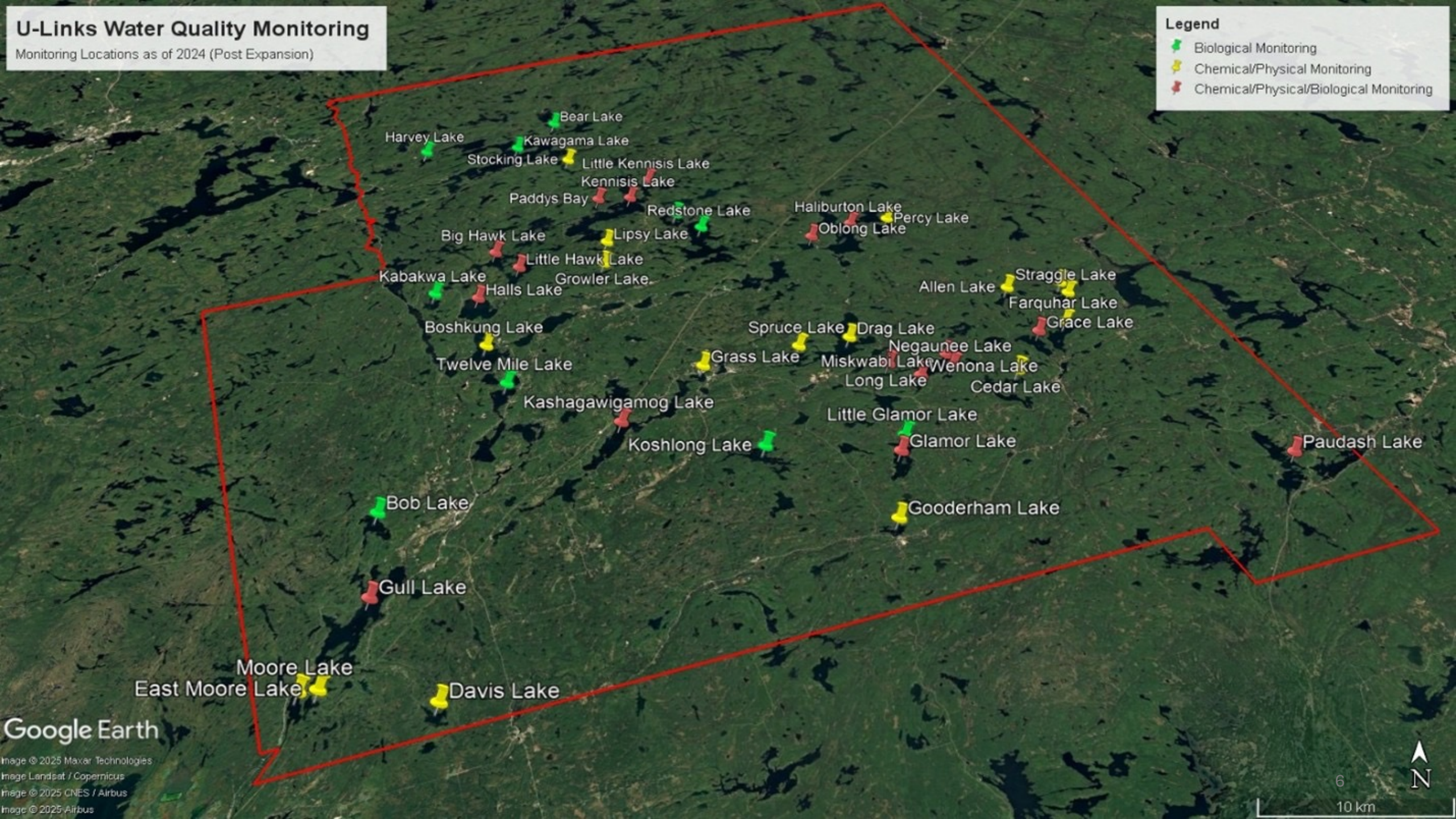
U-Links Water Quality Monitoring
Monitoring Locations as of 2024 (Post Expansion)
Legend
Biological Monitoring
Chemical/Physical Monitoring
Chemical/Physical/Biological Monitoring
Bear Lake
Harvey Lake
Kawagama Lake
Stocking Lake
Little Kennisis Lake
Kennisis Lake
Paddys Bay
Redstone Lake
Haliburton Lake
Percy Lake
Oblong Lake
Big Hawk Lake
Lipsy Lake
Little Hawk Lake
Growler Lake
Kabakwa Lake
Halls Lake
Straggle Lake
Allen Lake
Farquhar Lake
Grace Lake
Boshkung Lake
Spruce Lake
Drag Lake
Negaunee Lake
Twelve Mile Lake
Grass Lake
Miskwabi Lake
Wenona Lake
Long Lake
Cedar Lake
Kashagawigamog Lake
Little Glamor Lake
Glamor Lake
Koshlong Lake
Paudash Lake
Bob Lake
Gooderham Lake
Gull Lake
Moore Lake
East Moore Lake
Davis Lake
Google Earth
Image © 2025 Maxar Technologies
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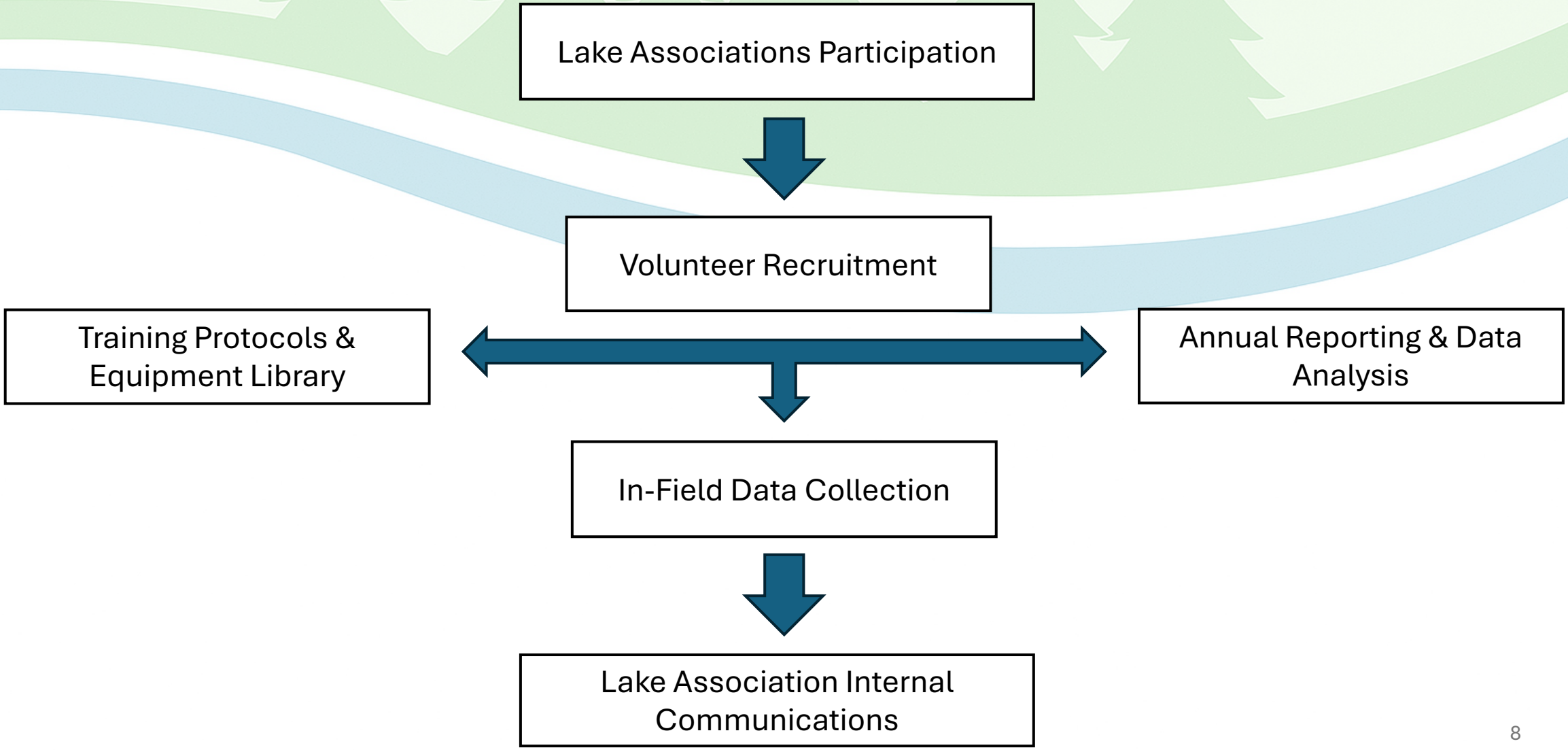
Image © 2025 Airbus
6
N
10 km

# WWEW Program Sustainability

- Community Driven = Long-Term Buy-In
- Multiple Program Streams
- Special Grant Projects
- Post Secondary Institution Collaborations
- Stable Haliburton County Support
- Strong Academic Integration
- Build-In Knowledge Sharing
- Scalable, Replicable Model

# WWEW Citizen Scientist Model



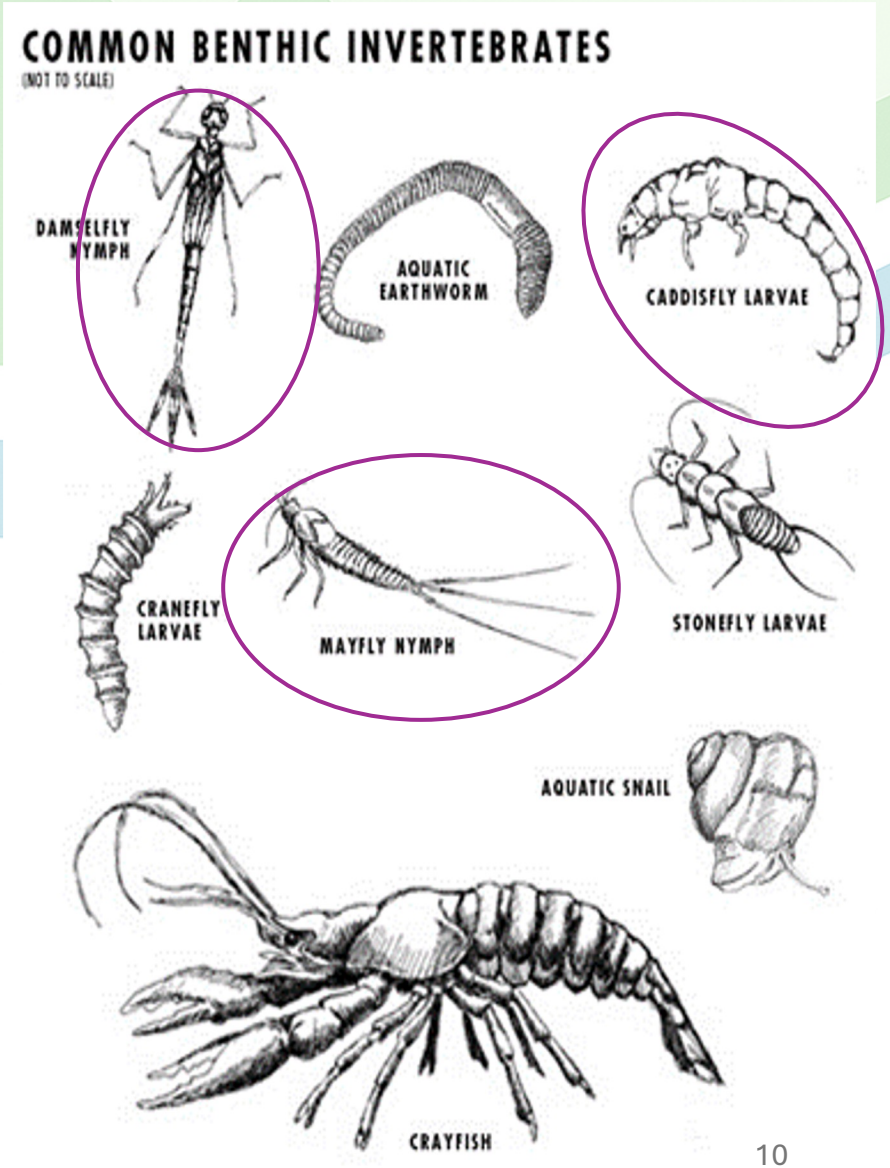
# Benthic Biomonitoring Program

**Using Biological Indicators for Water Quality Health**

# Benthic Biomonitoring Program

**Why Benthics?**

- Benthic Macroinvertebrates (or “benthics”) serve as reliable indicators of aquatic ecosystem health
- Living in direct contact with sediments and water for extended periods, they are exposed to wide range of chemical and physical stressors
- Certain species are **highly sensitive to pollution**, population numbers help detect impacts from nutrient loading, habitat disturbance, or organic contamination.



# Benthic Biomonitoring Program

Benthic Biomonitoring has been used across Canada since the early 2000's and is an established part of **national biomonitoring programs**

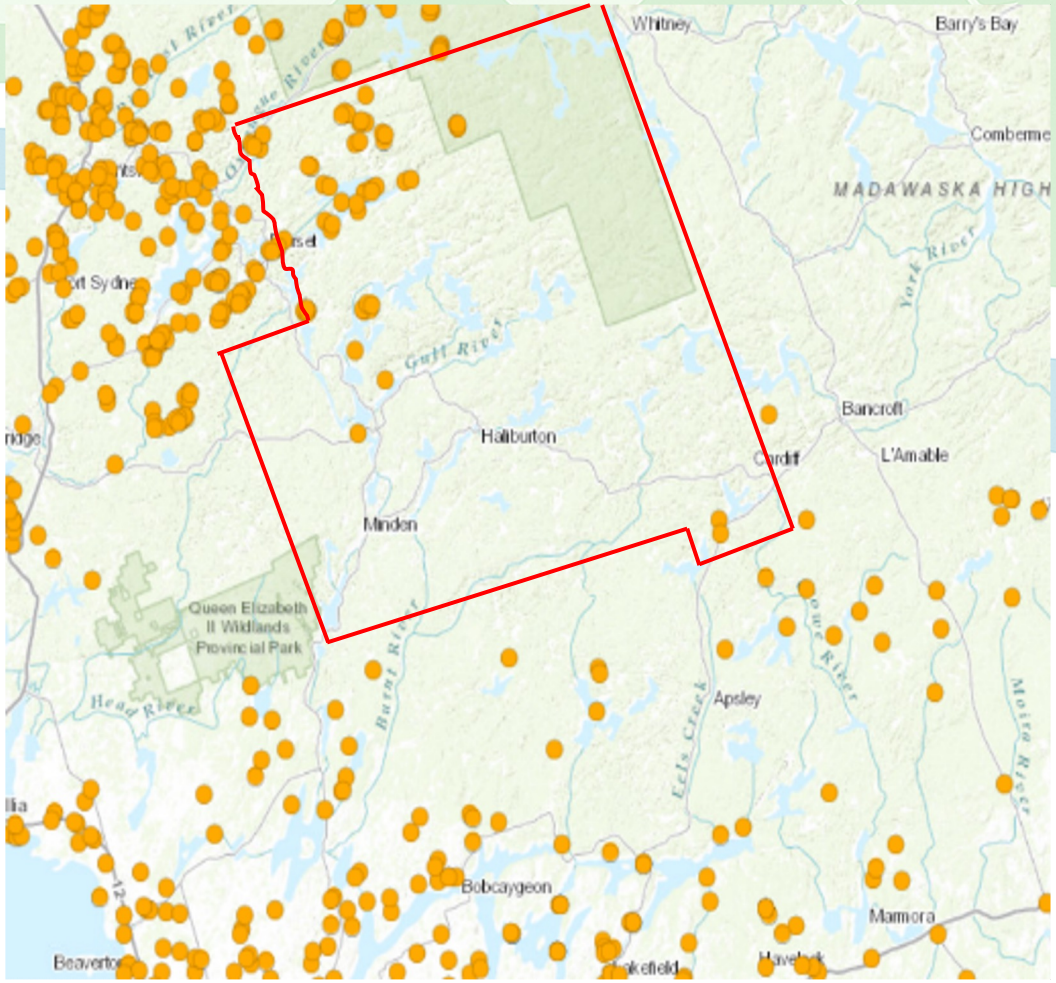
They are not the only biological indicator used – but strike a sweet spot

- Limited Mobility
- Multi-Year Life Cycle
- Taxonomic Diversity
- Widespread Distribution
- Low Tech and Cost Effective Sampling

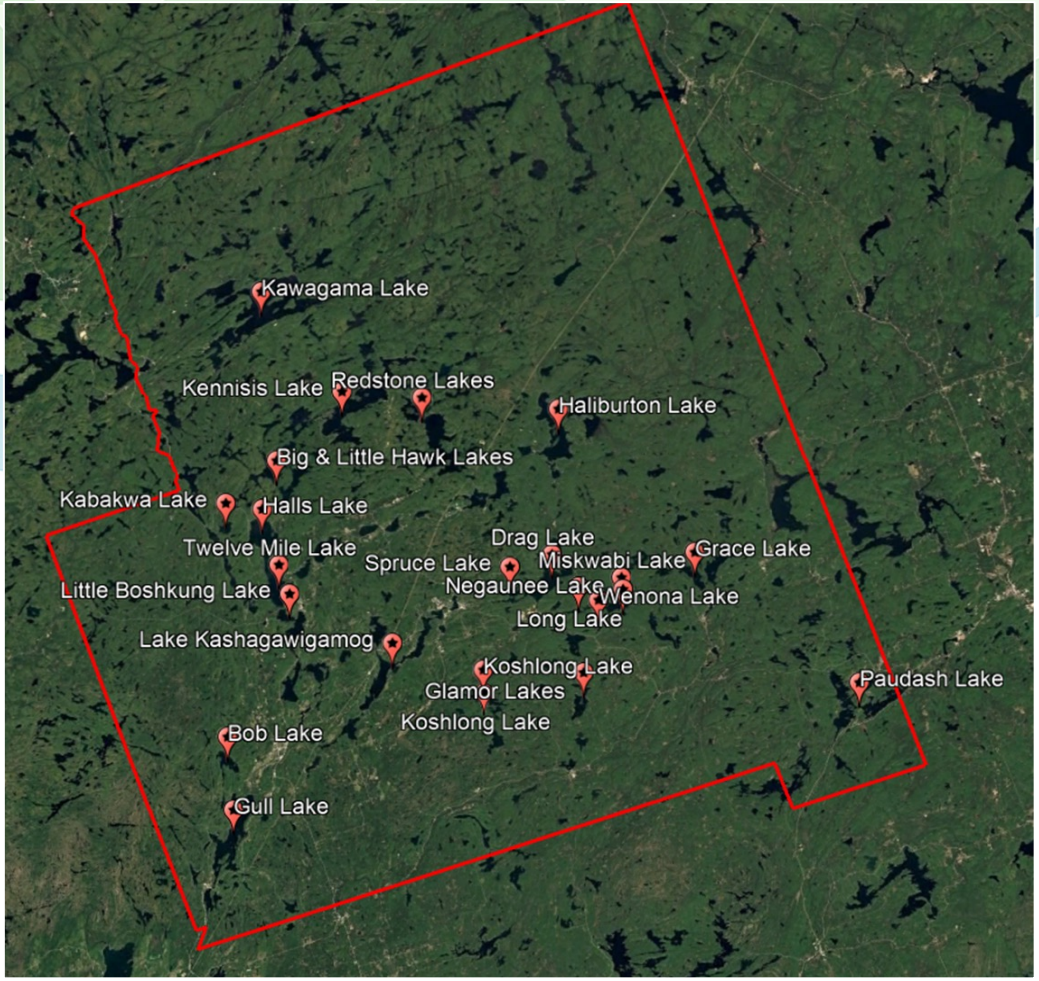


Photo Credit: Aaron Belanger – Environmental Resource Science, 2025

# Benthic Biomonitoring Program




OBBN Benthic Sites, 2019




WWEW Benthic Sites, 2025

# Establishing Baselines in Benthic Monitoring

- Tracking Ecological Baselines
- Tracking Change Over Time
- Measuring Cumulative Impacts
- Site-Specific Sensitivities
- Informs Policy, Stewardship & Conservation
- Foundational for Integrated Lake Health Reporting

| Lake | Average %EOT | Rank | Percentile |
|---|---|---|---|
| *Little Glamour Lake* | 30.45% | 1 | 100.00% |
| *Kawagama Lake* | 27.45% | 2 | 95.00% |
| *Koshlong Lake* | 25.02% | 3 | 90.00% |
| *Kennisis Lake* | 21.72% | 4 | 85.00% |
| *Glamour Lake* | 21.36% | 5 | 80.00% |
| *Bear Lake* | 20.41% | 6 | 75.00% |
| *Little Boshkung Lake* | 18.16% | 7 | 70.00% |
| *Haliburton Lake* | 17.47% | 8 | 65.00% |
| *Grace Lake* | 16.54% | 9 | 60.00% |
| *Long Lake* | 15.65% | 10 | 55.00% |
| *Negaunee Lake* | 15.24% | 11 | 50.00% |
| *Big Hawk Lake* | 14.18% | 12 | 45.00% |
| *Bob Lake* | 11.33% | 13 | 40.00% |
| *Little Hawk Lake* | 9.65% | 14 | 35.00% |
| *Halls Lake* | 9.61% | 15 | 30.00% |
| *Gull Lake* | 9.09% | 16 | 25.00% |
| *Kashagawigamog Lake* | 8.73% | 17 | 20.00% |
| *Twelve Mile Lake* | 8.11% | 18 | 15.00% |
| *Wenona Lake* | 7.72% | 19 | 10.00% |
| *Harvey Lake* | 7.43% | 20 | 5.00% |
| *Miskwabi Lake* | 6.69% | 21 | 0.00% |

Table Produced By: Aaron Belanger – Environmental Resource Science, 2025

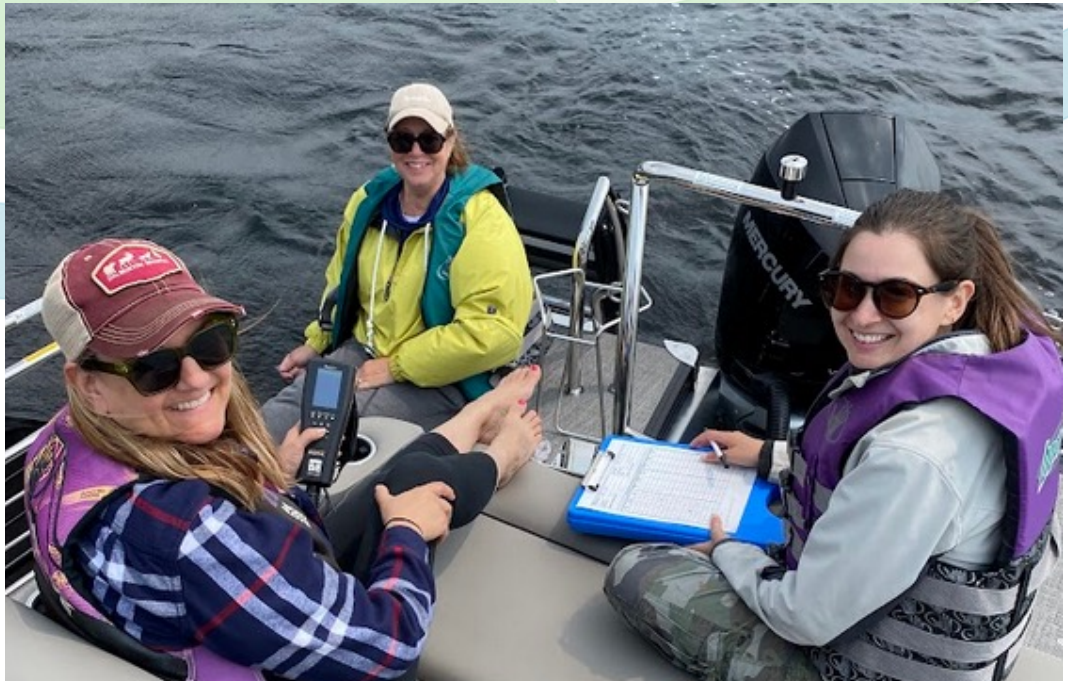
# Testing the Waters Program

**Physical and Chemical Indicators for Water Quality Health**

# Testing the Waters Program

**A Haliburton County Wide Comprehensive Water Quality Monitoring Program**

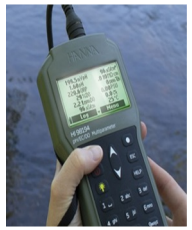
- 61 Sites across 39 Lakes in Partnership with 25 Lake Associations
- Standardized, Region Specific Protocols
- Lake Association Volunteer Supported
- Seasonal, Multi-Site Data Collection
- Actionable Reporting for Stewardship
- Expanding Capacity for Long-Term Trend Analysis



# Program Overview – By the Numbers

## 2022 - Present

**>6600 Physical WQ Measurements**



**>2900 Water Chemistry Samples**

**>1300 Volunteer Hours**

**>200 Training Hours**

**> 150 Volunteers**

**39 Lakes 61 Locations**

**25 Lake Associations**

Kennisis Lake Cottage Owners' Association

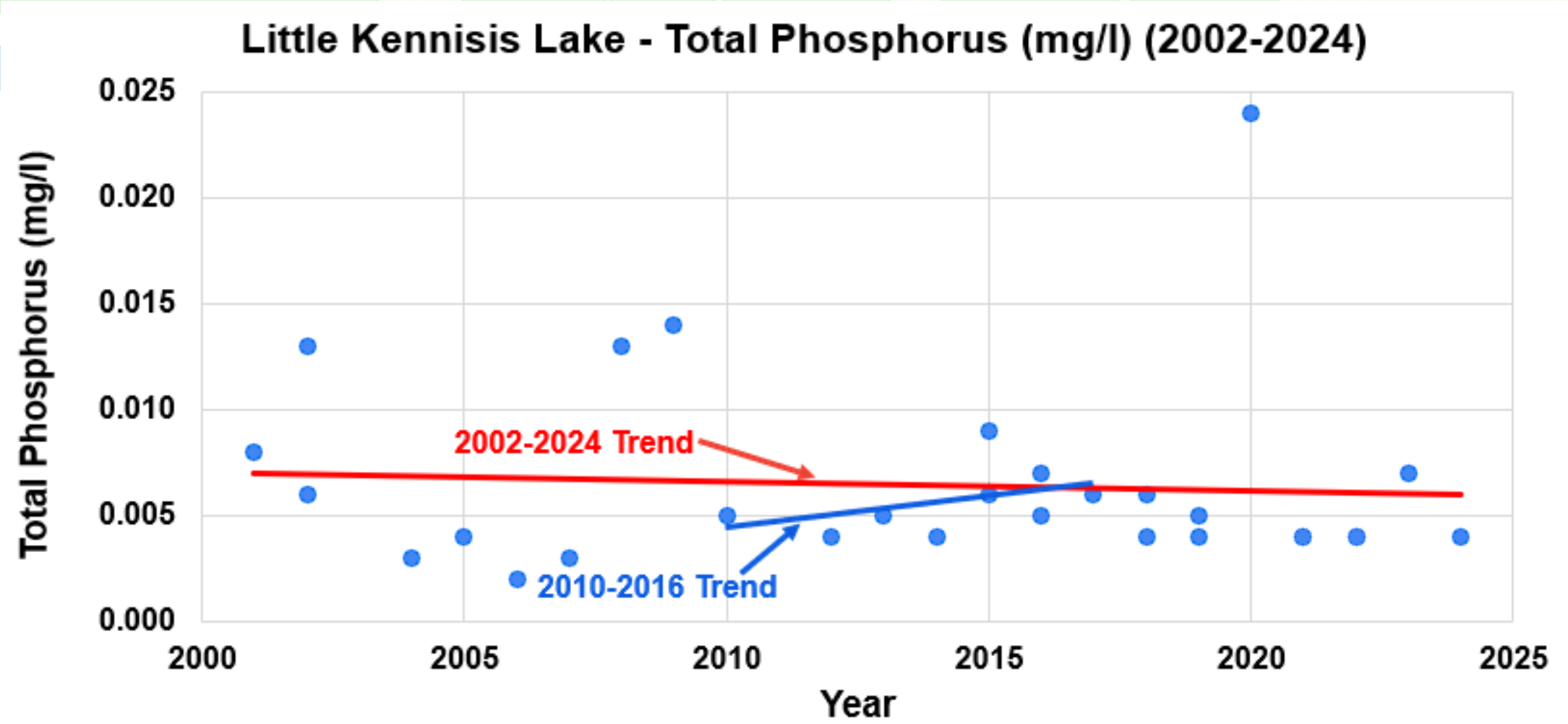
# Sampling Protocol – Parameters Measured

| PARAMETER MEASURED | Lake Partner Program | MECP - Trout Lake Monitoring | MNDMNRF Broad Scale Monitoring | KLCOA (LPP + Internal Data) | Testing the Waters Haliburton County WQ Monitoring |
|---|---|---|---|---|---|
| FREQUENCY | 1 Sampling/Year | Every ~5-8 Years 2 Samplings/Year | 4-6 Year Cycles for Select Lakes | 1-2 Samplings/Year | 3 Samplings/Year |
| Secchi Depth (m) (Clarity) | YES | YES | YES | YES | YES |
| Total Phosphorus | YES | YES | YES | YES | YES |
| Nitrogen - Ammonia | NO | YES | YES | YES | YES |
| Nitrogen - Nitrite | NO | YES | YES | YES | NO |
| Nitrogen - Nitrate+Nitrite | NO | YES | YES | YES | YES |
| Total Kjeldahl Nitrogen | NO | YES | YES | NO | YES |
| Sulphate | NO | NO | YES | NO | YES |
| Dissolved Organic Carbon | NO | YES | YES | NO | NO |
| Dissolved Inorganic Carbon | NO | YES | YES | NO | NO |
| pH | NO | YES | YES | NO | YES |
| Total Alkalinity | NO | YES | YES | NO | YES |
| Conductivity (uS/cm) | NO | YES | YES | NO | YES |
| Calcium | YES | YES | YES | YES | NO |
| Magnesium | NO | YES | YES | NO | NO |
| Hardness | NO | YES | YES | NO | YES |
| Total Suspended Solids | NO | YES | YES | NO | NO |
| Total Dissolved Solids | NO | YES | YES | NO | NO |
| Dissolved Oxygen | NO | YES | YES | YES | YES |
| Temperature | NO | YES | YES | YES | YES |
| Chloride | YES | NO | YES | YES | NO |
| Bacterial Contamination | | | | | |
| E. Coli | NO | NO | NO | NO | NO |
| Total Coliforms | NO | NO | NO | NO | NO |

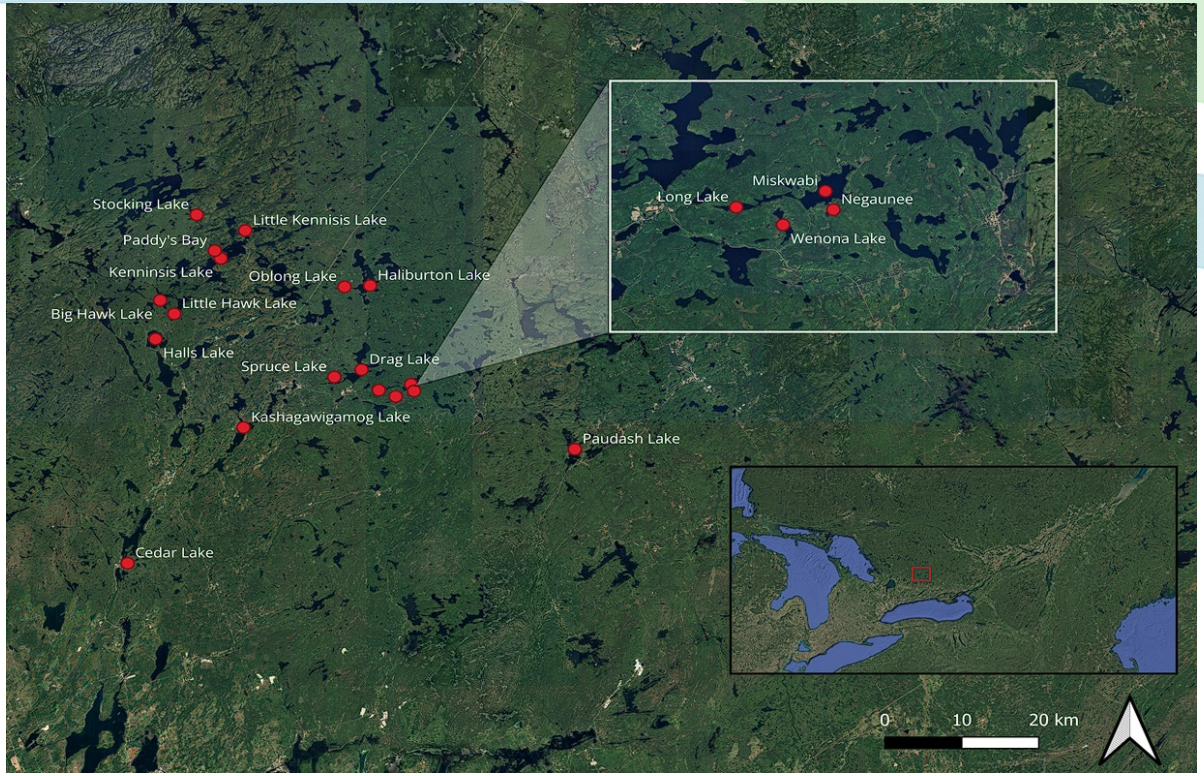
**3 Samples/Year**
**July/Sept/Winter – Ice On**

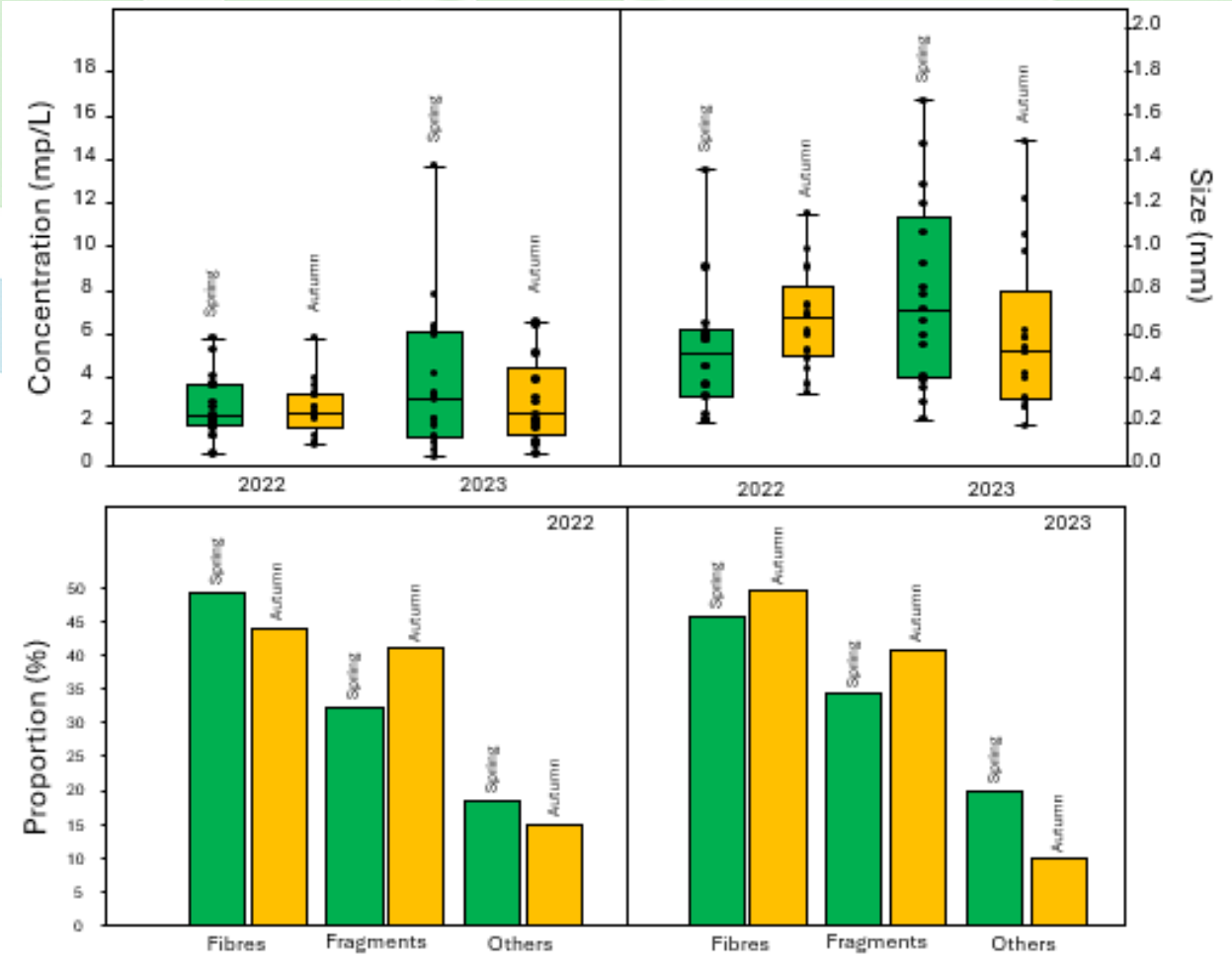
Unique Feature: Below-ice winter sampling directed to lakes with water drawdowns, known to be detrimental to certain ecological processes in lakes.

# Data Use – Trend Analysis



# Microplastics Analysis



# Programming Challenges

**Operational Challenges**

- Volunteer Turnover & Retraining
- Scheduling Difficulties
- Property Access
- Maintaining QA/QC Across LA's

**Environmental & Logistic Challenges**

- Inconsistent Ice Conditions
- Storms and Water Levels
- Limited or Unreliable Boat Access
- Site-Specific Constraints for Benthic Sampling
- Not all Lakes Safely Accessible During Winter

# Future Outlook and Closings

- Moving From Monitoring to Management
- Program Trajectories
- Expanding Digital Tools
- New Parameters on the Horizon
- Scaling Through New Partnerships
- Opportunities for Engagement

# Thank You

to all volunteers, partners and supporters.

# Questions?

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