

Watershed Health Indicators Shortlist and Implementation Report



You can find more information on the Phase One Report and the accompanying Summary Factsheet on the District of Muskoka website at www.muskoka.on.ca/iwmprojects

This project is part of the extended **Integrated Watershed Management (IWM)** initiative, focusing on reducing flooding impacts and enhancing Muskoka River Watershed (MRW) health. It's one of seven chosen for expansion from the original twelve projects. This initiative supports and advances the implementation for an IWM approach for the entire MRW.

The Watershed Health Indicators Project aims to expand on existing data and research to define environmental and ecological metrics for monitoring the health of the Muskoka River Watershed.

Phase One established 29 health indicators categorized into two areas: Ecological Status, and Threats to Ecological Status. One of the Phase One recommendations was to create a shortlist of indicators.

- ✓ Use a standardized approach in collaboration with the Community Round Table (CRT), local experts, and stakeholders to narrow down a longlist of 29 indicators to the final 18, ensuring alignment with community needs.
- ✓ Offer detailed implementation guidance for monitoring the finalized 18 indicators in the Muskoka River Watershed, building upon previous reports' insights on watershed health, water quality indicators, and monitoring design.

Measuring Watershed Health:

Watershed health involves monitoring the ecosystem's ability to sustain natural features and processes. Indicators simplify complex data, measuring physical, chemical, biological, and socio-economic aspects. Effective indicators are measurable, consistent, relevant, understandable, reliable, comprehensive, and cost-effective. Indicators typically represent:

Condition:

Assessing attributes like water quality and biodiversity.

Pressure:

Addressing natural processes and human activities impacting the environment.

Response:

Focusing on actions taken to manage or prevent environmental damage.

Survey Methodology

A survey sent via email gathered opinions from the CRT, local experts, and stakeholders on the list of indicators. Respondents rated 29 indicators on a 1-5 scale and offered comments. The analysis focused on:

- **Usefulness**
- **Resource allocation**
- **Ability to address unwanted changes**
- **Impact on the environment and society**

Purpose/ Background

Scope



Survey Results

Surveys Received

17 responses were received, but four were excluded due to incomplete or early submissions before a survey issue was fixed.

Survey Scoring

The scoring of all 29 indicators ranged from 173 to 227. The top ten indicators, based on survey scores, included:

1. Percent wetland cover
2. Riparian connectivity
3. Muskoka River water quality
4. Total phosphorus
5. Benthic macroinvertebrates
6. Percent forest cover
7. Percent land cover
8. Percent forest interior
9. Road density
10. Habitat fragmentation

Survey Comments

Comments from participants covered several topics, including the ease and cost-effectiveness of using indicators, their suitability for addressing different scale issues, and the ability to identify the causes of indicator changes. These comments also included recommendations for further research and specific data collection protocols.

Key points from the comments:

Riparian Zone: Width and vegetation discussions.

Wetland Cover: Relationship with habitat intactness.

E. coli: Monitoring and its link to beach health.

Riparian Connectivity: Emphasis on natural habitat connection.

% Land Cover: Components, uses, and measurement.

Habitat Fragmentation: Focus on patch size and biodiversity.

Time of Ice On/Off: Suitability as a climate change indicator and its link to local temperatures.

Muskoka River Water Quality: Sampling approach, data parameters, locations, timing, and methodology discussions.

Survey Limitations

- Low response rate (22%)
- CRT member concerns about relying on public feedback.
- No input from Indigenous communities
- Small sample size, but still valuable in conjunction with guidance from other sources.
- Involvement of scientific experts in survey and longlist development.

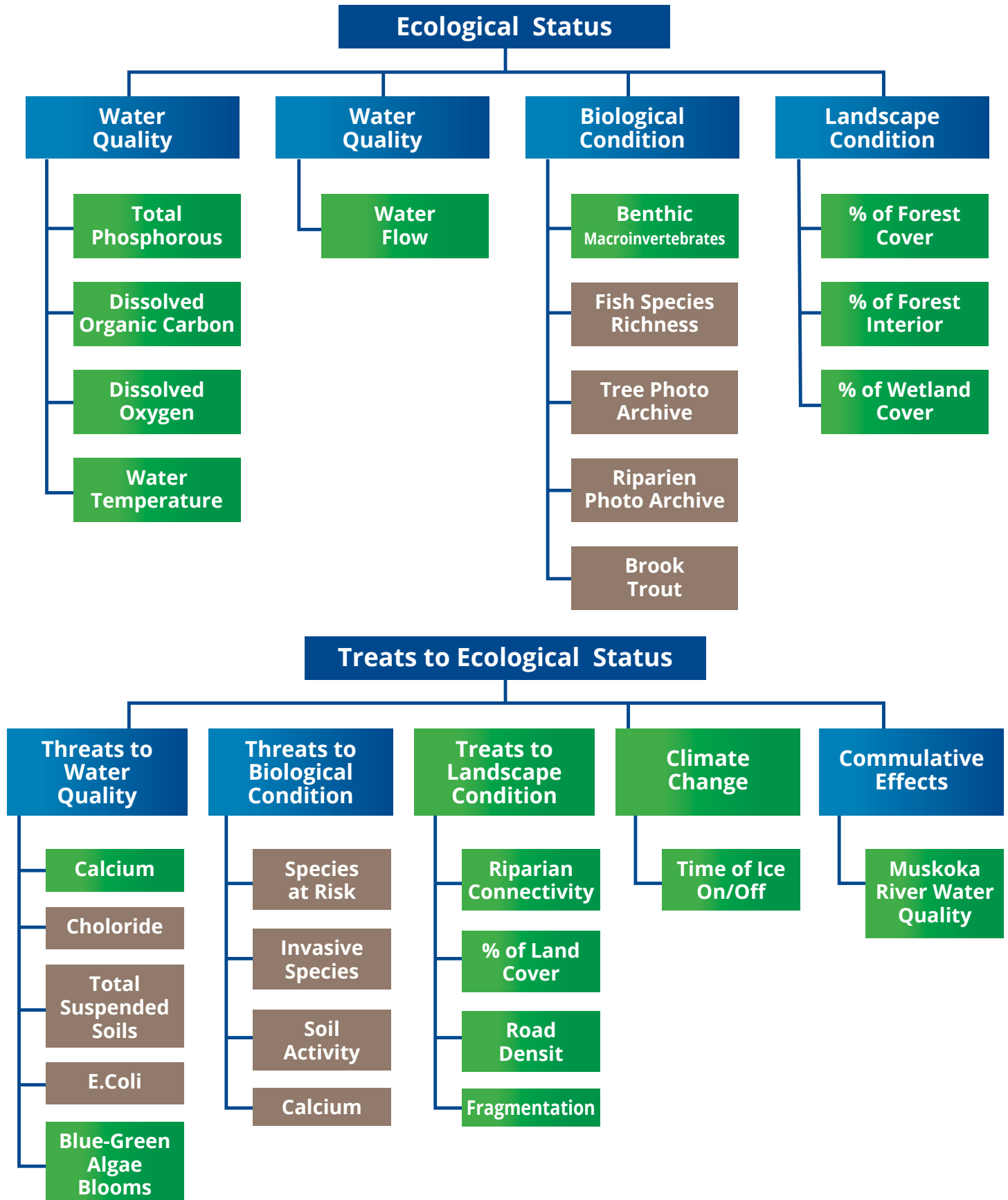
Indicator Selection

Insights from the survey group, in conjunction with guidance from multiple jurisdictions, have shaped the initial indicator list. Key criteria for shortlisting included quantifiability, scalability, and data availability.



Watershed Health Indicators - Shortlist Recommendations

- 18 Indicators recommended to be shortlisted into two categories - Ecological Status and Threats to Ecological Status.
- Recommended Indicators are highlighted in green.



Shortlist Implementation Recommendation Highlights:

1. Lake Monitoring

- Continue monitoring total phosphorus, dissolved oxygen carbon, calcium, and chloride through the Recreational Water Quality Program.
- Expand dissolved oxygen and water temperature monitoring in lakes with low phosphorus and frequent harmful algal blooms via automated sampling.
- Employ high-frequency automated monitoring for early detection of algal blooms from August to October. Also, collect meteorological data to study bloom-climate relationships.
- Consider additional benthic macroinvertebrate monitoring only for point source discharge assessments.
- Engage citizen scientists in tracking lake ice coverage through the IceWatch Program.

2. River Monitoring

- Extend monitoring to Muskoka River and tributaries to track water effects across the watershed.
- Monitor TP, DOC, DO, water temperature, calcium, chloride, and water flow at specific sites reflecting various environmental impacts.
- Collect samples from spring to fall to capture different seasonal river conditions.

3. Landscape Condition

- Utilize GIS datasets to gauge landscape and threats to landscape conditions.
- Measure forest conditions, wetland types, riparian connectivity, land cover by types, and road density.
- Calculate the percentage of natural areas of varying sizes within the watershed.

4. Review and Reporting

- Regularly review field data for quality assurance.
- Analyze monitoring data annually to assess spatial and temporal resolution for watershed condition discernment.
- Report findings every two to five years, detailing trends in watershed health.
- Conduct GIS analysis and reporting every five years for landscape condition indicators.



For the complete report and further information on Integrated Watershed Management (IWM), the twelve projects (including the seven extended ones), and efforts towards an Integrated Watershed Management approach for the Muskoka River Watershed, please visit www.muskoka.on.ca/iwmprojects.

This project has received funding support from the Government of Ontario.

Such support does not indicate endorsement by the Government of Ontario of the contents of this material.