Natural Capital Inventory Aquatic Ecosystem Classification

THE DISTRICT MUNICIPALITY OF MUSKOKA

This project is part of the extended I**ntegrated Watershed Management (IWM)** initiative, focusing on reducing flooding impacts and enhancing Muskoka River Watershed 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 Muskoka River Watershed (MRW).

You can find more information on the Phase One Report – "Natural Capital Inventory" and the accompanying Summary Factsheet on the District of Muskoka Website at: www.muskoka.on.ca/iwmprojects

Background

The Ontario Aquatic Ecosystem Classification (AEC) simplifies understanding rivers and streams by using consistent methods to study their features. It helps with planning, fisheries management, and decision-making.

At Issue

The current AEC data for the Muskoka River Watershed lacks detail. It's based on broader information sources, limiting its usefulness for precise decision-making. The dataset doesn't include fine-scale data critical for thorough analysis.

Scope

This report explores how the AEC criteria are applied to a detailed study of the Muskoka River. It aims to enhance understanding beyond the limitations of the existing data, enabling more accurate decision-making for watershed management.

Methodology

Muskoka River Watershed AEC Mapping Summary

Attributes Quantified: Using LiDAR data and modeling techniques, the AEC process assessed key features like reach, slope, catchment area, velocity class, and network line type in high detail (0.5m resolution).

Reach and Network Line Type: Calculated reach distance within the network in ArcGIS Pro, distinguishing between "real" flow in terrestrial and "virtual" flow in aquatic environments based on intersections and catchment divides.

Slope and Velocity: Used LiDAR data for slope calculation and velocity classification (slow/fast water movement) using GIS tools.

Upstream Catchment Area: Derived catchments from LiDAR data, mapping them precisely at specific stream orders across the watershed.

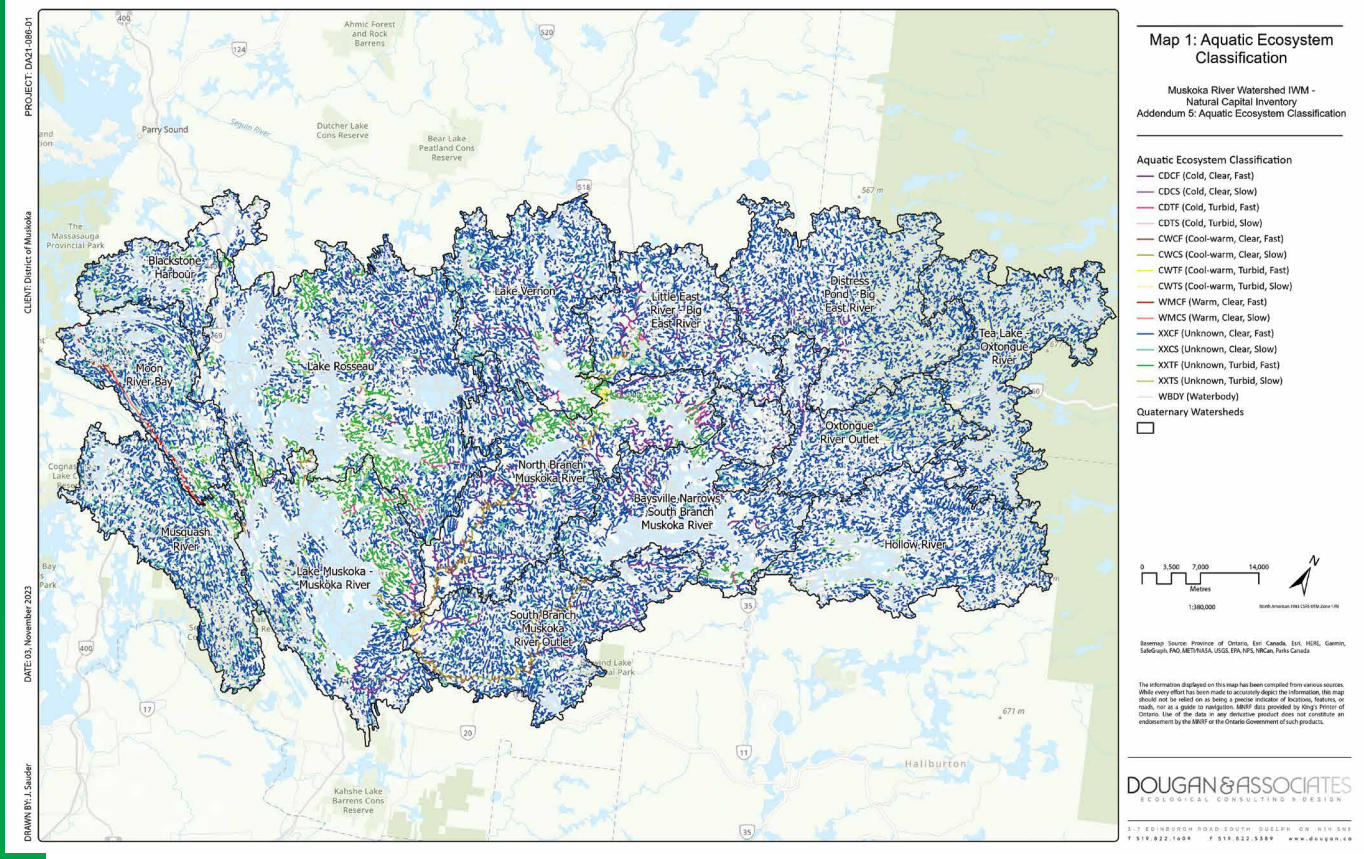
Turbidity & Temperature: Identified clay-dominated areas impacting turbidity; however, temperature class calculations require more data for accurate evaluation.

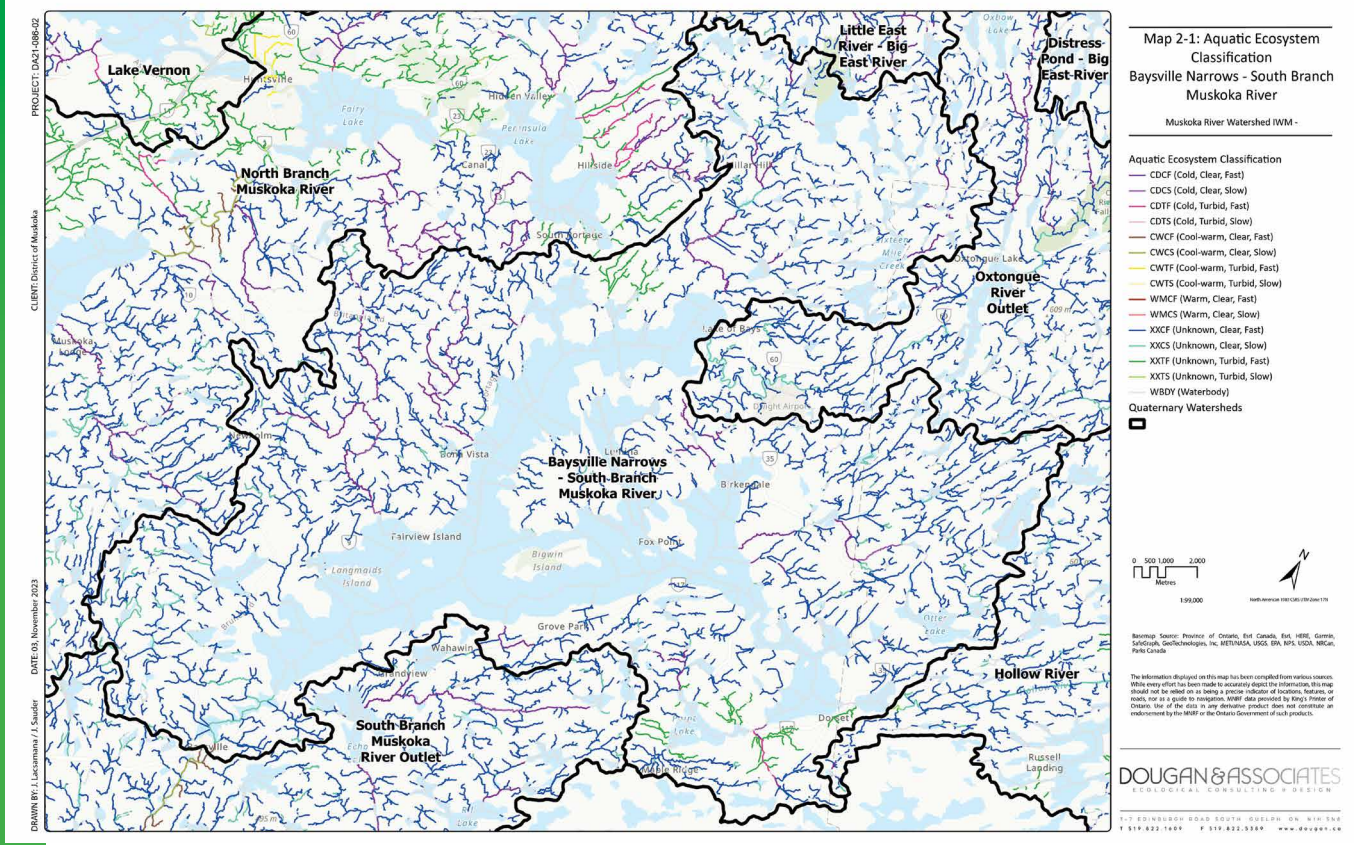
Results

Mapping Details

Associated Reach Length Documentation: Table 1 on page 5 in the detailed report illustrates the reach length for each preliminary AEC class.

Spatial Presentation: The preliminary AEC is visually represented both at the broader watershed scale (Report Appendix: Map 1) and within individual subwatersheds (Report Appendix: Map 2).





Temperature Class Attribution:

Temperature classes were identified for approximately 892 km of the watercourse network:

- 658.5 km classified as Cold.
- 194.6 km as Cold-Cool Transitional.
- 39.2 km as Warm.

About 16,745 km of the network lacked temperature class identification:

- 13,166 km without identification.
- 3,579 km including 'virtual' watercourses.

Other Key Classifications Across the Network:

Turbidity Classes

- Clear watercourses spanned 13,010 km.
- Turbid watercourses covered 1,048 km.

Velocity Classes

- Fast-moving watercourses accounted for 12,299 km.
- Slow-moving watercourses covered 1,759 km.

Combined Classes

- Clear/Fast: 11,372.5 km.
- Clear/Slow: 1,637.5 km.
- Turbid/Fast: 927 km.
- Turbid/Slow: 121 km.

Limitations and Observed Trends:

Temperature Class Constraints:

- Lack of sufficient data from weather stations and in-stream loggers limited the determination of temperature classes.

Subwatershed Trends in Classifications - Temperature Class:

- Decreased representation of Cold watercourses in lower subwatersheds.
- Increase in Cool-Warm Transitional class in middle subwatersheds.
- Warm watercourses identified solely in lower subwatersheds.

Subwatershed Trends in Classifications - Turbidity and Slope Class:

- Variations observed across upper, middle, and lower subwatersheds: Turbidity and slope classes showed different representations among these subwatersheds, influenced notably by certain subwatersheds like Lake Rosseau, Lake Muskoka - Muskoka River, and others.

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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.

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