Watershed Quality Indicators Citizen Science Algae Bloom Monitoring Program

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.

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**

Background

The Water Quality Monitoring Phase I Report recommended a Citizen Science-based program to track cyanobacteria and algal blooms. With increasing algal blooms in Muskoka, vulnerable lakes were identified under the District Municipality of Muskoka Official Plan. Studies revealed a critical lack of essential bloom data, and recommended creating a citizen scientist program. The Muskoka Watershed Council (MWC) responded by initiating a pilot algae monitoring program to gather detailed data on specific lakes.

At Issue

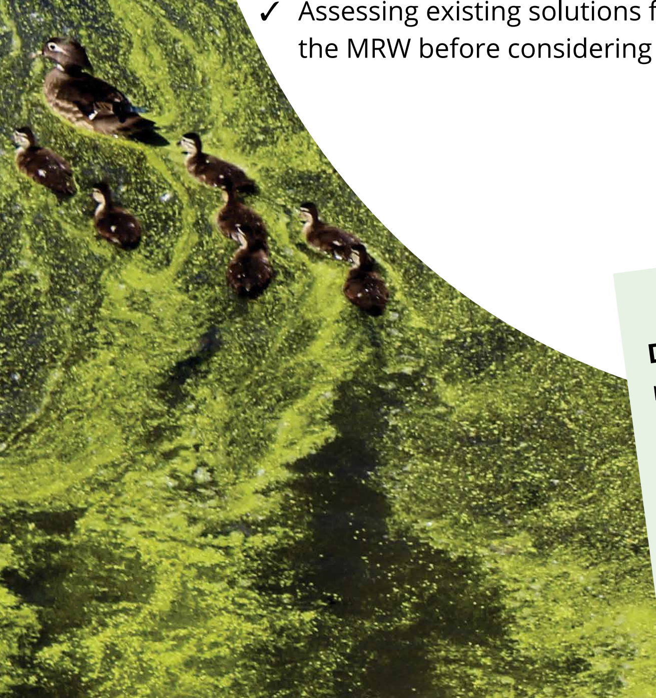
Monitoring cyanobacteria is challenging due to limited resources and the unpredictable nature of harmful algal blooms (HABs), which occur briefly in specific areas, making tracking difficult. Citizen science plays a crucial role in providing timely, local insights into bloom occurrences, aiding in understanding their onset and severity. Documenting these occurrences will significantly contribute to a better overall understanding of cyanobacterial blooms.

Scope

This report details a Citizen Science monitoring initiative aimed at recognizing potential HABs for the entire MRW and includes:

✓ The evaluationand recommendation of user-friendly smartphone applications for detecting and reporting HABs.

✓ Assessing existing solutions from diverse regions to ascertain their suitability for adaptation within the MRW before considering the creation of a custom application.



Disclaimer: This program does not replace the formal reporting of blooms to the Ministry of Environment, Conservation and Parks (MECP), nor does it function as a regulatory tool.

Application Comparisons

1. Bloomin’ Algae

Features/ Functionality

- Verifies harmful algal blooms.
- Provides guidance through simple pictures to differentiate between various types of algae.
- Allows users to report bloom sightings and submit photos.

Challenges/Limitations

- Requires modifications for use in Canada.
- Limited metadata options (such as location, bloom size).
- Needs further development for full functionality within the Muskoka River Watershed.

2. BloomOptix AI

Features/ Functionality

- Automatically identifies and counts cyanobacterial cells from common genera using a compatible microscope.
- Provides colony identification and density estimates within 30 seconds.
- Offers robust reporting options for field observations with various metadata submissions.

Challenges/Limitations

- Identifies a limited range of genera.
- Concerns about consistency in sample analysis due to methodological limitations.
- Requires standardization for widespread use and accuracy across different locations within the watershed.

3. AlgaeScumID

Features/ Functionality

- Identifies potentially toxic freshwater algae.
- Operates exclusively on iOS devices.
- Utilizes a series of questions (dichotomous key) for identification.
- Enables reporting of bloom sightings, photo uploads, and location recording.

Challenges/Limitations

- Lacks Android compatibility.
- Requires substantial funding to develop Android functionality.

4. Cyanobacteria Monitoring Collaborative – bloomWatch

Features/ Functionality

- Monitors blooms, documents spatial/temporal occurrences, functional on both iOS and Android platforms.
- Provides guidance through pictures, allows quick and intuitive data entry for bloom sightings with metadata (weather, lake conditions, bloom extent).

Challenges/Limitations

- Limited usage in Canada
- Potential for broader application within the watershed with increased user adoption and support.

Recommendation

✓ bloomWatch

Exploring a proprietary application is not necessary.

Rationale

- Supports various devices, ensuring widespread accessibility.
- Enables thorough documentation of HAB properties and extent.
- Facilitates engagement, enhancing the Algal Monitoring Program's growth.
- Provides a user-friendly approach to manage HABs, catering to less technical users.
- Acts as a supportive alternative to the more complex existing monitoring program.
- Involves minimal initial expenses for implementation.
- Can be seamlessly promoted through established District platforms like Waterweb and Engage Muskoka.

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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