

Big and Little Hawk Lakes Benthic Biomonitoring Project

Background

Benthic invertebrates are aquatic bottom dwelling organisms that are commonly used to assess the health of aquatic ecosystems. Benthic invertebrates are used as a bioindicator, as they can indicate water and habitat quality. By compiling benthic invertebrate data over multiple years, a baseline can be created to determine the health of the lakes.

This is the first year of a multi-year study. Conclusive results regarding the health of the lake cannot be made until at least 3-5 years of data is collected.



Figure 1: Benthics from the orders of Hemiptera, Coleoptera and Odonata. Reference: Witty, L.M. and C. Sarrazin-Delay, 2014. Illustrated Guide to Boreal Shield Invertebrate Benthos. Cooperative Freshwater Ecology Unit.

Research Questions

- What benthic invertebrate communities exist in the lakes?
- Do the benthic communities represent a healthy or impacted environment?
- What kind of water quality do the benthic communities indicate?

Methods

- Followed Ontario Benthos Biomonitoring Network Protocol.
- Sampled 3 sites on Big Hawk Lake and 4 sites on Little Hawk Lake with 2 replicates at each site for a total of 14 samples.
- Utilized the kick and sweep method to collect the benthic invertebrates.
- Samples were taken to Trent University and identified using a microscope.

Results

- Water chemistry indices of pH, dissolved oxygen, temperature and conductivity were consistent with measurements found in other nearby lakes and relatively consistent with previous measurements taken.
- 3 biotic indices were calculated:
- The percent composition of benthic invertebrates indicates that groups tolerant to pollution are those that dominate, but groups sensitive to pollution were also represented in the samples (Figure 2).
 - The Hilsenhoff Biotic Index (HBI) estimates the tolerance of a benthic community to pollution. The average HBI value across the lakes was 6.62 which falls in the poor range in relation to water quality.
 - The Simpsons Diversity Index calculates the diversity of the benthic community on a scale from 0 to 1, 1 being an infinite level of diversity. The average score for both lakes was 0.63, which is relatively high.

Percent Composition of Benthic Invertebrates in Hawk Lakes

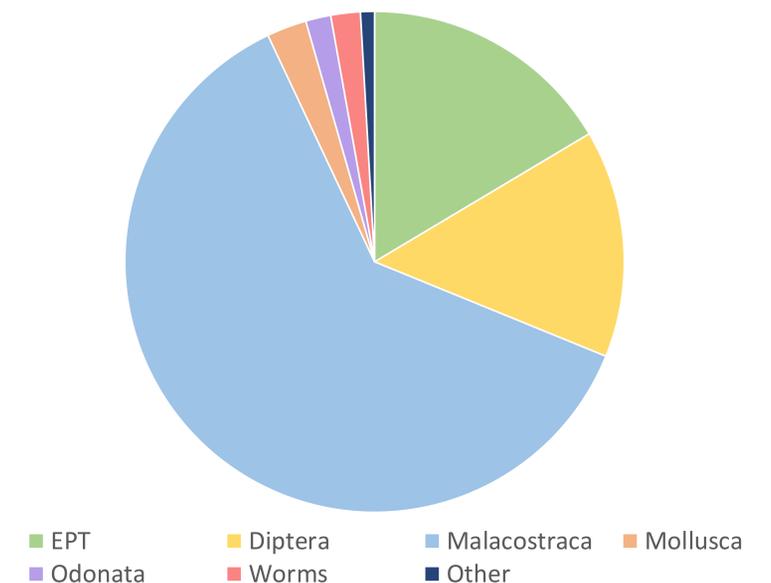


Figure 2: A pie chart representing the percent composition of benthic invertebrates in Hawk Lakes. EPT includes Mayflies, Stoneflies and Caddisflies. Diptera includes two-winged flies. Malacostraca includes Sow bugs and Scuds. Mollusca includes Mussels and Snails. Odonata includes Dragonflies and Damselflies.

Discussion

Based on the benthic invertebrate sampling that was completed this year, no definitive conclusions regarding the health of the lake can be made. By looking at the results of all the indices together, we could conclude that the lake is likely in adequate health, with the possibility of some pollution occurring or having occurred in the past. With additional years of research, more robust conclusions can be made regarding the health of the Hawk Lakes. By tracking changes in the composition of benthic communities over time, water quality can be monitored and recommendations implemented when necessary.

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