2021 Community Science Water Quality Monitoring Project: Sturgeon Lake

Final Report

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Project Overview

- The purpose of this study was to examine water quality in the nearshore zone of Balsam, Cameron, Sturgeon and Pigeon Lakes.
- The nearshore zone is an important component to the overall lake ecosystem as it provides fish spawning and nursery grounds, and habitat and food for many aquatic organisms that live in the aquatic plant beds.
- The nearshore zone is also where we enjoy the lake, when we are at a beach, or swimming. It's also where the impacts from our activities on land are directly felt.
- From June September 2021 community scientists, collected 164 samples from 4 lakes.







Water Quality Parameter	Common Source(s)	Significance
Total Phosphorus (TP)	Manure, fertilizer, septic systems, wastewater treatment facilities, and animals.	An important nutrient for plant and algae. High levels can result in excessive aquatic weed and algae growth.
Chlorophyll a (Chl a)		Represents the amount of algae growing in the water.
E. coli	Animal feces, manure, and failing septic systems.	Indicator bacteria of fecal pollution. Fecal pollution may contain water-borne pathogens.
Water Temperature	Thermal pollution- inline ponds, lack of canopy vegetation to shade creeks and shorelines.	Increasing water temperature reduces the amount of oxygen available to aquatic life. It can limit some plant and animal species. Higher temperatures promote algal blooms.

Sturgeon Lake Water Quality Results



Water Temperature

- Water temperature followed expected seasonal trends over the 2021 summer, peaking in August.
- In Sturgeon Lake water temperature ranged from 14 to 24 °C
- Current water temperatures are not of concern for aquatic life.





Total Phosphorus

- Average total phosphorus for Sturgeon Lake sites during the 2021 sampling season. The PWQO of 20 µg/L is indicated on the graph with the red dashed line.
- Total phosphorus levels are approaching the PWQO which indicates they are not currently of concern for Sturgeon Lake but may be if they increase.
- Total phosphorus concentration across Sturgeon Lake indicate a classification of mesotrophic (10-30 µg/L).

Chlorophyll a

- Average chlorophyll *a* (amount of algae) for Sturgeon Lake during the 2021 sampling season.
- In freshwater lakes, phosphorus is the limiting nutrient for algae growth, this is why we often see a trend where chlorophyll *a* levels mirror the fluctuations in TP.
- There is not a clear relationship between chlorophyll *a* and TP on Sturgeon Lake.
- Chlorophyll *a* levels peaked in August as expected.



E. coli

- Average *E. coli* levels on Sturgeon Lake for the 2021 sampling season. The PWQO is indicated on the graph with the red dashed line.
- *E. coli* levels tend to increase when there is higher precipitation washing it into the lake from the sources listed in Table 1.
- *E. coli* levels were well below the PWQO levels from June September. This suggests that fecal contamination is not an issue on Sturgeon Lake.

Overview of Findings

We want to thank you for your participation in the Citizen Science Nearshore Monitoring program. Your efforts have contributed significantly to research on your lake and to the scientific community. In summation, our findings on Sturgeon Lake are as follows:

- Water temperature in Sturgeon Lake was not at levels of concern, although with climate change it is something that should continue to be monitored.
- Phosphorus nutrient pollution was not problematic on your lake during the 2021 summer.
- Chlorophyll-a levels were relatively low throughout the summer, indicating low risk to algal blooms.
- Although there were *E. coli* during the study, these low numbers represent animal inputs of E. coli, most commonly from animals that frequent the shoreline (waterfowl or domestical dogs). Values were never consistently high, which is encouraging considering the number and age of septic systems on Sturgeon Lake.



Biological Sampling

- Aquatic macroinvertebrates are aquatic insects, often they are the larval form of the terrestrial insect, but also includes things like snails, leeches and mussels.
- Macroinvertebrates are often studied in aquatic ecology because their community reflects local water quality conditions. Each taxa has a certain tolerance to conditions such as nutrient enrichment (TP and TN) and oxygen levels. In this study macroinvertebrates were collected from a device called a Hester Dendy artificial sampler (pictured right).
- We are currently working on identifying and counting the macroinvertebrates collected from the Hester Dendy samplers this summer, but we have seen some promising signs! Trichoptera (caddisfly) and Ephemeroptera (mayfly) taxa have been identified, these are families that tend to be fairly sensitive to water quality conditions, and are less likely to be found in degraded environments.







What YOU can do to enhance your nearshore water quality

Clean, fresh, and abundant water is needed for both humans and wildlife. Degradation of water quality may pose higher risk of diseases, loss of habitat (and therefor lost of wildlife), poor land value, and increase maintenance cost. There are many simple ways for landowners to enhance their section of lakeshore, and thus contribute to better water quality of the lake.

Minimize impacts & strengthen water resources

- 1. Keep household hazardous waste, ex. cleaning products, expired products, fertilizers, etc., in a secure location until they are properly disposed of, e.g., municipal waste facility.
- 2. Plant native plants across your lot. These plants require less watering, fertilizer, or pesticides. Native plants are also friendlier than non-native plants as they have co-evolve together for many centuries.
- 3. Conserve water whenever possible! You can collect rainwater and use the store rainwater for gardening.
- 4. Allow trees and shrubs to grow around edges of ponds, streams, rivers, and lakes. They act as a filter of all water running into the lake. More roots = more filtering = better water quality.
- 5. Keep septic in good conditions. Tanks that are not properly maintained can overflow and leak into the ground, contaminating ground water supplies.

Grants

Kawartha Conservation offers two grants for larger scale stewardship project. The Kawartha Water Fund (up to \$4000) and the Scugog Water Fund (up to \$8000).

A few of the projects that these grants have made possible are:

- Agricultural stewardship projects
- Erosion and loss of natural cover along shorelines and stream banks
- Poorly functioning septic systems and wells
- Rainwater/runoff management
- Tree plantings

Contact Kawartha Conservation (geninfo@kawarthaconservation.com) to discuss your project ideas.



