COMMUNITY SCIENCE

2024 NEARSHORE MONITORING REPORT

SEE INSIDE

Program Information and Water Quality Results

NEARSHORE WATER QUALITY RESULTS AND SITE MAPS

BALSAM LAKE
CAMERON LAKE
STURGEON LAKE
PIGEON LAKE

KAWARTHA CONSERVATION

HISTORY OF NEARSHORE MONITORING

Since the creation of our first Nearshore Monitoring Program in 2019, Kawartha Conservation has been actively assessing lake health in the shallow areas near shore. The program tracks water quality which is essential for understanding the ecological balance of our lakes. By continually monitoring these areas, we can identify potential environmental issues caused by human activity. Over the years, this data has been instrumental in guiding conservation efforts and protecting these vital ecosystems for future generations.

As the program evolves, we recognized the importance of involving local communities in our monitoring efforts. Engaging residents with strong connections to the lakes allows us to further our conservation efforts, which is crucial for monitoring lake health.

In 2024, the program was expanded and rebranded as the **Community Science Program**. The revamped program takes a comprehensive approach to monitoring lake health by engaging residents as active participants. Citizen Scientists from lakefront communities help to monitor water quality directly from their docks or access points on the following lakes:

- **Pigeon Lake**
- **Sturgeon Lake**
- **Cameron Lake**
- **Balsam Lake**

WHAT IS NEARSHORE?

The nearshore environment, often called the "ribbon of life," is the shallow area near the shore where land and water interact, influencing water quality and ecosystems.

WHY NEARSHORE?

This zone is vital for its rich habitats, supporting spawning and foraging for various species. It provides essential ecosystem services, such as filtering stormwater runoff, and serves as a popular area for people to connect with the water. Monitoring the nearshore helps protect these critical functions, ensuring a healthy ecosystem for both wildlife and humans.

HOW THE PROGRAM WORKS

The Community Science program is dedicated to actively involving our communities in hands-on efforts to protect and preserve our lakes. The program strives to enhance local residents' understanding of their lakes and the essential role everyone plays in safeguarding their waters by involving them in meaningful, science-based activities. Volunteers receive the training and tools needed to collect water samples, record data, and share observations during their monthly sampling activities.

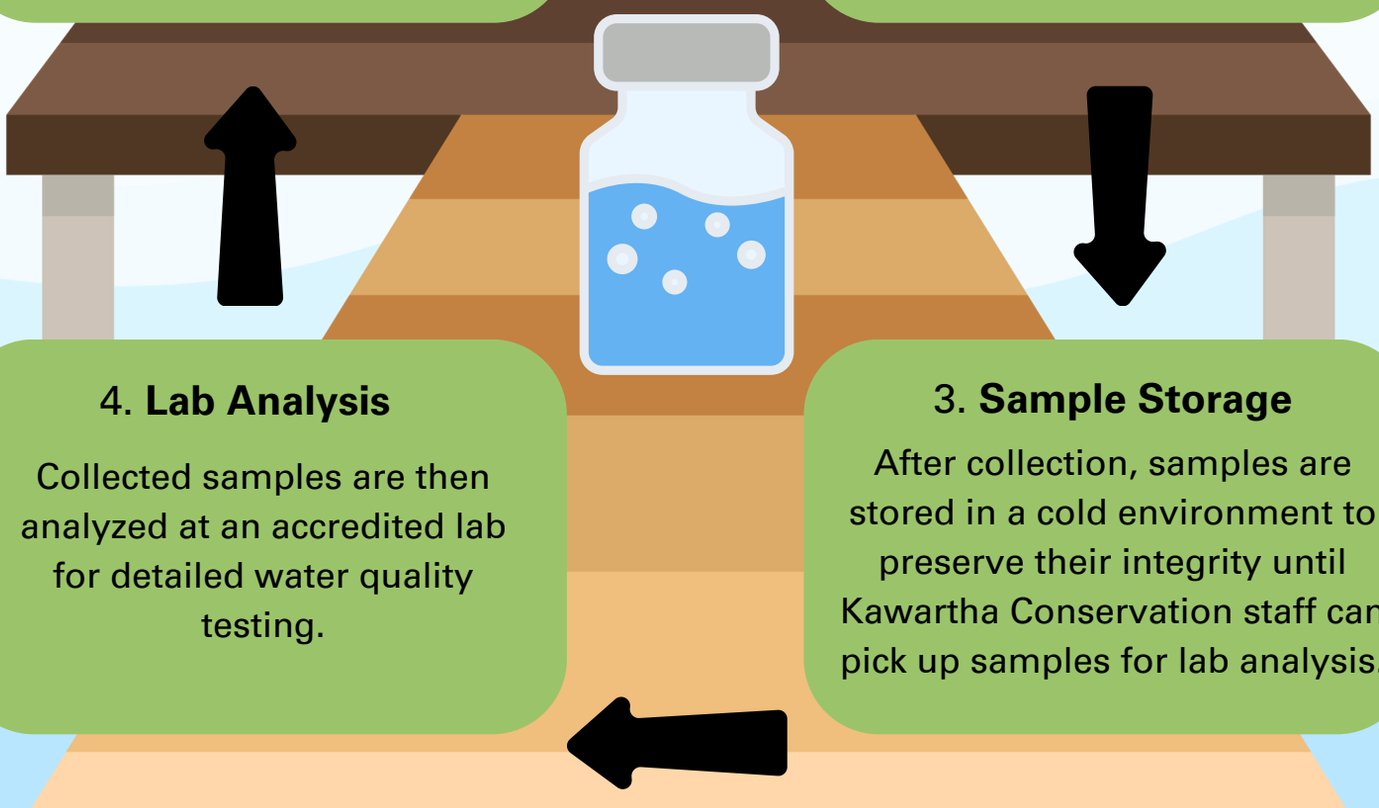
WATER SAMPLING PROCESS

1. **Program Overview**

Volunteers begin with a comprehensive overview of the program, receive training, and learn about the significance of nearshore water sampling

2. **Collecting Water Samples**

Volunteers then collect monthly water samples from designated nearshore locations, following guidelines to ensure consistency and accuracy.



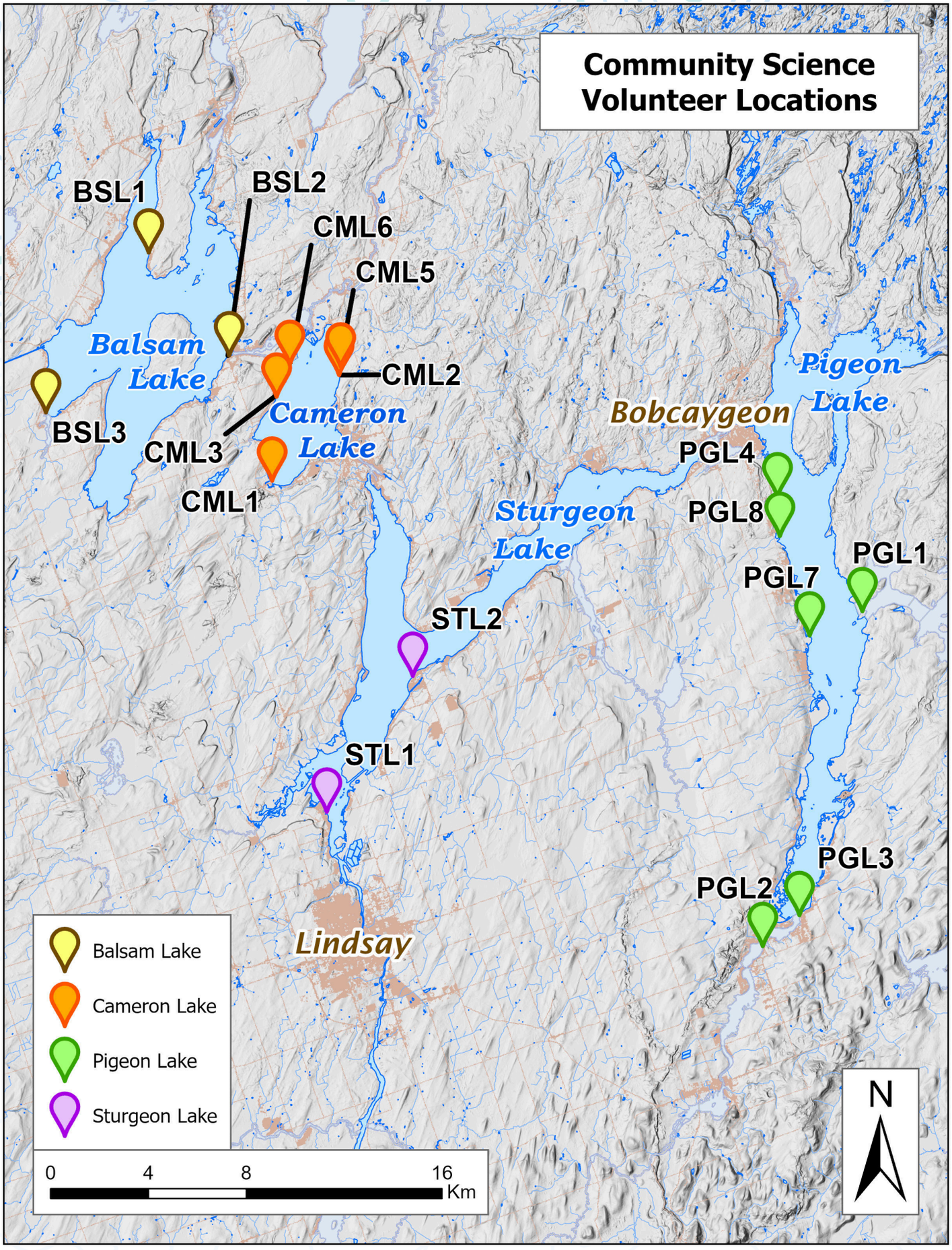
3. **Sample Storage**

After collection, samples are stored in a cold environment to preserve their integrity until Kawartha Conservation staff can pick up samples for lab analysis.

4. **Lab Analysis**

Collected samples are then analyzed at an accredited lab for detailed water quality testing.

STUDY AREA


Community Science Volunteer Locations
BSL1
BSL2
CML6
CML5
CML2
CML3
CML1
BSL3
Balsam Lake
Cameron Lake
Bobcaygeon
Pigeon Lake
PGL4
PGL8
PGL1
PGL7
Sturgeon Lake
STL2
STL1
PGL3
PGL2
Lindsay
Balsam Lake
Cameron Lake
Pigeon Lake
Sturgeon Lake
0
4
8
16
Km
N

UNDERSTANDING WATER QUALITY

The Community Science Program utilizes a variety of water quality parameters to monitor and summarize lake health effectively. Nearshore water samples are analyzed for Escherichia coli (E.coli), phosphorus, nitrate, and chloride. Water temperature and conductivity are also recorded using a water quality meter.

Phosphorus

Phosphorus is an essential nutrient for plant and animal growth. However, higher phosphorus levels in water can lead to fast and uncontrollable growth of aquatic plants and algae.

Chloride

Chloride is typically abundant in seawater (oceans and seas). Freshwater systems like rivers and lakes have low amounts of chloride. This means that fish and wildlife have naturally evolved in this region to live in lower chloride conditions and are more sensitive to big inputs of chloride.

Nitrate

Nitrate is a type of nitrogen compound commonly found in water, soil, and plants. Similar to phosphorus, nitrogen is an essential nutrient, but too much can cause uncontrollable growth of aquatic plants and algae.

E.coli

The bacteria *Escherichia coli* (E. coli) is used as a fecal contamination indicator, as it is only found in the gut of warm-bodied animals (cows, birds, humans). High levels of E. coli can result in a higher risk of waterborne illnesses.

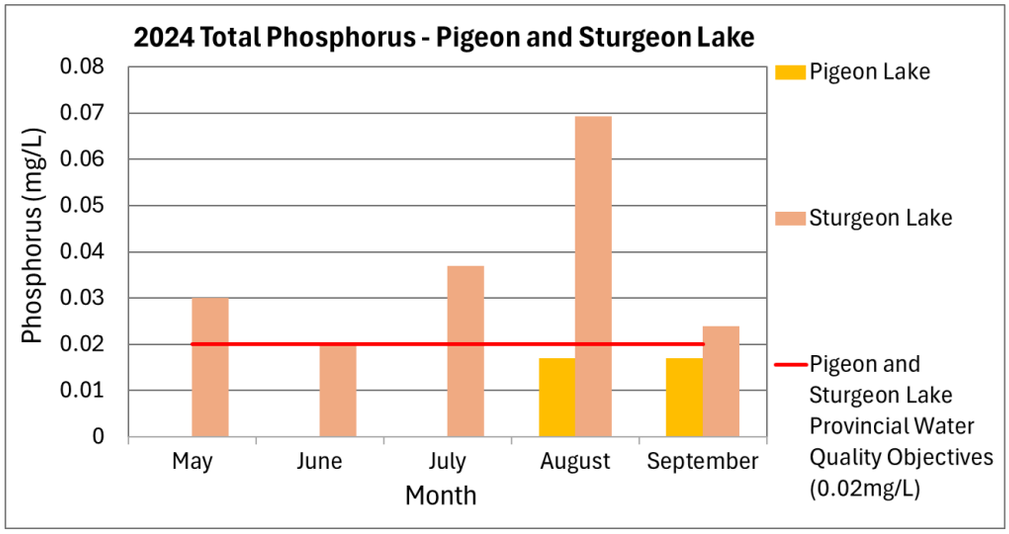
Water Temperature and Conductivity

Water temperature and conductivity are important aspects of water quality. Temperature affects the survival and behavior of aquatic organisms and influences the amount of dissolved oxygen in the water. Conductivity measures the water's ability to conduct electricity, which reflects the levels of dissolved salts and minerals in the water.

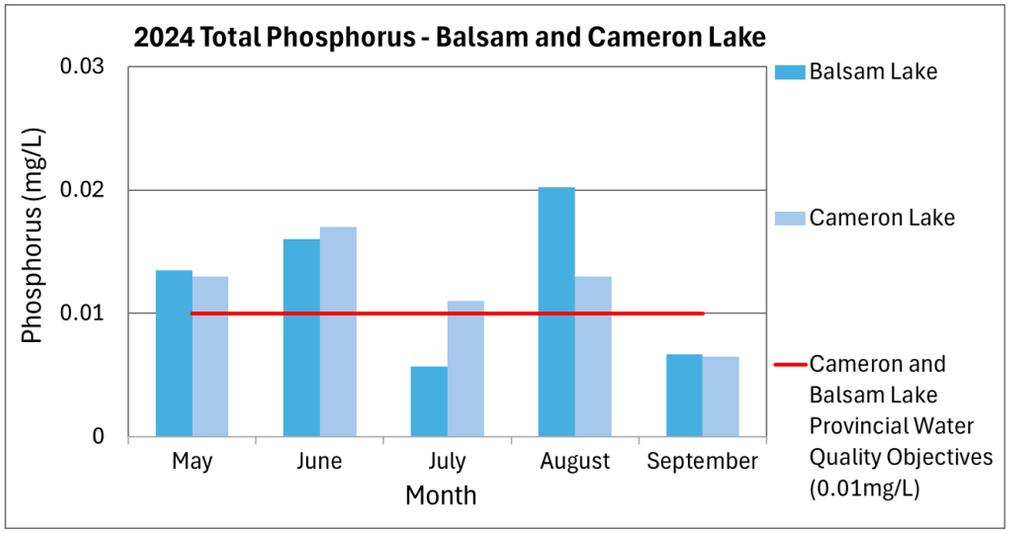
WATER QUALITY RESULTS

Phosphorus

Monitoring phosphorus in nearshore areas of lakes is important as these regions are highly sensitive to nutrient inputs from surrounding land uses. Elevated phosphorus levels in these areas can lead to rapid and uncontrolled growth of algae and aquatic plants. Algal blooms can reduce water clarity, limit sunlight penetration, and also create low-oxygen environments. This can result in reduced water quality, while also negatively affecting recreational activities like fishing and swimming.



Assessing early summer phosphorus levels at Pigeon Lake was challenging due to a lack of volunteers. Sturgeon Lake, Balsam Lake, and Cameron Lake showed to have higher phosphorus levels during these summer months, often exceeding Provincial Water Quality Guidelines.

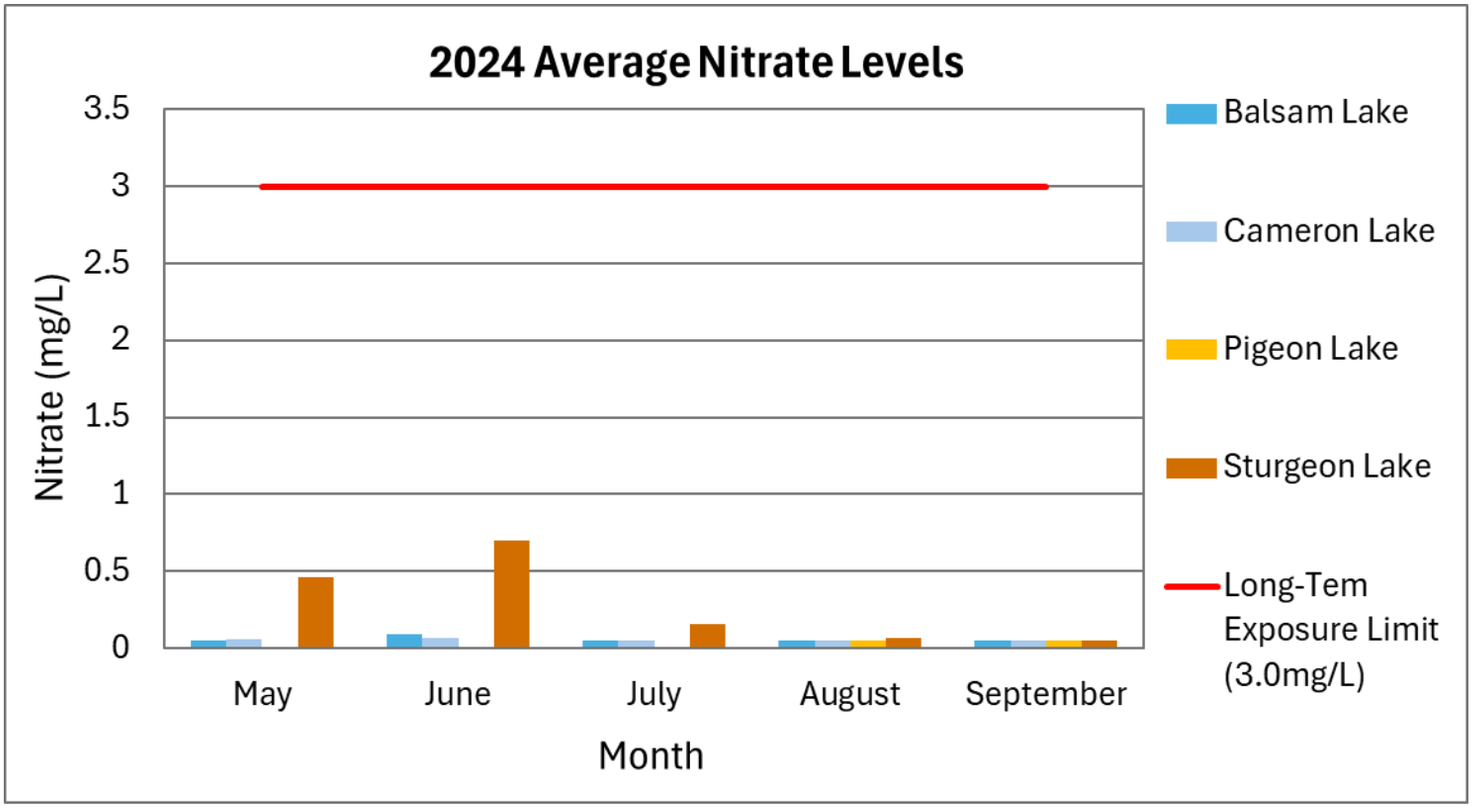


To address phosphorus runoff in these lakes, it's crucial to minimize fertilizer use and preserve natural shoreline vegetation. This will help maintain a healthy shoreline ecosystem and will provide the right habitat for aquatic life to thrive.

WATER QUALITY RESULTS

Nitrate

Assessing nitrate levels in the nearshore areas of lakes is also vital because these regions are particularly vulnerable to nutrient inputs from agricultural runoff and urban development. Elevated nitrate concentrations can lead to excessive growth of aquatic plants and algae, and can also negatively affect aquatic organisms such as fish and benthic invertebrates. Monitoring nitrate levels is essential for identifying early signs of nutrient pollution. By doing so, we can protect water quality and promote the ecological integrity of these vital nearshore habitats.

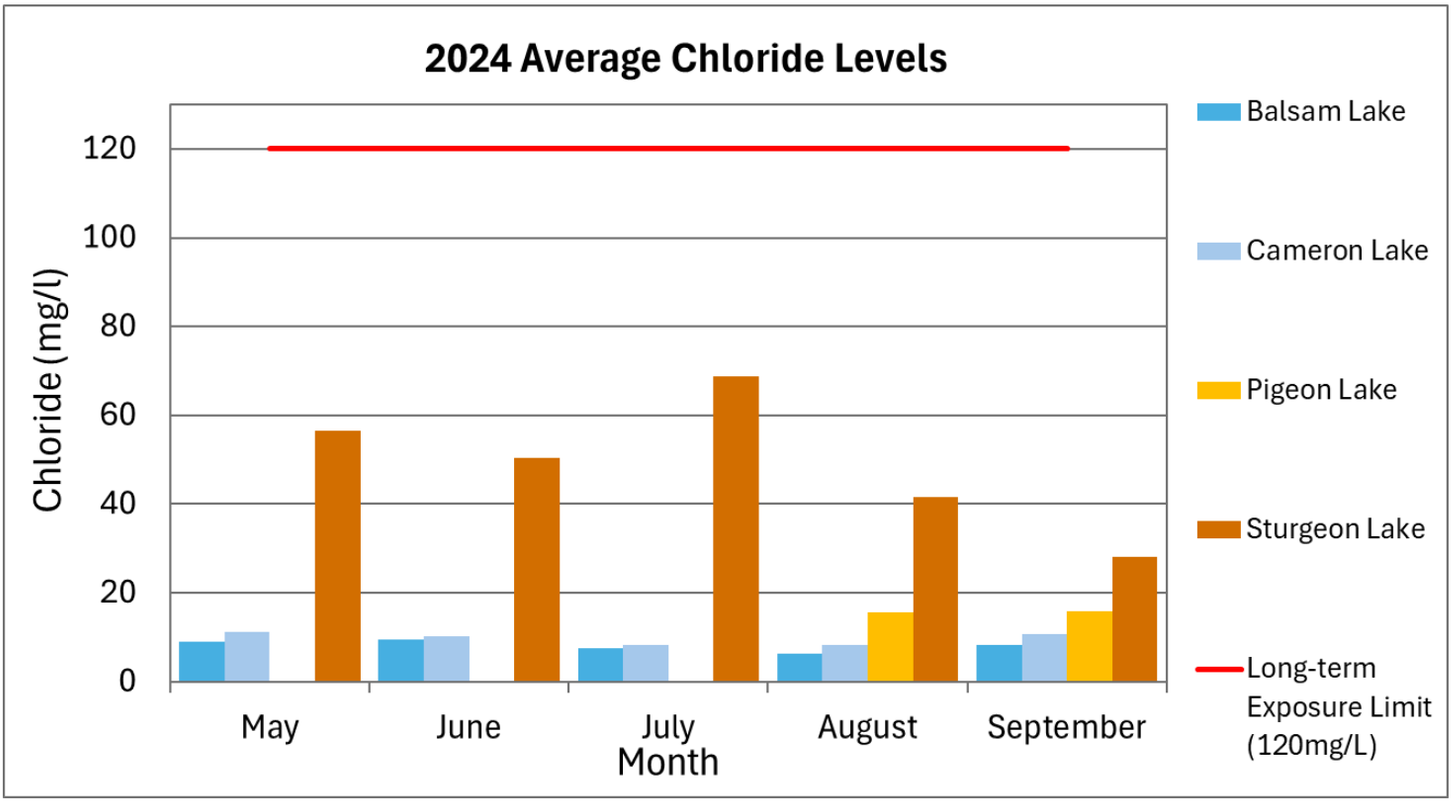


Sturgeon Lake had multiple samples with an average nitrate level above the minimal detection range the lab can detect, with the highest average month being in June at 0.7 mg/L. All four lakes, however, did not have nitrate values above the long-term exposure limit of 3.0 mg/L outlined in the Canadian Water Quality Guidelines for Aquatic Life, which if maintained for a longer period can cause long-term effects on aquatic life. This is great to see as it ensures nearshore habitats are not being overexposed to nitrates.

WATER QUALITY RESULTS

Chloride

Evaluating chloride levels in the nearshore areas of lakes is essential, as these areas are particularly susceptible to inputs from road salts, often in urban areas. Elevated chloride concentrations can negatively impact aquatic organisms in this region, including fish, benthic invertebrates, and amphibians such as frogs and salamanders by harming reproductive success and creating stress due to an irregular balance of salts in their body. Regular testing of chloride levels is essential for identifying waterways that may be at risk of overexposure to road salts. Monitoring changes in chloride levels within streams and lakes is critical to further understanding how it impacts aquatic life and biodiversity.

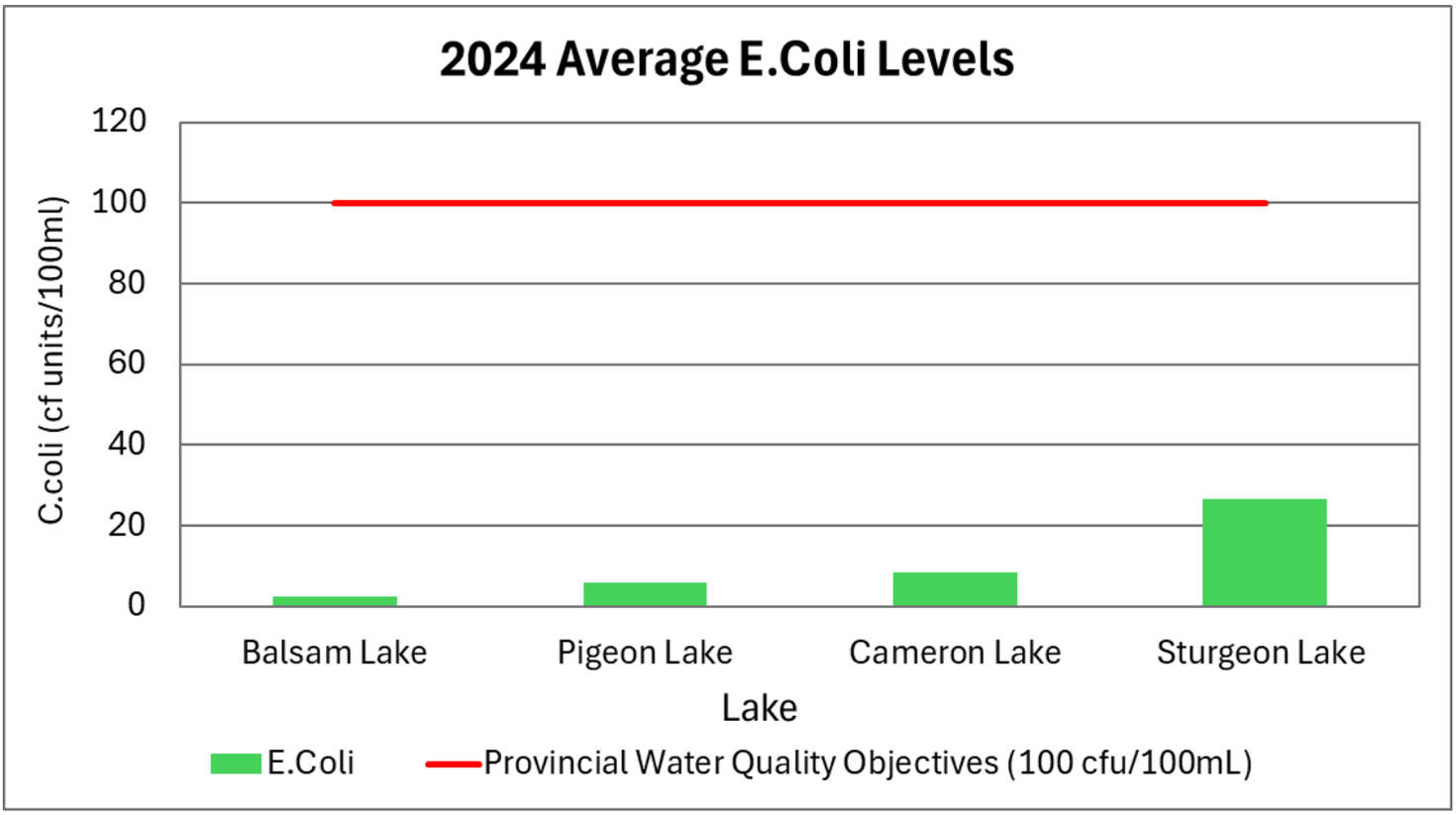


Chloride levels in all four lakes were below the Long-term Exposure Limit of 120 mg/L specified by the Canadian Water Quality Guidelines for Aquatic Life, which is set to protect freshwater organisms from long-term exposure to harmful concentrations of chloride. Sturgeon Lake constantly showed higher levels of chloride than the other 3 lakes, most likely due to the larger amount of runoff containing salts from urban areas and agricultural land uses surrounding Sturgeon Lake.

WATER QUALITY RESULTS

E.Coli

Monitoring Escherichia coli (E.coli) levels has become one of the most important ways of assessing the safety and health of nearshore areas in lakes, as these regions are particularly vulnerable to contamination from urban runoff, agricultural activities, and improperly treated wastewater. E.coli is commonly used as an indicator of fecal contamination as it is naturally present in the intestines of warm-blooded animals, including birds, cows, and humans. Elevated concentrations of E. coli indicate the presence of fecal contamination, which can pose serious health risks to both humans and wildlife.



The levels of E. coli across the four lakes are considerably low when in comparison to the Provincial Water Quality Objectives. Small amounts of E.coli can be from a combination of increased urban and agricultural runoff, higher amounts of wildlife, and aging septic systems. Additionally, larger populations of waterfowl, including ducks, geese, and seagulls commonly observed by volunteers, can contribute to higher amounts of fecal deposits in the water. Low amounts of E.coli is great to see as it indicates there are not any significant long-term inputs entering these lakes.

WHAT CAN WE DO?

Improvements in water quality can be achieved through practical and effective measures that help reduce nutrient inputs into our lakes. These actions can be strategically implemented along shorelines and around properties to maximize their impact. From reducing the use of salts in the winter to implementing low-impact developments (LIDs) aimed at slowing down runoff, communities have the opportunity to help safeguard our lakes within the Kawartha Region. The content below explores practical ways we can implement to reduce nutrients from entering our lakes and help protect our water resources for future generations.

Phosphorus

- Minimize the use of fertilizers for lawns located on waterfront properties.
- Reduce the use of phosphorus-based fertilizers (Super phosphorus, TSP, MAP).
- Plant native plant species to help with the uptake of nutrients (Big blue stem, Buttonbush, Silver maple, White cedar, Swamp aster).

Nitrate

- Create a more naturalized landscape and shoreline by planting native plant species to help uptake nitrates before entering the water.
- Installing a rain garden on your property will help slow down runoff entering into the water.
- Reduce the use of nitrogen-based fertilizers (Urea, Slow Release Nitrogen, Ammonium nitrate).
- Maintain and inspect septic systems located on waterfront properties.

Chloride

- Reduce the use of salts on sidewalks, driveways, and roadways.
- Consider using effective alternatives such as sand and sugar beet juice which can achieve similar results without containing salt.

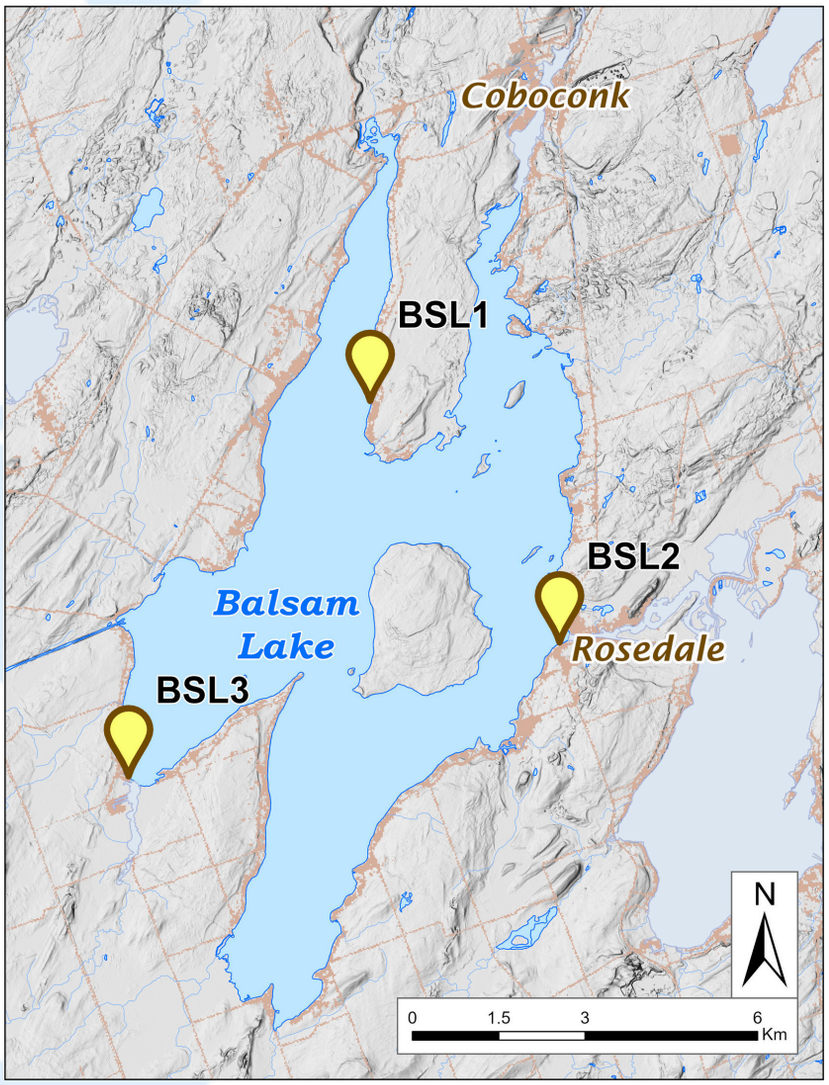
E.Coli

- Regularly inspect, maintain, and upgrade failing septic systems along nearshore properties, and promote the use of advanced septic systems designed to reduce pathogens.
- Reduce wildlife congregation near the shoreline by managing food waste and discouraging the feeding of birds or other animals.

BALSAM LAKE

Balsam Lake is a significantly large lake located in south-central Ontario, and is part of the Trent-Severn Waterway. The lake is primarily fed by the Gull River and supports a diverse ecosystem, hosting various fish species, including small and largemouth bass, walleye, and muskellunge.

Balsam Lakes nearshore water samples showcased that the lake has minimal amounts of chloride, nitrate, and E.coli, with slightly higher amounts of phosphorus. Balsam Lake showed to have lower conductivity and water temperature readings. The lake's overall health is in great condition, with excellent nearshore water quality.



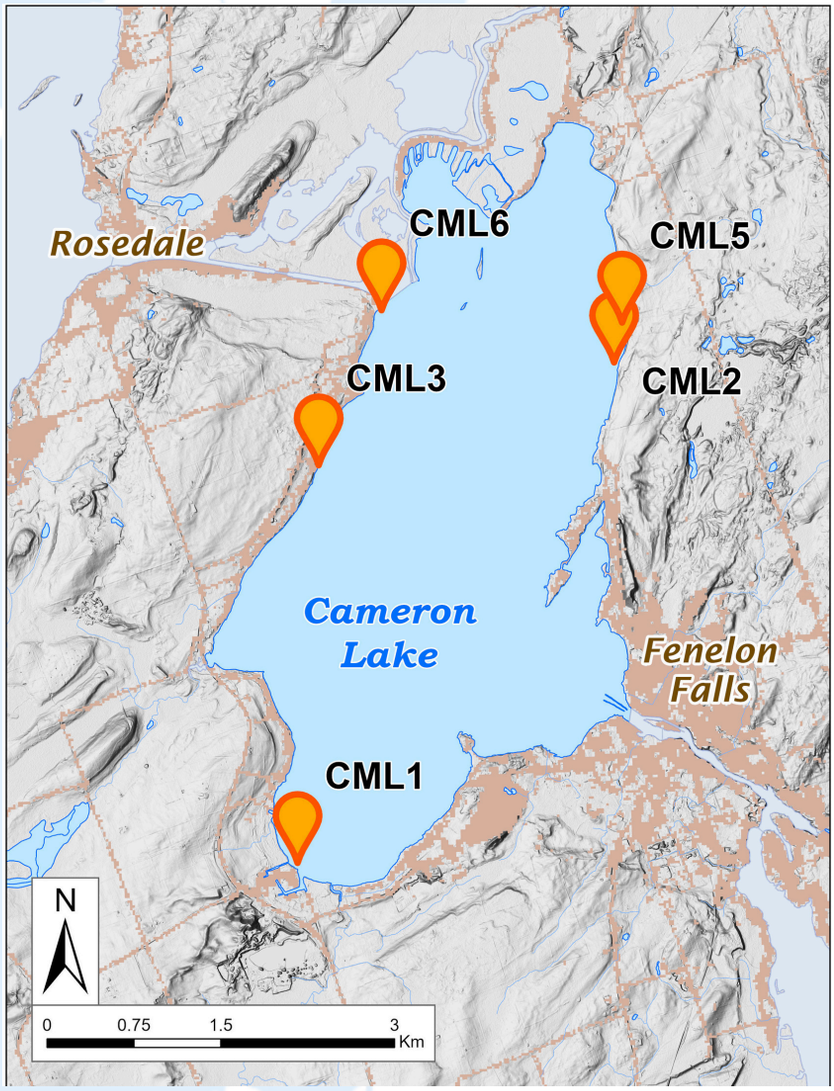
Lake Facts

Average Conductivity	**160 µs/cm**	Lake Area	**48 km²**
Average Water Temperature	**21.9°C**	Watershed Area	**115 km²**
Max Water Temperature	**26.2°C**	Lake Volume	**237 Million cubic meters (m³)**
Total # of Samples	**18**	Lake Depth	**Average depth 4.8m Max depth 14.9m**
		Lake Elevation	**256.3 Meters above sea level (mASL)**

CAMERON LAKE

Cameron Lake is a lake situated in the Kawartha Lakes region, adjacent to Fenelon Falls. The lake is primarily fed by the tributaries of the Burnt River and the outflow water from Balsam Lake, and is also part of the Trent-Severn Waterway system. The lake receives on average 1.4 billion cubic meters (m^3) of water annually, mainly from the Burnt River.

The chloride, nitrate, and E.coli levels were low while showcasing slightly higher levels of total phosphorus. Cameron Lake also had low conductivity and water temperature readings throughout the summer months. Based on our result, Cameron Lake has great lake health and has excellent nearshore water quality conditions.



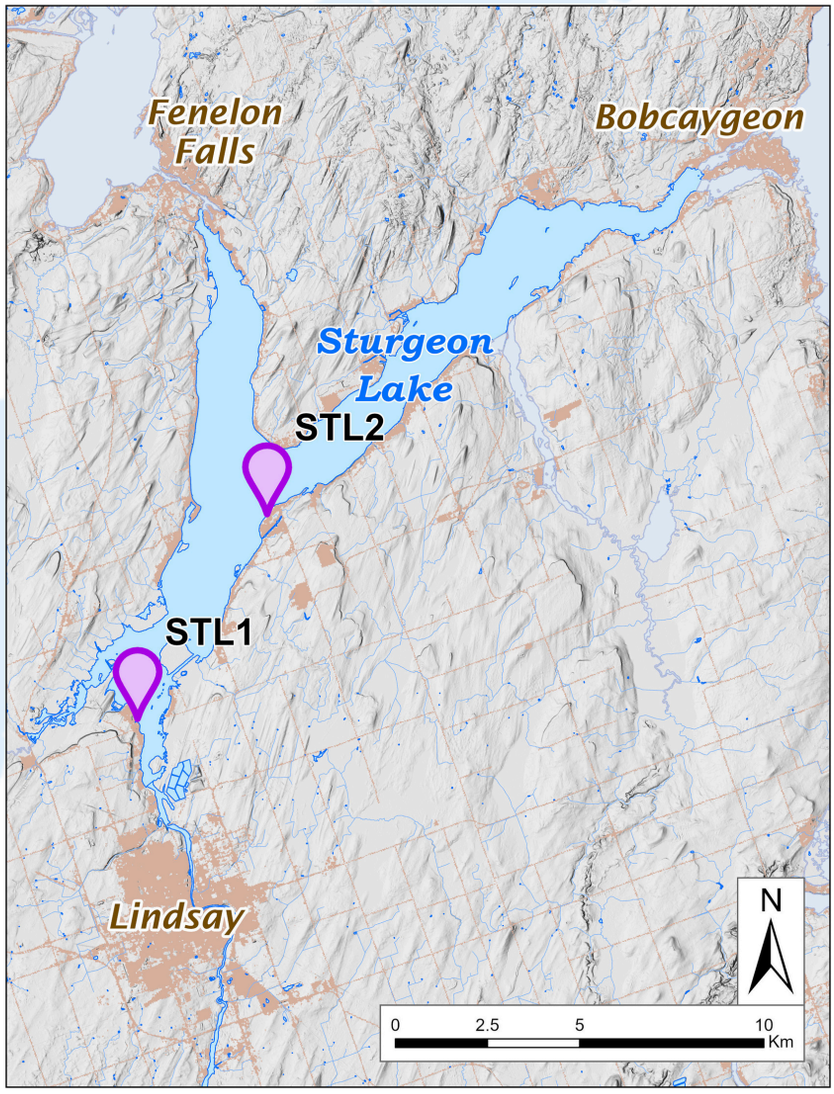
Lake Facts

Average Conductivity	**150 µs/cm**	Lake Area	**15 km²**
Average Water Temperature	**21.2°C**	Watershed Area	**26 km²**
Max Water Temperature	**23.4°C**	Lake Volume	**100 Million cubic meters (m^3)**
Total # of Samples	**17**	Lake Depth	**Average depth 9.3m Max depth 18.2m**
		Lake Elevation	**255 Meters above sea level (mASL)**

STURGEON LAKE

Sturgeon Lake is centered in the City of Kawartha Lakes, located between the towns of Fenelon Falls and Lindsay, while also spanning up to the town of Bobcaygeon. Sturgeon Lake is primarily fed by the Scugog River and Cameron Lake through Fenelon Fall's, and is also a critical part of the Trent-Severn Waterway.

Sturgeon Lake showed to have different results, with slightly higher levels of E.coli, chloride, total phosphorus, and nitrates. The lake's conductivity readings were the highest of the 4 lakes, with nearshore water temperatures being the lowest. Despite these findings, Sturgeon Lake has great nearshore water quality, with the opportunity for improvement.



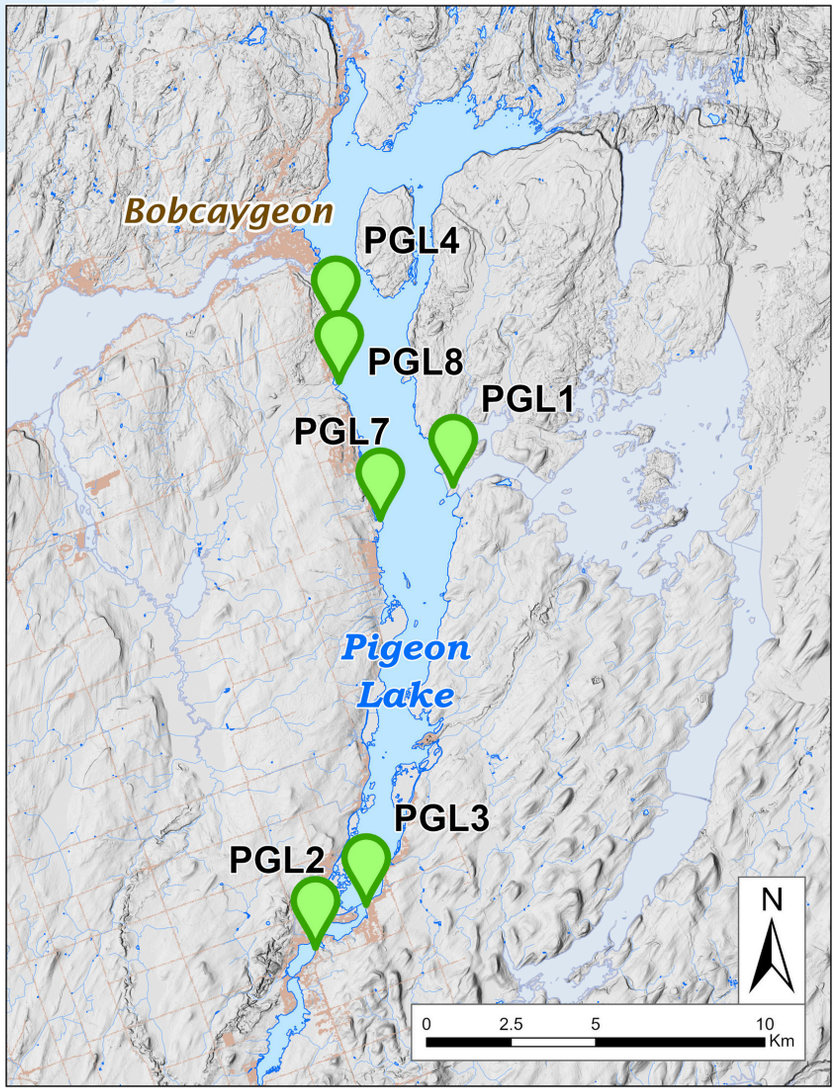
Lake Facts

Average Conductivity	**600 µs/cm**	Lake Area	**47 km²**
Average Water Temperature	**21°C**	Watershed Area	**144 km²**
Max Water Temperature	**22.1°C**	Lake Volume	**163 Million cubic meters (m³)**
Total # of Samples	**11**	Lake Depth	**Average depth 3.5m Max depth 10.6m**
		Lake Elevation	**247.7 Meters above sea level (mASL)**

PIGEON LAKE

Pigeon Lake is located on the east side of the City of Kawartha Lakes, with part of the lake located in the Municipality of Trent Lakes, and sections within the Otonabee Region. It lies between the communities of Bobcaygeon and Omemee and is fed primarily by Sturgeon Lake through the big and little Bobcaygeon Channel, making it a critical component of the Trent-Severn Waterway system.

Results highlighted low levels of E.coli, total phosphorus, chloride, and nitrates. Conductivity readings were slightly lower then Sturgeon Lake with water temperature readings also being considerably low throughout the summer. Overall, Pigeon Lake has great nearshore water quality.



Lake Facts

Average Conductivity	**400 µs/cm**	Lake Area	**57 km²**
Average Water Temperature	**21.5°C**	Watershed Area	**91 km²**
Max Water Temperature	**24°C**	Lake Volume	**189 Million cubic meters (m³)**
Total # of Samples	**20**	Lake Depth	**Average depth 3.3m Max depth 13.5m**
		Lake Elevation	**247 Meters above sea level (mASL)**

COMMUNITY SUCSESS

The Power of Volunteers

The Community Science program has allowed us to achieve a wider study area for tracking nearshore water quality in the Kawartha Lakes. Their efforts provide additional insight into the current state of our waters. In addition to our volunteers, the program was significantly supported by the **Kawartha Lakes Stewards Association** (KLSA) and the **Mississaugas of Scugog Island First Nation** (MSFIN) who provided us with funding to expand our program.

Acknowledgements

We would like to extend a much-appreciated thank you to all our 2024 volunteers who participated in the Community Science Monitoring program on Balsam, Cameron, Sturgeon, and Pigeon Lake. In addition to the volunteers, we also want to thank the Kawartha Lake Stewards Association and the Mississaugas of Scugog Island First Nations (MSIFN) for providing a financial contribution to the program.

References

Ontario Ministry of Environment and Energy. (1994). Water Management: Policies, Guidelines, Provincial Water Quality Objectives. Toronto, Ontario. Retrieved from https://www.ontario.ca/page/water-management-policies-guidelines-provincial-water-quality-objectives#section-11

Canadian Council of Ministers of the Environment. (n.d.). Chloride: Canadian Water Quality Guidelines for the Protection of Aquatic Life. Retrieved from https://ccme.ca/en/res/chloride-en-canadian-water-quality-guidelines-for-the-protection-of-aquatic-life.pdf

WANT TO BECOME A CITIZEN SCIENTIST?

Join the Community Science Program and help make a real difference in preserving the lakes we love. With minimal effort and full support from Kawartha Conservation, you can play a key role in monitoring nearshore water conditions and contributing to the health of our local ecosystems. No experience is necessary – just a passion for the environment and a desire to make a positive impact. Sign up today and be part of a growing community of Citizen Scientists working to protect our water for future generations!

Learn More at: https://www.kawarthaconservation.com/learn-and-get-involved/citizen-science/

KAWARTHA CONSERVATION
Discover · Protect · Restore

Contact Us

Phone: 705-328-2271 Ext. 235
Email: nrajevski@KawarthaConservation.com
Online: https://www.kawarthaconservation.com/