Leonard Lake Water Team Summary and Review of Activities in 2023

2024 Team Members

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- Esther Giesbrecht
- Betty Isbister
- Laurence Jay
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Purpose of the Water Team

- Investigate Water Quality Issues.
 - Respond to sightings of unusual water appearance.
 - Contact the Ministry if Blooms are found.
 - Monitor the blooms.
 - Study various parameters related to water quality.
- Provide Stakeholders with timely information about water quality issues.
- Advocate for better management for Lake Health.

How is Water Testing Done?

- About every 2 weeks water samples are collected at several 4 shoreline sites, and at buoys at the 3 deep sites on the lake: the South Bay, Mid Lake, and the North Deep Hole. Some of these sites are also sampled by the Province and the District.
- We also record data at each sampling site.
- The water samples may be tested by us, or sent to a lab for testing.

Equipment used

Secchi Disk: Used to measure the clarity of the water.

Depth Finder



Equipment Used

Composite Sampler: Takes a sample of the water column from the surface to a specific depth.



Van Dorn horizontal sampler: Takes a discrete water sample at a specific depth



Equipment Used

Fluorometer: Measures algae pigments: Chlorophyll and Phycocyanin



Sonde, with sensor for Temperature, Dissolved Oxygen, Conductivity



Fluorometer

- Measures 2 pigments:
- Chlorophyll: tells us the amount of total algae in the water,
- Phycocyanin indicates how much of that algae is Cyanobacteria. This will be elevated if a bloom is present.
- These results can be available in 24 hours.

Bloom Profile



Eyes-on-the-Lake Program

Visual sightings reported by cottagers are a vital component to further investigations by the Water Team. If the Fluorometer readings are elevated, the sample can be further evaluated under a microscope.





A Sonde Profile -- Temperature

NDH Temp. 2022



A Sonde Profile – Dissolved Oxygen



Sonde 2024 Temperature and Dissolved Oxygen



Why is lack of oxygen near the sediment important information?

- Under low oxygen conditions (anoxia), some compounds are released from the sediment into the lake: Iron, Phosphorus, (likely others such as Manganese).
- These released substances can supply cyanobacteria with the nutrients needed to form blooms.
- We need to determine when and where anoxia occurs, the extent and duration, and whether it varies from year to year.

Some of our Findings in 2023

• Please refer to the LLSA website for more detailed information: "Summary of Testing in 2023"

• No blooms were documented.

We noted that the water temperature in August was lower than in previous years, but don't know if this was a factor, or if other conditions contributed to the lack of blooms.



• Internal Loading:

We again documented the release of large amounts of **reduced iron** near the sediment in late summer. Whereas Iron at the surface was less than 50 ug/L, the concentration in Sept, near the bottom in South Bay was 8512 ug/L and at the NDH was 1252 ug/L. Elevated levels of **dissolved phosphorus** were also found, up to 4 times the amount measured at the surface.

Additional compounds will be measured this summer.

• We attempted to find the source of Cyanobacteria:

Water was sampled near the sediment in South Bay 4 times between the end of July and end of Sept. No **Dolichospermum lemmermannii** were seen; however they **were** seen at this location the previous year.

• We attempted to study the extent of anoxia in South Bay by mapping the geographical area.

The limited availability of instrumentation in 2023 meant that this exercise will continue this summer.

- Benthic testing: Leonard Lake Volunteers assisted District Representative Maggie Dechert, to count and identify zooplankton ("any tiny things that move") from shoreline gravel samples. Maggie believes that "the results indicate a decline in lake health, and that is the overall trend being seen in many lakes in Muskoka."
- **Run-off sites**: 13 RO sites were sampled in April (soon after the snow melted), and these samples were analyzed for **chloride**. (This is a reliable measure for the effects of road salt use.)

- Chloride levels matched the previous Spring and Fall results: 3 run-off sites near highway 118 West (around the boat launch area) deliver significant amounts of salt to Leonard Lake, some up to 15 times the level found in the lake.
- Our lake salt level could soon **adversely affect** Daphnia, the zooplankton that graze on algae. There is a concerted effort being made to reduce the amount of salt used on highways in the area.

Research and Consultations:

- Rebecca Gasman, a PhD student from York U. is completing her research on Leonard Lake; we do not yet have access to the data she gathered.
- Dr. Mark Vorshoor's report from research carried out in 2022 can now be found on the LLSA website.
- The District's final report of the Causation Study is also available on the website.
- Dr. Norman Yan has encouraged us to continue studying specific areas of the lake; and, to study water currents which may explain why blooms tend to be found in the same areas.

Progress and Changes:

• Road Salt Usage Down Across Muskoka (Matt Driscoll, South Muskoka Doppler, May 21, 2024)

A number of factors appear to have come together to reduce the amount of salt used on local roads throughout the winter months.

• District Water Quality Monitoring Program:

Staff will review the results of the Hutchison Environmental Sciences Ltd. Water Quality report and bring updated policy and programs forward in 2024 for implementation in 2025 to help address issues pertaining to water quality testing in the District.

Water Team Plan 2024

- Eyes on the Lake
- Monitoring of shoreline areas to continue where blooms have occurred in past years.
- Monitoring of deep sites, especially South Bay, to better understand oxygen depletion and internal loading. The new Sonde (ProSolo) will be a vital asset for this study.
- Continued study of lake water currents which could help us understand why algae blooms tend to recur in specific areas.
- Monitoring of chloride levels in run-off water entering Leonard Lake.
- Ongoing water testing as part of our participation in the Muskoka Watershed Council Algae Project and the Lake Partner Program.

THANK YOU

- Thank you for your encouragement and support for the Water Quality Team and our initiatives to study and monitor the water in our lake.
- Thank you for your patience and tolerance of the buoys anchored in 3 areas; they make our sampling easier.
- Thank you for your generous financial support which allows us to obtain important new equipment; we'll put it to good use!

Recent Bloom Sighting – July 6, 2024

• Update from Bill Heatlie









Drinking Water Considerations

The safety of drinking water is regulated by the Federal and Provincial levels of Government, Public Health authorities, and Municipalities.

For example, Simcoe Muskoka District Health Unit (SMDHU) has authority to detect, identify, and respond to drinking water contaminants and illnesses. Safe water includes the testing of drinking water, beaches and recreational water facilities, and blue-green algae tracking and public health impact.

Visit the SMDHU website for additional information:

https://www.simcoemuskokahealth.org/topics/SafeWater

Testing Drinking Water

The SMDHU website provides additional information such as obtaining test bottles, collecting water samples, and the location of Public Health Laboratories for water sample drop-off.

- Public Health Laboratories (e.g. Orillia, Huntsville, Gravenhurst) test for bacteria.
- Private Labs (some provided on website) will test for other contaminants such as chemicals and minerals.

Information regarding drinking water testing will be added to the LLSA website <u>www.leonardlake.net</u>