

Sherbrooke Lake's 2018 Water Quality Report

Sherbrooke Lake is the largest waterbody in the LaHave River watershed. It covers 16.94 km², has a drainage basin of 285 km², and is fed by 14 inlet streams. Sherbrooke Lake's drainage basin is used for forestry, silviculture, and agriculture, with cottage development and rural communities concentrated around the lake.

Sherbrooke Lake Sampling

A group of trained volunteers, comprised of property-owners around the lake, take field measurements and water samples each month, from May-October. Water samples are collected from lake and stream sites and tested for total suspended solids, total nitrogen, total phosphorus, fecal coliform, hydrocarbons, and chlorophyll A. Four streams are monitored bimonthly, while seven streams around the lake are tested after a large rain event to monitor for water quality changes related to high runoff events. Bottom sediment samples are also collected at two lake sites and one river site, to assess the long-term accumulation of nutrients and metals which can also influence the lake's water chemistry.

How is Sherbrooke Lake's Water Quality?

Bacteria : All lake sites are consistently below Health Canada's 400 CFU/100 mL recreational limits for fecal coliform – the highest lake concentration was 20 CFU/100 mL, well below the threshold. All streams have also never exceeded Health Canada guidelines; however, bacteria concentrations did rise close to the threshold after rainfall events (350 CFU/100 mL was recorded at Butler Lake Brook, and 320 CFU/100 mL at Zwicker Brook, both after more than 30mm of rain). It appears rain is flushing bacteria into rivers from surrounding surfaces. Although it does not appear to affect the lake quality, **swimming in rivers after a rainfall event should be avoided**. Water from the lake and the rivers should always be treated prior to consumption (i.e. bathing, washing, drinking).

Algal Blooms : Algal blooms are a part of the natural cycle in lakes but can be enhanced in size and frequency if there are pollution sources adding extra nutrients into the environment. In balanced environments, algae and other organisms' growth is limited by the amount of nutrients available; however, if nutrients become available (both naturally through fall and spring turnover and sediment resuspension of nutrients, or human-caused pollution), algae can spread. Not all plumes are algae (pollen from pine trees can form films in the water), and not all algae are toxic; however, only a water quality test can confirm the presence/absence of toxic algae species. No algal bloom was detected in Sherbrooke Lake during 2018; however, there is always the possibility for blooms in the future.

Sherbrooke Lake Stewardship

Monitoring of Sherbrooke Lake is led by the Sherbrooke Lake Stewardship Committee, a group comprised of five citizen representatives appointed by the Municipality of Chester, and the Municipality of the District of Lunenburg. The group receives technical support from Coastal Action, which is also leading the related LaHave River watershed study which includes monitoring of water quality at one tributary to the lake and downstream of the lake's output since 2007. In 2018, the cost of the Sherbrooke Lake water quality survey was \$22,000.00, primarily for laboratory analyses of the water samples. Both municipalities share this funding in support of the program to provide public access to Sherbrooke Lake.

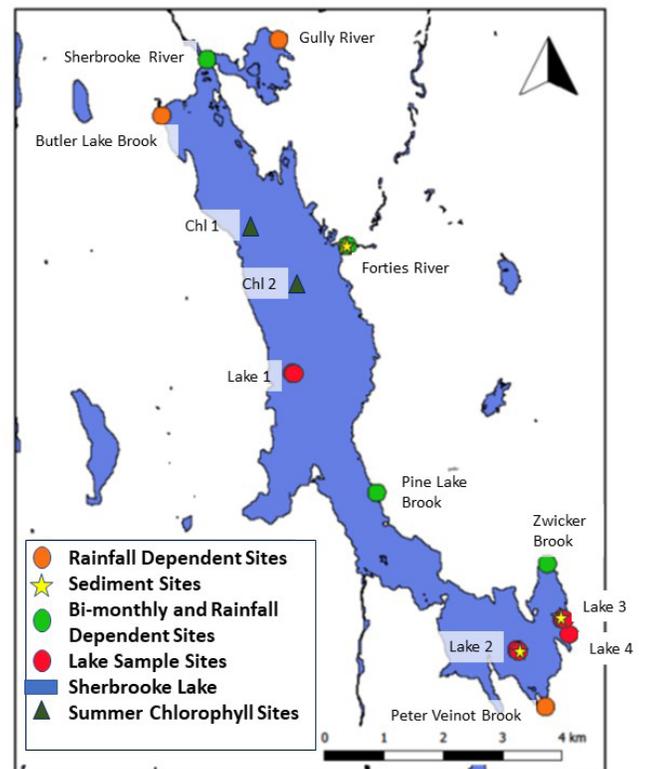


Figure 1: Sampling sites for the 2018 Sherbrooke Lake water quality program.

Nutrients : The tributaries feeding Sherbrooke Lake have higher nutrient concentrations than the lake; however, rainfall sampling observed the highest peaks of nutrients, suggesting nutrients and fertilizers are flushed off land and into the water during storms. Currently Sherbrooke lake's nutrient status is at the low end for freshwater lakes. This is encouraging news, but only through continued vigilance will that situation continue in the face of increasing development and alteration of the lake shoreline and watershed. Nutrient inputs from human activities should be minimized as much as possible.

Hydrocarbons : Throughout the entire 2018 program, no site has had detectable concentrations of hydrocarbons (carbon compounds found in petroleum and natural gas).

Other Concerns : Two other conditions in the lake are of concern: first, the low oxygen conditions that occur in deep bottom waters during the summer and the implications this holds for organisms and potential nutrient re-release from bottom sediments and second, the elevated levels of mercury, arsenic, cadmium, and lead in lake sediments and the implications for uptake by aquatic biota, including fish.

Overall the 2018 sampling program indicated that Sherbrooke lake is healthy but shows that human activity has already impacted the lake. The current lake water quality remains vulnerable to the addition of nutrients and fecal bacteria from its tributaries and increased shoreline development and use. A more detailed report on the 2018 sampling program is available upon request from the Municipality of Chester and the Municipality of the District of Lunenburg.



Figure 2: A bloom of cyanobacteria in Quai du Wault, France. Picture by Lamiot, September 2009. https://commons.wikimedia.org/wiki/File:CyanobacteriaLamiot2009_07_26_290.jpg

How Can You Help?

To help protect the Sherbrooke Lake, and all other water bodies, it is important to remember that you have an impact on the environment!

To Reduce Nutrients and Algal Blooms: When mowing your lawn, or harvesting crops, leave a buffer zone (known as a 'riparian zone') along the edge of all waterbodies. This zone will help protect the water against erosion, and filter runoff pollutants and excess nutrients! Be mindful when buying dish soaps – some contain phosphorus which can promote algal blooms. Do not fertilize your lawns, as those nutrients will be washed into nearby streams and into Sherbrooke Lake. **If an algal bloom occurs, inform your homeowners association president so the situation can be assessed;** remember, if toxic algae are present, their toxins can last several weeks after the bloom disappears, so be careful around the water and rinse off after contact (including pets!).

To Reduce Fecal Bacteria: No one should discharge their sewage or grey water through a straight pipe to the lake or its tributaries. A properly designed and maintained septic tank or approved composting system are the only effective ways which can properly treat domestic waste (See Nova Scotia Environment for further information). Maintain and pump your septic system regularly, keep livestock out of the water by providing them with alternative watering sources, and pick up your dog's waste.

To Reduce Hydrocarbons: Don't let your boat's motor idle – turn it off when not in use. Be cautious with fuels and chemicals used around the house, car, and boat; be careful not to spill, and to clean up and dispose of waste properly if a spill occurs.



Figure 4: A secchi disk, which is used by Sherbrooke Lake volunteers to determine the clarity of the water.



Figure 3: A YSI sonde with built-in sensors used by Sherbrooke Lake volunteers to monitor the physical properties of the water.



Coastal Action is a community-based charitable organization with a mandate to address environmental concerns along the South Shore of Nova Scotia. Coastal Action's mission is to restore and protect the environment through research, education, and action.