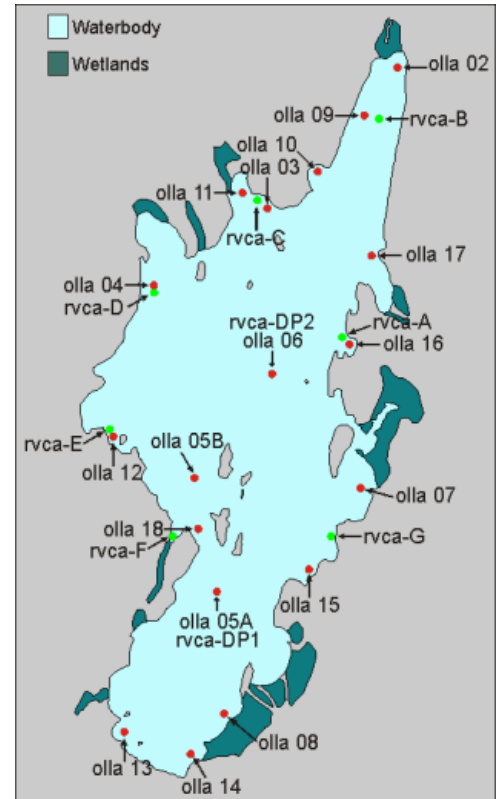


Lake Steward's Report - 2017

Water quality testing is an important diagnostic tool to help residents of Otter Lake determine the health of the lake. We need early warnings to predict important changes in the lake's ecological process. By systematic testing and monitoring over time, it is possible to evaluate if water quality is improving or declining. By selective testing at strategic sites, water quality indicators can help determine the source or cause of contamination. The ecological and trophic status of a lake is generally determined by the levels of nutrients it contains.

As in previous years OLLA was fortunate to have the assistance of the Rideau Valley Conservation Authority (RVCA) in testing the water quality of Otter Lake. Thanks are due to Sarah MacLeod, Kaitlin Brady and their qualified team of technologists for allowing us to include their data in this report. Both RVCA and OLLA test at least 3 times per year but at different sites. The map on the right indicates the location of all the current OLLA and RVCA test sites. These sites have been chosen to be representative of the whole lake. Sites 05A, 05B and 06 represent the 3 deepest water sites (more than 90ft). Sites 04, 07, 08, 11 and 18 are in areas where there are known inflows from streams and wetlands into the lake. Other sites are in shallow bays where there is an increased tendency for weed and algae growth.



NUTRIENTS & BACTERIA

Recreational water quality can often be expressed in terms of how clear the water appears. Water clarity is influenced by the amount of soil sediment and phytoplankton, or microscopic algae, present in the water. Clarity is measured by a simple visual test using a Secchi Disk, a 20 centimeter black and white disk attached to a measured line. The disk is then lowered into the lake until it is no longer visible and the depth recorded. Additional information on water quality is gained through analysis of samples for nutrients, specifically phosphorus and nitrogen, which gives an indication of how much nutrient and energy is available for the growth of algae and aquatic plants

Nitrogen in various forms is an abundant and essential nutrient in aquatic ecosystems. In addition to fertilizers, agricultural waste and wastewater contribute nitrogen into lakes. In large amounts, ammonia and nitrates can be toxic to aquatic organisms. Total Kjeldahl Nitrogen (TKN) which is what we and

RVCA measure, determines the concentration of all forms of nitrogen in the lake. While there are no precise guidelines for acceptable levels of TKN, according to RVCA, TKN in water bodies not influenced by excessive organic inputs such as Otter Lake typically range from 100 to 500 µg/L.

Phosphorous is generally recognized as the limiting nutrient in freshwater ecosystems and the major nutrient contributing to eutrophication in lakes. Since phosphorous is the principal source of energy for all living organisms the amount of phosphorous in the environment will determine how fast an organism grows and proliferates. Phosphorus is therefore the principal limiting factor in the growth of algae, meaning that algae growth will occur in greater amounts as more phosphorus is added to a lake. Most of the phosphorous that enters a septic system from phosphorous containing detergents will emerge intact, enter the water table and eventually the lake. Phosphorus levels below 5 µg/L are typical of oligotrophic lakes that generally are clear and deep with few nutrients. Such lakes are typically found in the northern regions of Ontario. Phosphorous levels above 20 µg/L are typical of eutrophic lakes that are laden with nutrients which lead to excessive algae and plant growth. Mesotrophic lakes have phosphorous concentrations between these two extremes and are typical of the lakes found in our region of Ontario

Bacteria are present in all lakes, they will be found in the faeces of the wildlife (fish, waterfowl, beavers, etc.) that inhabit the lake. Coliforms are bacteria found in the large intestine of humans and other mammals and are usually present in soil. While some strains of coliforms do produce toxins, most are not harmful to humans. Some such as Escherichia coli (E. Coli) do produce pathogenic toxins. Therefore levels of E. Coli are often used as indicators of possible contamination by fecal matter. Thus high E. Coli levels in lakes or rivers can be an indication of septic pollution. The recommended safety level of E. Coli in a lake for recreational safety is not more than 100 colony-forming units (cfu) per 100ml of water. E.coli at any level is unacceptable for drinking water, therefore some form of treatment and purification is necessary for anyone who draws water from the lake for drinking purposes.

RESULTS FOR 2017

The results of water testing in 2017 are shown on the left. They indicate that

the trend seen in 2016 is continuing despite the higher than normal water levels that resulted from our very wet Spring and Summer last year. Low levels

| WATER QUALITY DATA - 2017 | | | | | | | | | | | | | | | |
|---------------------------|----------|----------------------|-----|-----|--------------------------------|-----|-----|-----|--------------------------|-----|-----|-----|----------------------|------|-----|
| RVCA ID | OLLA ID | E. Coli (cfu/100 ml) | | | Total Kjeldahl nitrogen (µg/l) | | | | Total Phosphorous (µg/l) | | | | Secchi Disk (meters) | | |
| | | May | Jul | Aug | May | Jul | Aug | Oct | May | Jul | Aug | Oct | May | Aug | Oct |
| RVL-26C | OLLA 03 | | 2 | 2 | | 490 | 460 | | | 8 | 77 | | | | |
| RVL-26DP1 | OLLA 05A | | | | 350 | 330 | 490 | 300 | 7 | 7 | 10 | 7 | 6.50 | 5.00 | 7.0 |
| RVL-26DP3 | OLLA 06 | | | | 410 | 310 | 480 | 300 | 8 | 6 | 12 | 7 | 6.00 | 5.50 | 7.0 |
| RVL-26B | OLLA 09 | | 4 | 2 | | 360 | 390 | | | 7 | 10 | | | | |
| RVL-26F | OLLA 18 | | 2 | 2 | | 370 | 460 | | | 7 | 18 | | | | |
| Average | | 2.33 | | | 392.86 | | | | 8.77 | | | | 6.17 | | |
| Std. Error | | 0.31 | | | 15.00 | | | | 0.87 | | | | 0.31 | | |

of E. coli were detected at all sites tested, likely the result of increased runoff, however a value of 2 cfu/100ml is the minimum detection limit for E. coli by the testing laboratory and in Ontario public beaches are closed when E. coli levels exceed 100 cfu/100ml

Total Kjeldahl Nitrogen levels were generally in the acceptable range of between 300 - 500 µg/L which is within the acceptable range for a lake such as ours.

Total phosphorous was generally low with the exception of one site (OLLA 03 a shoreline test site between Roads O3 and O4) in August at which a value of 77 µg/L was obtained. This result was not used in the calculation of the average total phosphorous value and this site will be retested in 2018. Secchi depth readings were about 6 metres indicating that the lake remains very clear and as a result there were some significant algae blooms last Summer, especially in September when we had some very hot temperatures.

Doug Franks
Lake Steward

