



State of the Lake Report Fall 2014

The purpose of this document is to summarize the physical, chemical and biological monitoring programs that were conducted on Otty Lake during the April to October period this year and evaluate the health of the overall Otty Lake environment.

Physical Limnology:

The water temperature (measured at a 1 meter depth at the Deep Point in the center of the lake) reached 4C on November 30th 2013 at which time there was ice along the lake shoreline.

We had a very long and cold winter. Ice depths of up to 30 cm were reported last spring. The ice left Otty on April 23rd this year. This is a full week later than 2013 and four weeks later than 2012.

Lake Water Levels

The maximum lake water level at Otty this year was an elevation of 132.28 metres (unofficial) on April 16. This is a record high level based on the observations over the past 30 years. By early August the lake level had dropped 50 cm. Near the end of September the lake level has regained 7 cm for a lake level of 131.85 (unofficial). This is about 20 cm. higher than the average for this time of year, despite the much larger than average flow through Jebbs Creek.

Jebbs Creek

The flow through Jebbs Creek was extremely large this spring. It was estimated at 3.7 cubic metres/second (cms) on the day of the high lake water record. A normal spring high flow is about 1.5 cms. The highest estimated flow since monitoring began at Jebbs in 2005 by the OLA, was an estimated flow of 2.9 cms on April 17, 2008. The flow of Jebbs Creek has remained much higher than average for the summer and early fall period. Near the end of September the flow was estimated at 0.77 cms. This flow is much larger than the typical flow of 0.15 cms for the time of year.

Water temperatures were lower than normal in the Late April and May. The water temperature was 10C on May 8th, but reached 19C on May 31st, a more normal condition.

This year on August 25th the surface of Otty lake was 25 degrees. The thermocline in the center of the lake was at a depth of 6.5 metres. At an 8 metre depth the water was only 30% saturated with oxygen and at a depth of 25 metres there was almost no oxygen and the lake temperature was only 6 degrees. That means all fish life is restricted to the top 6.5 metres of the lake.

Chemical and Bacteriological Sampling results:

Lake monitoring was carried out on a monthly basis from May to September for E.coli bacteria, Total Phosphorus (TP) and total Kjeldahl Nitrogen (TKN). This bacteria work was focused on assuring that nearshore areas of the lake were safe for swimming and boating activities. The nutrient samples were taken to evaluate the nutrient enrichment and trophic status of the lake.

A total of 53 samples were taken for E.Coli. All samples were well within standards for swimming and 30 samples were bacteria free. Only two several sample showed slightly elevated counts (66 and 35 cfu/100ml respectively), a condition which is normal given the fauna living in lake environments. These locations were resampled on September 22 and bacteria levels were found to be zero in one sample and at a very low and acceptable level in the other. Overall, the bacteria results were excellent and showed an improvement over our 2013 results.

Fourteen samples were analyzed for TP and TKN concentrations. Samples were taken at the deep point, at the mouths of two of Otty's sub-watersheds, in Mud Lake and in the zone where Jebbs creek leaves the lake. All the total phosphorus levels at the deep were within the 20 microgram/litre concentration used as a standard for mesotrophic lakes. Minor exceedences of the 500 microgram/litre TKN standard were noted, related to nitrogen inputs to the lake from wetland areas. This is considered to be normal condition and is definitely not indicative of source of contamination. In summary, the nutrient levels of the lake are stable.

Note that the data we have at this time are from the OLA sampling. The TP values from the MOE Lake Partner Program will be available in February and the RVCA Watershed Watch program in January/February. The RVCA data will also provide information such as Dissolved Oxygen and Temperature profiles and nutrient levels at the bottom of the deep point.

CCME WQI re-calculation:

Using all the available OLA data from the last 3 years, the CCMW Water Quality Index was calculated and Otty Lake receives a GOOD water quality rating. This is supported by the observations made in this report. The MOE data are good and will support our case for a better rating. The RVCA nutrient sampling is mixed in the past three years, with a number of exceedences. Some of these are presumably from sampling at the deep point near the bottom of the lake (where the lake is anoxic which causes the water chemistry to deteriorate) but there are also some exceedences at their shoreline sites. This method will be recalculated when All RVCA and MOE data are available

Zebra Mussel Sampling:

Eight zebra mussel samplers were installed off docks and in nearshore areas where mussel growth was evident around Otty on May 24th and removed in late September. In addition, routine observations of zebra mussel populations were made throughout the summer. Five of the samplers produced very small numbers of mussels (less than 100 zebra mussels per square metre), and the remaining three produced higher numbers (less than 700 zebra mussels per square metre). The highest concentration was found at Cloverleaf Island and the lowest in front of Wally Robins cottage. (The highest concentration reported in the literature is 700,000 mussels in one square metre at a power plant in Michigan!)

In general, it is felt that the zebra mussel population is in decline. As positive as this is, it is not known if this is a cyclical phenomenon or if there are factors controlling zebra mussel growth. For example, we know that lake temperatures and calcium content (which is around 30 mg/l) are not limiting the zebra mussel population. Monitoring will be continued and will be expanded next summer using several different sampler designs.

Algal Blooms and Eurasian Water Milfoil:

Two periods of minor algal growth took place this summer. On June 1, some concentrations of green filamentous algae were noted. These were of the species *Mougeotia* Sp., and the blooms were short lived and limited in size. In August, concentrations of another species of green filamentous algae, *Spirogyra* sp. were noted. In general, the algal bloom problem was significantly improved this summer over the summer of 2103, when large floating algal mats were noted in most of the shallow bays around the lake.

Eurasian water milfoil (EWM), which is invasive, proliferated in most of the shallow bays this summer, perhaps related to the decline in the algal concentrations with which it competes for nutrients. It should be noted that one of the ways EWM replicates is by fragmentation. If you break it into pieces in any way you are simply producing more plants. Controlling this species using milfoil weevils has proven inconclusive and very expensive. In addition, sunfish like to eat the weevils, and we have lots of sunfish! We will have to wait for science to provide us with a better solution to this problem.

Septic Tank Re-inspection Program:

A properly working septic system on a lakeside property is an important aspect of reducing bacteria and nutrient inputs into the lake. Both townships at Otty Lake have implemented a mandatory septic re-inspection program. As of this summer there were only a few properties that were not yet inspected and significant progress has been made in rehabilitating substandard systems.

Shoreline Plantings

Vegetated shoreline buffers are important to reduce nutrient inputs to the lake, reduce shoreline erosion and provide habitat for fauna. In 2014 Otty Lake property owners planted another 100 shrubs and 75 wildflowers through the Otty Lake Shoreline Planting Program. An additional 89 plants and shrubs were planted by the RVCA through their Shoreline Naturalization Program, as part of the Love Your Lake Program.

State of Otty Fishery:

Otty's smallmouth and largemouth bass populations appear to be stable although both require careful monitoring and protection especially during the critical spawning period. Additionally, anglers need to release any bass over 2 pounds

to ensure a sustainable, healthy bass population. Bass of this size and larger are of spawning age and represent the future of the fishery. Please note the very positive results of the bass spawning bed enhancement program which is in second year.

Panfish of various species are prevalent in Otty and can be freely harvested according to existing possession limits. Lake herring or "shad" are an essential forage base. This population appears to be in good health. While northern pike exist in Otty, this population is in very poor health with very few large fish in the system.

Enhancing habitat is one of the most critical things that can be done to stabilize and sustain any population of any species. This fall the OLA and RVCA completed year two of an innovative and extensive bass spawning bed enhancement program. In total, 175 new spawning beds have been created, 181 wood clusters were installed to enhance existing habitat and 58 cornerstones were emplaced at nest sites to provide cover for guarding males. The OLA has received critical acclaim for this program, which is unique in Ontario. It is planned to continue this work in subsequent years.

Drinking water sampling program:

Nineteen people submitted groundwater samples for analysis. To date, I have been asked to review the water chemistry results from 15 of those analyzes. All 15 analyses are free of contamination (septic effluents, fertilizers etc.) and are chemically potable. All analyzes showed very low levels of iron and other metals, and very low concentrations of nitrate. This is a very positive result.

The Otty area produces "hard" water. Hardness is a function of calcium and magnesium content. High hardness becomes evident in your home when lime scale forms in your kettle and on your bathroom fixtures. This is a nuisance not a health hazard, and may require the installation of a water softener in your home.

Summary:

There has been a great deal of lake stewardship and environmental activity on Otty Lake this summer. Overall, the results of these programs are positive. Otty is in stable shape environmentally and there have been improvements noted over 2013. Notably, algal blooms were definitely less this year and bacteria levels were acceptable. We will continue these programs next year and hopefully conditions will remain as positive.

We invite your ideas and participation.

Derek Smith, Murray Hunt and Wally Robins