Otty Lake

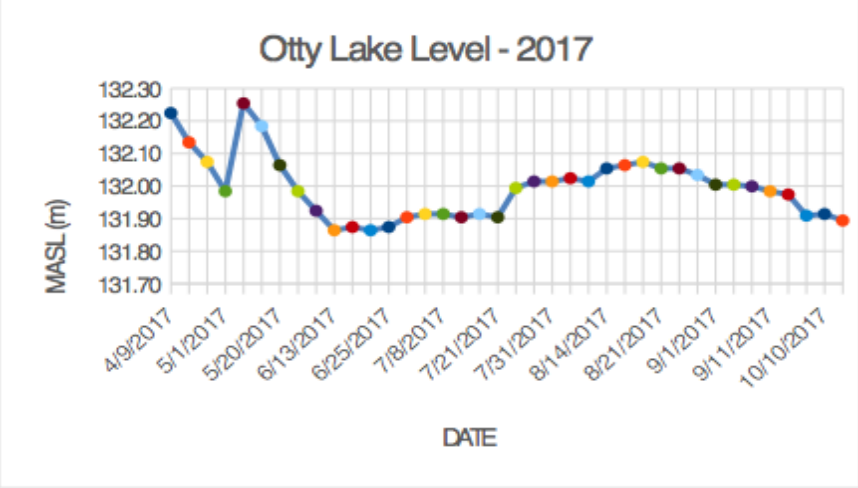
State of the Lake Report 2017

This October, for the fourth consecutive year, members of the OLA board have produced a short "State of the Lake Report". The report summarizes the condition of our lake and the environmental activities that have been completed on Otty this summer. The report includes sections on physical and chemical monitoring, loon sightings, the Otty fishery, zebra mussels and algae conditions, site investigations, and wildlife habitat and shoreline planting activities. Five OLA board members and associates have contributed to the report this year.

Lake Water Levels

Once again this past year brought unusual weather conditions to Otty Lake. In 2016, there were very dry conditions resulting in very low water levels at Otty Lake. The Rideau Valley Conservation Authority (RVCA) placed a “severe drought” condition on the watershed by August 2016. This drought condition was not completely removed until early 2017. By the ice-out on Otty on April 12 this year, the lake level had recovered to a higher than average level.

The spring and summer months this year brought much larger than average rainfall. Rainfall amounts each month, from April through to August, were double the average monthly rainfall as recorded at the automated weather station in Drummond Centre. This large rainfall resulted in very high water levels at Otty, particularly in early May when a level of 132.25 metres above sea level was reached. Please see the chart.

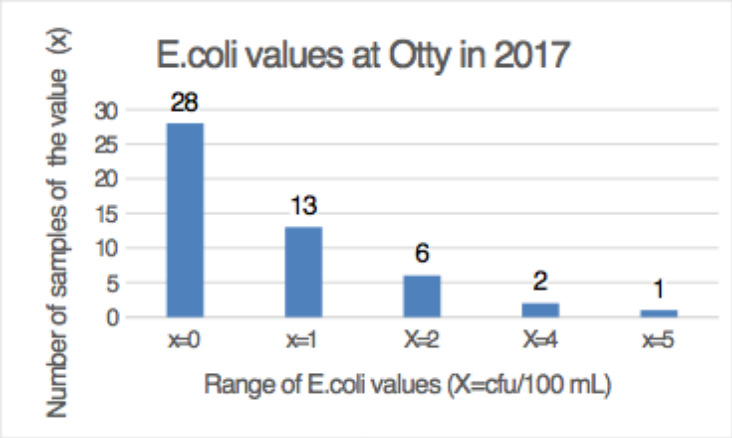


Bacteria Sampling

The forerunner to the current lake association began sampling for bacteria levels by measuring fecal counts in Otty Lake in 1971. In 2001, sampling for fecal counts was replaced by E.coli sampling as it is a

more specific indicator of the bacteria that affect human health. Fifty E.coli samples were taken by the OLA in 2017. The results this year were excellent. Forty-one E.coli samples had a value of 0 or 1 colony forming units/100 mL (cfu/100 mL). The highest value recorded this year was 5 cfu/100 mL. The provincial swimming standard is 100 cfu/100 mL.

We are unable to sample the entire lake for E.coli at the frequency of a monitored public swimming beach. Nevertheless, these recorded values of E.coli would indicate that Otty can be generally regarded as a safe lake for swimming. Drinking untreated lake water is not advised. Please see the chart for a breakdown of the values of the E.coli sampling.



Nutrient Sampling and Water Clarity

Nutrient samples were taken at the mid-lake, deep point from May through to September by the OLA and analyzed for Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN) concentrations. A few TP and TKN samples were also taken at two stream inputs to Otty Lake. There was one exceedance of the provincial objective for TP in June. What was more unusual was that there were several exceedences of the provincial standard for TKN sampled at the deep point. As discussed in the next section, the RVCA also samples at Otty Lake and we will take the RVCA data for TKN sampling into consideration when it becomes available to us.

Water clarity is measured by determining the maximum depth that a Secchi disk is visible. The average water clarity at Otty Lake in 2017 was 5.0 metres. This is slightly less than the average clarity over the past 10 years.

Other Water Quality Sampling

The data we have at this time are from the OLA sampling. The OLA also participates in the Ministry of the Environment and Climate Change, Lake Partner Program. Samples for phosphorus are taken six

times a year at Otty Lake and once at McLaren Lake. Calcium levels are also determined. The 2017 data will be available in February 2018.

The RVCA also conducts its Watershed Watch program at Otty and McLaren Lakes, four times each year, with the assistance of OLA volunteers providing the boat transportation. The RVCA data provides additional information to the OLA beyond our own monitoring. This includes Dissolved Oxygen/Temperature profiles measured at the mid-lake deep points at Otty and McLaren Lakes. Nutrient samples are also taken at one metre from the bottom and also at twice Secchi depth at these same deep points. Sampling for nutrients is done at some shoreline sites. As well a program of sampling for macroinvertebrates in near-shore waters is undertaken as another indicator of lake health.

Wildlife Habitat

In 2015, with the help of 7 Otty Lake residents and 3 RVCA employees, 10 swallow/bluebird houses and 10 wood duck nesting boxes were built.

In 2016, 20 volunteers including 3 RVCA team members and 1 Watersheds Canada representative assembled 20 bat boxes, 2 swallow boxes and 5 wood duck boxes. The assembly of houses done in both years would not have been possible without the preparatory work done by Richard and Jay Hendry.

All houses have been installed around the lake. Based on input from 35% of those who installed boxes,

- 5 of the 20 bat boxes have been used
- 1 of the 12 swallow/bluebird boxes had a resident
- 3 of the 15 wood duck boxes were occupied

It can take up to 3 years for our feathered friends to move into a new residence. Hopefully 2018 will yield more occupied houses.

Owners of these boxes are encouraged to clean them out before the spring 2018 occupancy activities begin.

Consideration in 2017 was given to a few options regarding wildlife habitat, specifically building bee/butterfly houses and building Gray Ratsnake hibernacula. In the end, it was decided to ask for input from the Otty Lake community regarding Gray Ratsnake sightings. Sightings were reported frequently at the beginning of the summer when the request for input was issued. There were over 20 separate sightings, mostly in Tay Valley Township, on both shores. There were two separate sightings at the northeast end of the lake, one of which became an almost daily sighting of a breeding pair of snakes who had at least 2 young. The Board will now ask for assistance from Murphy's Point Provincial Park to determine if a nest would be helpful, or it this is a reasonable number of snakes for this area. The terrain around Otty Lake is conducive for natural Gray Ratsnake nests.

Shoreline Planting

In 2017, to celebrate Canada's 150th anniversary, the Shoreline Planting project took a slightly different direction. It was decided to offer 150 maple trees to our community for planting on Otty Lake

properties. We offered silver, sugar and red maples for a cost of $2 each. RVCA contributed to the cost of bare root trees, and donated cuir mats as well as tree protectors. In addition, the OLA sold wire to protect the trees from foraging animals. All trees were sold after being potted and cared for a month. Most homeowners took advantage of the fencing. The feedback has been positive in that fenced trees are doing well.

The OLA Board also gave consideration to selling native pollinator seeds to residents. However, these seeds can take up to 5 years to habituate so it was felt that perhaps potted plants should be given consideration in the future. They have been sold as part of the Shoreline Planting program in the past and have not done well if not protected by fencing.

Zebra Mussel Population Survey

Veligers of zebra mussels were first detected at Otty in 2001. Adult mussel populations multiplied in the next few years. The zebra mussel population in Otty has been systematically observed and measured since the summer of 2014.

There was a significant increase in the density of zebra mussels on our samplers in 2015 compared to our 2014 results. The maximum density on any of the samplers was 2,300 individuals (or a density of approximately 3,500 mussels per square metre) and the lowest density was 360 mussels per square metre. A high percentage of the mussels were juveniles on each sampler. We concluded that the zebra mussel population was thriving in Otty Lake.

Our 2016 measurements of zebra mussel populations revealed a significant decrease in population densities compared to 2015 although the results remain very slightly higher than our 2014 observations.

This summer observations of zebra mussel populations were made by 11 residents around Otty. All observers report no or very few mussels on their boats or docks, indicating a further reduction from previous levels.

This suggests that Zebra mussel populations are cyclical and prehaps they have stabilized. We can expect further fluctuations in future years and will continue to monitor mussel populations in Otty. We are also monitoring the scientific literature for possible methods to control and eradicate this invasive species.

Algae

Floating mats of green filamentous algae are an unsightly nuisance that reduce our enjoyment of our lake environment. Algal blooms occur when excess nutrients (phosphorus and nitrogen compounds) are available which permits algal species to flourish. The winter of 2015-2016 was warmer than the previous two years, and Otty was ice free by late January. Floating algal mats began developing in late April triggered by the availability of sunlight even though the water temperature was still only 6 C. The

predominant species, Spirogyra sp., a green filamentous algae, proliferated through May and June. The algae mats died off by July 10th and the algal problem did not reappeared.

This summer has produced a very positive change. Otty was ice covered until April 12th. Algal mats appeared in several restricted areas of the lake (Baxter Bay, Parks Bay, Little Otty, Burgess Woods dock) during the week of June 18th but they died off by the week of July 12th and they did re-appear during August. Once again Spirogyra was the predominant algal type observed.

There is no clear answer in the scientific literature to explain why algal blooms die off. The reasons given include lack of nutrients, lower temperatures, lack of sunlight and depleted oxygen levels. If Otty is receiving a decreased load of nutrients, this may be in part due to the reduction in Zebra mussel populations. We will monitor again next summer to see if this trend continues.

Otty Lake's Fishery

Generally, the state of Otty Lake's fishery is status quo when compared to the past three years. The smallmouth and largemouth populations appear to be stable containing fish of various size ranges. This is an important feature of healthy fisheries. It indicates that recruitment (fry that survived previous spawns) is sustainable and retention (the percentage of larger, spawning capable specimens) is not problematic. Of note is a seemingly higher percentage of smallmouth bass in the 1 –1 1/2 pound range. This may indicate that the smallmouth bass spawning enhancement work done on Otty for four successive years has had a positive impact. More clarity on the success of the initiative may be discovered in the years 2018-2020 inclusive if more smallmouth in the 2 –2 1/2 pound bracket are captured.

While stated that the largemouth populations is stable, in 2017 far fewer fish were captured. Less time was spent targeting this species but other factors may also be at play. A later spring and predominantly cooler air and water surface temperatures throughout the summer months may have scattered the fish. The fact that that there was less concentrated, deeper growing milfoil would also cause largemouth to relate to various depths over wider expanses of water. In 2018, more focus will be directed at Otty's largemouth bass population to determine if corrective action through habitat enhancement may be required.

Smallmouth and largemouth bass, along with a small northern pike populations, are the apex predators in Otty Lake. No less important are their various forage bases. In fact, the availability and health of food sources like lake herring (shad) sucker and other minnow species, panfish and crawfish are major determinants of the sustainability of predator fish. All forage bases appear to be readily available in sufficient numbers.

To repeat a constant refrain from previous State of the Lake reports, it is imperative that Otty Lake property owners and their guests who fish need to exercise sound judgement when harvesting bass for the table. Fish up to 1 3/4 pounds are the best choices for consumption. They contain substantially fewer

contaminants than larger specimens. As well, releasing larger bass will sustain specific gene strains which, in turn, contribute to the recruitment (production) of fish that will grow to larger sizes.

Loons

The map created using observations submitted by various residents and cottagers around the lake suggests that 5 pairs of loons lived on Otty Lake this year.

The mating season of loons generally begins in May, after which the female lays two eggs, and these are incubated for approximately 28 days. After a year of zero chicks on Otty last year (2016), it was confirmed that two pairs of loons produced young this year. One chick was born on July 23rd (near Maple Glen) and the other chick was born on July 30th (near Echo Bay). This is quite late in the year to observe new chicks however loons will re-nest if the initial eggs are lost, and also may nest late if territorial disputes result in a delay in mating. Either or both of these scenarios may explain this year's delay. Unfortunately, the chick near Maple Glen was last seen on August 20th and is presumed to have died. Earlier in the summer, there was also an unconfirmed report of a deceased baby loon having been found on shore (not reported to Bird Studies Canada due to it being unconfirmed).

The surviving chick has continued to thrive. Loon parents stay close by until the offspring is twelve weeks old and has learned how to fly at which point they will begin their journey south. The parents of this year's surviving chick likely left in mid-October, while the chick will stay until late October or possibly November.

Once again, Richard and Jay Hendry were instrumental in providing accurate, consistent and frequent observations of loons on the lake. Data was submitted to Bird Studies Canada, Canada Loon Survey, for the OLA (account # 50693, lake # 106918) on October 16, 2017 by Kyla Haley.

Invasive species

The Rideau Valley Conservation Authority monitors for the presence of various invasive species in Otty Lake on an annual basis. Zebra mussels, Eurasian Water Milfoil, Banded Mystery Snail, Rusty Crayfish

and European Frogbit have been identified in Otty. So far the presence of the invasive species, the Spiny Water Flea has not been detected.

The *Otty Lake Shoreline Handbook* is a source of information on invasive species. Pages 48 – 51 contain a list and description of "selected invasive species that may be found in this area".

The status of invasive species in Otty Lake will be monitored by the OLA in the future and this information will be included in future State of the Lake reports.

Site Investigations

Three site investigations were conducted by OLA Board members. One was to investigate an odour complaint along the shoreline in front of a cottage this spring. The other two were site/environmental evaluations of properties where applications for major cottage renovations were received.

The odour issue was temporary and water quality sampling did not indicate a shoreline water quality problem. Perhaps it was related to early spring discharges from swampy areas near the cottage.

The site investigations included a hydrogeological investigation and discussions with the homeowners relate to issues of septic tank locations, effluent and runoff movements, erosion and shoreline buffer zones. Both properties agree to install Tertiary septic tank systems. Both applications will not cause impacts to Otty Lake and the OLA supports both applications fully.

In the past, the OLA has organized drinking water quality investigations for numerous residents. There was no demand for this service during 2017, but we are available to organize and interpret water chemistry results on an on-going basis.

Summary

There has been a great deal of lake stewardship and environmental activity on Otty Lake again this summer.

High rainfall and a late ice-free date contributed to high water levels in Otty throughout the summer. Bacteria were acceptable again this summer indicating that Otty is safe for swimming. Water chemistry sampling produced several small exceedences from TKN and TP guidelines. However, algal blooms appeared for a much shorter time than in previous years and were restricted to several locations around the lake. A significant decrease in the density of zebra mussels was noted around the lake compared to 2015 and 2016. The fish population is stable. The loon population was monitored and mapped in detail and at least one loon chick survived the summer. A wildlife habitat program was conducted successfully. Shoreline planting activities included the planting of 150 maple trees to commemorate Canada's 150th birthday.

Our programs indicate that Otty Lake is healthy, we hope in part due to our combined efforts to protect and enhance the lake environment. However, we should not become complacent. We will continue these

programs next summer. The OLA Board is actively searching for and reviewing new initiatives that can be added to our environmental program. We invite your ideas and participation.

The following people contributed sections to this document:

Physical and chemical limnology: Murray Hunt
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Algae, Zebra Mussels, site monitoring: Derek Smith
Loons: Kyla Haley
Wild Life Habitat and Shoreline Planting: Christine Kilburn