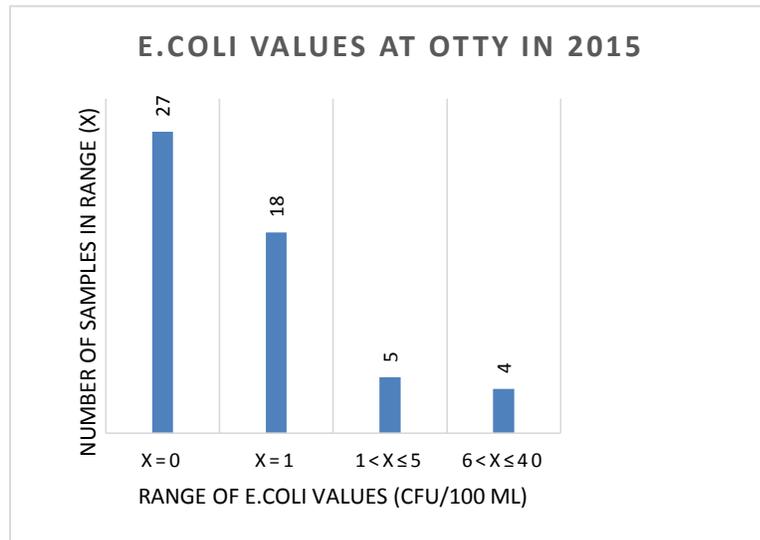


Lake water quality monitoring was carried out from May to October. Sampling was conducted for E.coli bacteria, phosphorus and nitrogen. The bacteria work was focused on ensuring that nearshore areas of the lake were safe for swimming and boating activities. The nutrient samples were taken to evaluate the nutrient enrichment and the trophic status of the lake.



A total of 54 samples were taken for E.coli in 2015. All samples were well within the Ontario Provincial Standard for swimming of 100 colony forming units per 100 millilitre (cfu/100mL). Forty-five samples had values of 1 cfu/100 mL or less. Three E.coli samples had somewhat elevated counts between 25 and 40 cfu/100 mL. These three samples were from the same location taken at various times in the summer. Additional sampling at this location showed improved values in September/October.

Overall these E.coli values for 2015 were excellent. Although we are unable to sample the entire lake for E.coli at the intensity of a monitored public swimming beach, these recorded values of E.coli would indicate that Otty is a safe lake for swimming.

Nutrient samples were taken at the mid-lake, deep point each month from May to October and analyzed for Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN) concentrations. Some TP and TKN samples were also taken at various stream outlets entering Otty Lake. All the TP samples taken at the deep point were well within the provincial objective of 20 micrograms/Litre ($\mu\text{g/L}$) for a mesotrophic lake. There was one exceedance of TP taken in a stream entering Otty Lake. There were several elevated values of TKN samples particularly in streams flowing into Otty Lake. This is typical of streams draining wetlands. Overall the nutrient levels in Otty Lake appear to be stable.

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 and takes samples for phosphorus six times a year at Otty Lake and once at McLaren Lake. The 2015 data will be available in February 2016.

The RVCA also conducts its Watershed Watch program at Otty and McLaren Lakes four times each year with the assistance of an OLA volunteer providing the boat transportation. The RVCA data provides additional information such as Dissolved Oxygen and Temperature profiles and nutrient levels at the bottom of the mid-lake deep points at Otty and McLaren Lakes. The 2015 data will also be available to us by February 2016. This information will be placed on the OLA website at that time.

Green Algal Blooms and Eurasian Water Milfoil:

Two periods of minor algal growth took place again this summer. By June 1, some concentrations of green filamentous algae were noted, especially in Little Otty. These were of the species *Mougeotia* Sp., and the blooms were short lived and limited in size. As in 2014, concentrations of another species of green filamentous algae, *Spirogyra* sp. were noted in August. This algal species continued to be present in small quantities until October.

In general, the algal bloom problem was improved over the summer of 2014, and significantly improved over the summer of 2013, when large floating algal mats were noted in most of the shallow bays around the lake.

Eurasian water milfoil (EWM), which is invasive, is present in most of the shallow bays around the lake, but in smaller quantities than 2014.

Blue-Green Algae

This year the local Health Unit and the OLA placed an increased emphasis on creating awareness in the lake community of the potential hazards of blue-green algal blooms and the means of identifying these blooms. There were no blue-green algal blooms reported at Otty Lake. However, one blue green species (*Anabaena* sp.) was identified by microscopic investigation in August. This species occurs in very small quantities in the lake, but is one that produces phytotoxins and would be a concern if these tiny concentrations were to concentrate into a bloom.

Zebra Mussels

Eight zebra mussel samplers were installed around Otty Lake on the May 24th weekend and were removed on September 16th. The sampling method and duration was identical to the 2014 summer sampling procedure. The zebra mussels were removed from the surface of each sampler and counted. Each sampler had a surface area of about 0.65 square metres.

The following results were noted:

- 1) There was a significant increase in the density of zebra mussels on 6 of the 8 samplers over the 2014 results. One sampler was vandalized and the results are not valid (Loon Island off of Conlon Farmer Road). The sampler in Little Otty was located in muddy sediment and the results are not considered to be typical of the area.
- 2) The maximum density on any of the samplers was 2,300 individuals (or a density of approximately 3,500 mussels per square metre). This sampler was located on the south east shore of Otty south of Cherrie Island. Two of the other samplers were in the 2000 mussels per square metre range and the lowest density was 360 mussels per square metre. This sampler was located in Conlon Bay at the north-east end of the lake. Note that densities much higher than these numbers are reported in the scientific literature; however the increase over the 2014 data is significant.
- 3) A high percentage of the mussels were juveniles on each sampler. A juvenile is defined as a mussel with a length of 5 millimeters or less. Note that a) fully grown mussels will have a length of 1 cm or more, b) the samplers were in the water an adequate time to permit fully grown mussels to develop and c) zebra mussels live for 4-5 years.
- 4) One adult zebra mussel can filter a litre of lake water in a day. The Secchi disk depth, which is a measure of water clarity, increased in August from 5.8 to 6.2 metres this year as compared to

August 2014. This is most probably due to the filtering action of the increased zebra mussel population.

It is concluded that the zebra mussel population is thriving in Otty Lake. Zebra mussels are invasive and severely disrupt the lakes natural ecosystem. Perhaps the population density is cyclical and fluctuations will be noted in future years. Research is being carried out to find a method to control and remediate them.

Drinking water sampling program:

Nineteen people submitted groundwater samples for analysis during the summer of 2014. The water chemistry results from 17 of those analyzes were reviewed. All 17 analyzes were 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.

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 has required the installation of a water softener in many homes. During the summer of 2015 an additional site investigation and analysis evaluation was carried out at a residence with groundwater quality issues (high sodium chloride, very high hardness, and high nitrate). After consultations in conjunction with a water treatment company a solution was found for this problem.

The groundwater sampling program is on-going and is available to any Otty residents who want to assure the quality of their drinking water.

Septic System 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.

OLA Shoreline Plants Sale

July 2015 marked the fourth consecutive year of OLA sponsoring the sale of potted shrubs to enhance the ribbon of life on Otty Lake. Bare-rooted plants were offered for a two year period prior to this. This was the second year of pairing shoreline shrubs with shoreline wildflowers. The 2015 order was sold in its entirety as noted below.

	Total # ordered	Pre-ordered	Sold	Sold at AGM
Shrubs	50	39	40	10
Wildflowers	72	63	63	9

Shoreline potted shrub sales have been reduced by 67% from the initial 150 plants offered in 2012. OLA paid \$4/plant or a total of \$414.80 to support this year’s environmental initiative which reached 24 property owners. The use of cages was demonstrated upon plant pick up on July 4th as well as at our AGM. Plant protection was strongly recommended until stock is well settled. Species were chosen based

upon their ability to respond to browsing by wildlife; however it is important for participants to actively protect plants during their early years.

A number of factors are currently under review including: offering 2 gal pots of shrubs that are larger and stronger but at an additional cost to residents, limiting OLA discounts to members only, including some "large" bare root species of trees for mid to upper shoreline planting, varying the wildflower selection, and offering this as an alternate year vs. annual sale.

Shoreline surveys were conducted on Otty Lake in 2005 and 2013. The 2013 survey showed an increase in the naturalization of Otty shorelines. It is likely that part of this change can be attributed to the OLA shoreline planting program.

State of the Otty Lake Fishery

No noticeable change has been seen in either the smallmouth or largemouth populations in Otty Lake in 2015. Both species appear to be well represented in terms of year classes (size range), although as one would expect, there are fewer large members (4 pounds plus) than juvenile or young-to-middle age adult fish. It remains critical that anglers refrain from harvesting bass over 2 pounds to sustain a healthy fishery in the future.

Other resident species appear to be unchanged. Otty hosts an over abundant population of various panfish (bluegills, pumpkinseed/sunfish, rock bass). These species are major predators of bass fry and YOY (young of the year). Harvesting of panfish is recommended within reason.

Northern pike still reside in Otty Lake although their overall size range is unevenly tilted towards smaller fish (2-4 pounds). This is not unusual nor cause for major concern. Pike are a cold water species and, as Otty naturally ages, normal water temperatures have increased. While it is unusual to catch a pike over 10 pounds in Otty, it must be noted that few, if any, anglers specifically target pike. Larger northern still reside in Otty but they are few in number.

The shad (lake herring) population appears to be stable. Should it radically decline, major feeding adjustments will ensue as bass readjust to their environment.

In September 2015, Phase Three of the Smallmouth Bass Spawning Habitat Enhancement Project took place in conjunction with our partner, Rideau Valley Conservation Authority (RVCA). Jennifer Lamoureux (RVCA), her team and volunteers spent an enjoyable day, learning and being productive. Roughly 50 new nests were created to supplement the almost 200 nest sites constructed during the first two phases of this initiative. The next step in this five year project will be to assess the viability of constructing more nests specific to smallmouth bass. Otty has a finite number of adult smallmouth bass capable of spawning. Work will be done in 2016 in conjunction with the Freshwater Fisheries Conservation Laboratory of Queens University to assess the maximum spawning potential of Otty Lake's smallmouth population. Additionally, research into and assessment of work that could be done to enhance spawning by largemouth bass will take place.

A number of cormorants were seen on Otty in 2015. These fish eating predators can devastate a fishery due to their massive daily consumption of fish up to 12 inches in length. Juvenile bass are especially

susceptible to predation by cormorants. There is a growing resident population of cormorants on Big Rideau Lake and Otty Lake may experience a spillover effect.

Currently, cormorants are a protected species. Cormorants regularly rest and roost in trees on islands. Because their feces are extremely toxic to vegetation (and to humans), in a matter of a few short years, islands can be denuded of any living vegetation and be a danger to anyone who ventures on to the island. While protected, it is interesting to note that in southern Ontario, MNR has authorized the use of poison on cormorant nest and eggs to downsize the population. The Otty Lake Association will closely monitor any upturn in the number of cormorants that use or visit Otty and consider appropriate action as needed.

Bird Boxes:

Thanks to 7 volunteers from our Otty Lake community as well as 3 RVCA employees, 10 swallow/bluebird houses and ten wood duck nesting boxes were built this fall. The majority have now been placed on the shoreline or property of residents around the lake who have volunteered their properties. They will be maintaining the boxes as well as monitoring their occupants.

Contacts with Scientific Researchers:

Contacts have been maintained with researchers at Carleton University, Queens University, the University of Ottawa and the Dorset Environmental Science Center. In August, Carleton University ran their limnology field course at Otty for the third consecutive year under Dr. Derek Mueller.

In October, we helped Dr. Rebecca Dalton collect milfoil from the bays around Otty Lake. She is doing post-doctoral research, funded by Environment Canada, on the use of the Diquat herbicide for the control and eradication of milfoil. Dr. Dalton has agreed to organize a seminar and field course for interested Otty residents next spring. She is an expert on aquatic plants and eutrophication.

Summary:

There has been a great deal of lake stewardship and environmental activity on Otty Lake again this summer. Overall, the results of these programs are positive. Algal blooms and the amount of aquatic vegetation were definitely less this year than in 2014, and significantly less than during the summer of 2013.

A significant increase in the density of zebra mussels was noted across the lake. A high proportion of juvenile mussels were noted suggesting that the population will thrive and perhaps increase next summer. An increase in water clarity was noted and is attributed to this fact.

Bacteria levels were acceptable again this summer, although minor exceedences of nutrient levels were recorded. The fish population is stable and the third year of the Bass Nesting Enhancement program was successfully completed. The shoreline planting initiative will be continued but will be modified as its success is evaluated.

We will continue all these programs next year. 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:

Murray Hunt: Limnology, Sampling and Blue-Green Algae

Wally Robins: Fisheries

Gail Read and Evelyn Dore: Shoreline Planting

Derek Smith: Zebra Mussels, Drinking water, Green Algae, Contacts with scientific researchers.