Otter Lake
Sustainable Lake Plan

July 15, 2015
Amendment April 23, 2017

THE OTTER LAKE
LAND OWNERS' ASSOCIATION Inc.

#32 - O10, RR1, LOMBARDY, ONTARIO, K0G 1L0

Acknowledgements

Committee:	The Otter Lake Sustainable Lake Plan Committee Laurence Beaulieu, Chair Marcia Maxwell, June Finless, Shelley Dunlop, Karl Fiander, Judy Hodgins
Directors:	Otter Lake Landowners' Association Directors, past and present, support this initiative (since 2006)
Community:	Rideau Valley Conservation Authority (RVCA) Federation of Cottagers' Association (FOCA) Friends of East Lake/Quinte Conservation/County of Prince Edward Ministry of Natural Resources & Forestry (MNRF), Kemptville Watersheds Canada Township of Rideau Lakes Special thanks to the many lake associations for the information collected from their published lake plans.
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Photo Credits:	Philip Craig, Artist, Otter Lake Resident Doug Franks, OLLA Director, OLLA Website Joan Barclay, Otter Lake Resident Judy Hodgins, Otter Lake Resident Dianne Taylor, OLLA Director Google

Executive Summary

The aim of the Otter Lake Sustainable Lake Plan is to:

1. Identify the qualities that make Otter Lake a desirable place for people to live or visit and the challenges that put those qualities at risk;
2. Recommend a series of actions that will help to ensure the sustainability of the lake, the lands, the natural ecosystem and the way of life that we value; and
3. Serve as a reference and guide to support continued activity for the stewardship of the lake.

The Otter Lake State-of-the-Lake document, which contains historical and factual data gathered from government agencies, commercial operators and residents provides the foundation upon which the Lake Plan was built.

Lake plans are increasingly viewed as the best tool for improving lake stewardship, promoting community involvement and providing input to municipal official plans. The process for developing our Plan involved surveys, workshops and meetings with community stakeholders which led to identification of the key issues, goals, objectives and actions. The Otter Lake Sustainable Lake Plan is meant to be a living document to be revisited and updated at regular intervals. The success of the Lake Plan relies on awareness, education and responsibility of residents and stakeholders.

The preparation of this Plan is the first step … the important work of implementation of the actions contained in the lake plan has yet to be undertaken. We encourage everyone to become engaged in its recommended activities.

> *"Never doubt that a small group of thoughtful, committed citizens can change the world; indeed it's the only thing that ever has."*
>
> *Margaret Mead*

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1.0 INTRODUCTION

1.1 About the Plan

The Otter Lake Sustainable Lake Plan Committee, as established by the Directors of OLLA in the Fall of 2014, took on the large task of putting together the Lake Plan and State-of-the-Lake Report. Limited access to funding precluded using professional services to coordinate and develop the Otter Lake project. The committee, through research and borrowing from the many lake plans that exists in Ontario, decided on a format that provides a concise yet comprehensive document that can easily be updated.

The Lake Plan is meant to be used as a guide for lake stewardship both on an individual basis as well as for group/committee efforts. Specifically, the purpose of the Otter Lake Sustainable Lake Plan is to:

- Develop a strategy that outlines ways to maintain and improve the health of the Otter Lake Watershed;
- Develop such a strategic plan in cooperation with landowners, users and visitors of Otter Lake, as well as government and non-government organizations having a vested interest in the Otter Lake Watershed;
- Motivate, educate and engage residents to become involved in the health of the Otter Lake Watershed;
- Make recommendations to the municipalities concerning official plans, zoning by-law policies and environmental concerns;
- Adopt a watershed approach to managing the health of the Otter Lake ecosystem.

The Lake Plan is a living document and must be reviewed and updated on a regular basis (semi-annually for the first two years and then at least every 3 years) to reflect new and ongoing issues that affect the health of Otter Lake and its surrounding wetlands. This 2015 publication of the Lake Plan represents the first phase and addresses the key topics identified in the surveys. Additional topics will be addressed in future releases.

The Lake Plan clearly sets out the vision, values, goals, objectives and recommended actions based on input from property and community stakeholders. The Plan reflects and builds upon the background material collected for the State-of-the-Lake Report.

1.2 Preparing the Plan

The need for a Lake Plan was first identified in 2006 and in December of that year a questionnaire was sent to all Otter Lake landowners. The responses were tabulated and presented at the July 2007 AGM and are available on the website. In 2008 the terms of reference for creating a Lake Plan were developed. Unfortunately, work on the Lake Plan did not proceed due to a shortage of volunteers.

The issue of a Lake Plan was raised again at the 2010, 2011 and 2013 AGMs but without volunteers the work could not begin. A presentation on the Lake Plan was given at the 2014 AGM with another call for volunteers and a few people responded. At a Board of Directors Meeting in 2014 a Sustainable Lake Plan Committee was struck and Dianne Taylor nominated a new landowner, Laurence Beaulieu, to be chair of this committee. The Board accepted the nomination and the chair gathered information from board members, attended several seminars and made contact with organizations to solicit their assistance.

The first meeting of the Otter Lake Sustainable Lake Plan Committee (consisting of six members, including the chair) held their first meeting on March 1, 2015. As funding is no longer readily available from Trillium, etc. the committee researched existing lake plans on which to model the Otter Lake plan. OLLA Board of Directors approved a budget to cover costs incurred for committee activities and printing of the final plan.

Work began in earnest and a 2nd questionnaire was sent to all landowners at the end of March 2015, together with an invitation to attend the first Otter Lake Family Day at Camp Otterdale on June 7th. At the June 7th event, an information and Q&A session on the draft Sustainable Lake Plan and State-of-the-Lake Report was provided to gather feedback on the direction being taken by the Committee. Information was also provided on the Shoreline Assessment being conducted by Watershed Canada during the summer of 2015.

The Committee's first meeting with the Rideau Valley Conservation Authority was held on April 14, 2015 and their input and review of the Lake Plan and State-of-the-Lake Report was appreciated.

The Sustainable Lake Plan and State-of-the-Lake Report was presented and approved at the July 2015 AGM.

Otter Lake Sustainable Lake Plan Committee

1.3 Characteristics of Otter Lake

Otter Lake is a small lake, situated in Leeds/Grenville County, and within the Township of Rideau Lakes in the heart of the Rideau Lakes Area. The lake lies close to Highway 15 between the villages of Lombardy and Portland and is east of Big Rideau Lake, however, Otter Lake is not part of the Rideau Canal System. It is part of the Otter Creek/Hutton Creek Complex which is an area with a large north-eastern drainage pattern towards the mid part of the Rideau River. This is distinctly different from neighboring Bass Lake which drains to the north-west into the Lower Rideau Lake.

Otter Lake lies within the upper reaches of the Otter Creek catchment within what the Rideau Valley Conservation Authority (RVCA) refers to as the Middle Rideau Subwatershed. Otter Lake is one of only two lakes in the Middle Rideau. The Otter Creek catchment drains 91.1 km^2 of land.

Otter Lake is located on a limestone plain which abuts the Frontenac Axis of the Canadian Shield. As a result there are features around the lake which show the hard igneous rocks typical of the shield and also the soft light brown limestone typical of the area. Plant and animal life are quite sensitive to changes in acid levels and limestone tends to buffer the effects of acid rain which drifts in from the industrial areas of the US and Canada to the southwest. Otter Lake is about 5.3 km long and covers 572 hectares. The catchment area draining into the lake is about 36 square km. The total shoreline length is about 20 km. The lake is 124 meters above mean sea level and is part of the Rideau River drainage basin. There are several parent streams flowing into Otter Lake and one primary outlet (Otter Creek) which meanders about 33 km before flowing into the Rideau River south of Smiths Falls.

Otter Lake is also fed by numerous springs although little is known about the volume or source of these springs. It is likely that the springs are recharged from area wetlands. Overall, the water in Otter Lake replenishes about every four years by surface runoff, inflow streams, precipitation and springs. Water exits the lake through Otter Creek and by surface evaporation during the summer months.

There are also numerous natural wetland areas around the lake that are important habitat for a variety of aquatic life. Most of these wetlands are classified as “Locally Significant” however some have not yet been evaluated or classified. Wetlands to the east of Otter Lake are classified as “Provincially Significant” and represent an example of “linked wetlands” which allow a more diverse population of wildlife.

Because Otter Lake lies more or less in a north/south direction, there are often some spectacular sunrises and sunsets that can be viewed from property owners’ docks, balconies and decks. Otter Lake has several islands. Most of the larger islands are privately owned with cottages, however the smaller ones, many of which are mere granite outcroppings, make for excellent picnic spots.

Despite its relative small size, Otter Lake holds a large volume of water and is quite deep, up to 36 m at its deepest location. This means that the lake is one of the last lakes in the Rideau Lakes region to freeze in winter. As a result, in late November and often most of December the lake is home to a large variety of water fowl. Loons, Goldeneyes, Mergansers and even the occasional Trumpeter Swan will use the lake as a stopover point during their migration south for the winter.

The common loon is a frequent summer visitor arriving in early May and often staying until late November. The lake is home to about six loon pairs that nest in many of these wetlands. Hatching usually occurs towards the end of June or early July and while the young loons are natural swimmers they cannot dive so they have to be fed by their parents. In addition to loons, mergansers can sometimes be found sitting on docks. Canada geese often stop off at Otter Lake to raise their large families. The geese family has to stay until the young are able to fly and they love to eat juicy fresh grass close to the shore. The lake is also home to many great blue herons who mostly spend

their time in and around wetlands. While generally a rather timid bird, one may occasionally stay long enough on a dock to be photographed. There is an abundance of wildlife on land too. Deer are frequently sighted on cottage access roads and even in property owners' yards. The occasional black bear has also been sighted though not as yet photographed. Raccoons are frequent visitors all year round.

As depicted in the two aerial photos, there has been a degree of naturalization of the catchment basin between 1953 and 1991. Farmland has gradually been abandoned and shrub and tree cover has replaced open fields.

1991 photo [Composite of aerial photos, courtesy of MNRF, as posted on OLLA Website]

1953 photo [Composite of aerial photos, courtesy of RVCA, as posted on OLLA Website]

2.0 VISION and VALUES

The Vision of the Otter Lake Sustainable Lake Plan has been guided by what was heard from the community members who responded to surveys or participated in meetings and workshops.

Our vision for the future of our lake is …
A place were water quality, fish and wildlife habitat, natural beauty, recreational opportunities and peace and tranquility is maintained and improved for present and future generations to enjoy.

The values identified as "very important" by property owners in the 2015 survey, upon which the vision statement is based, are:

❖ Water Quality	94.55%
❖ Swimming	70.91%
❖ Peace and Quiet	60.91%
❖ Wild Life and Bird Viewing	40.00%
❖ Natural Shorelines	39.09%
❖ Sailing, Paddling	39.09%
❖ Fishing	16.36%
❖ Power Boating	12.73%

3.0 GOALS, OBJECTIVES and ACTION

3.1 Water Quality

Goal – Water quality in Otter Lake and its watershed will be protected and enhanced.

Monitor Water Quality

Water quality testing is an important diagnostic tool to help residents of Otter Lake determine the health of the lake. In the 2006 lake survey, 132 respondents (86%) responded with "strongly agree" to the statement "The quality of the water in our lake is important to me", the remaining respondents responded with "agree".

The following excerpts from the RVCA Water Quality Summary document provides insights in to factors that affect a lake's health and key nutrients to monitor.

> *"Many things affect a lake's health. Unsustainable recreational use and shoreline development, surface water runoff carrying excess nutrients, chemicals, and fertilizers, faulty sewage systems, excessive aquatic vegetation growth, algae blooms, invasive species, sedimentation from soil erosion, and the removal of shoreline vegetation all impact and degrade the lake's water quality."*
>
> *"**Total Phosphorus***
> *Phosphorus is an essential nutrient for aquatic plant growth (including algae). Phosphorus sources in a lake come from upstream lakes, streams, and wetlands that drain into the lake, from precipitation, and from lake bottom sediments. Human sources of phosphorus that enter the lake come from soaps, fertilizers, eroded soils from development, yard wastes, and untreated effluent from faulty septic systems……The Provincial Water Quality Objective (PWQO) for Total Phosphorous concentration is 20 µg/L to protect against algal bloom and excessive aquatic plant growth."*
>
> *"**Total Kjeldahl Nitrogen***
> *Nitrogen is another significant nutrient in all lakes. Measured as Total Kjeldahl Nitrogen (TKN) micrograms per litre (µg/L), it includes all organic nitrogen and ammonia found in a water body.*
>
> *High concentrations may be indicative of excessive nitrogen entering the lake. Naturally occurring sources of nitrogen include the atmosphere, animal and human waste, decaying organic matter, and live organic material including algae.*
> *……..The RVCA has adopted a concentration of 500 µg of TKN /L as a reference or guideline to indicate the presence of excessive nitrogen in the absence of a provincial water quality objective1; the higher the concentration of TKN and the greater the number of samples exceeding this reference, the greater the potential for excessive aquatic plant growth."*
>
> *"One subgroup of **fecal coliform bacteria**, Escherichia coliform (E. coli), is used as an indicator of the possible presence of other harmful bacteria and pathogens in water. The main sources of these harmful bacteria are animal (decay of dead animals, defecation near and in the water) and human waste (sewage systems and grey water). Levels above ……100 colony forming units/100 mL can mean that the water is unsafe for swimming. As a general precaution, untreated lake water should not be used for drinking water and use for washing and cooking should be limited.*

OLLA analysis, based on Google Earth, has indicated that the development pressure appears to be relatively high on Otter Lake compared to other lakes in the Rideau Lakes area. With 295 cottages, homes and commercial properties and a shoreline length of approximately 20km, Otter Lake has a higher concentration than neighbouring lakes.

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.

OLLA has an on-going water quality monitoring program, notably phosphorous and nitrogen content and dissolved oxygen at least 3 to 5 times during the year at a number of test sites. The location of the major OLLA test sites on Otter Lake are shown in Figure 1. Sites 05A, 05B and 06 represent the locations with the greatest water depth.

RVCA also has an on-going water quality monitoring program and has sampling sites on Otter Lake. The Table in Figure 2 shows the mapping of OLLA and RVCA sampling sites and the sampling schedule.

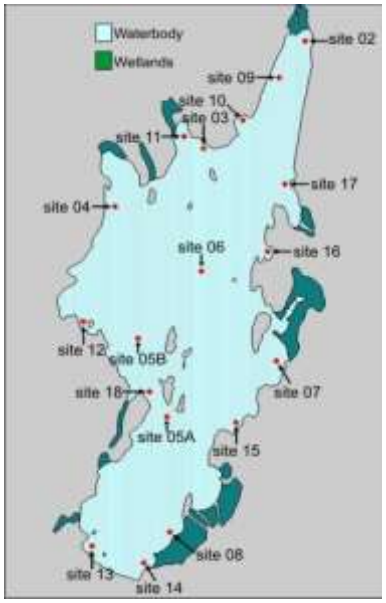


Figure 1: Otter Lake Water Monitoring Test Sites

OLLA Test Site ID	RVCA ID	E. Coli (cfu/100mL			Total Kjeldahl Nitrogen (µg/L)				Total Phosphorous µg/L				Sechi Disk (meters)			
		Jun	Jul	Aug	May	Jul	Aug	Oct	May	Jul	Aug	Oct	May	Jul	Aug	Oct
OLLA 02																
OLLA 03	RVL-26C															
OLLA 04	RVL-26D															
OLLA 05A	RVL-26DP1															
OLLA 05B																
OLLA 06	RVL-26DP3															
OLLA 07																
OLLA 08																
OLLA 09	RVL-26B															
OLLA 10																
OLLA 11																
OLLA 12	RVL-26E															
OLLA 13																
OLLA 14																
OLLA 15																
OLLA 16	RVL-26A															
OLLA 17																
OLLA 18	RVL-26F															
Average																
Std. Error																

Figure 2: Otter Lake Water Sampling Sites (OLLA & RVCA)

	Actions
Objective #1 **Monitor water quality.**	1. Continue monitoring E. coli levels and seek no net increase in levels over time, with OLLA target being less than 5 cfu/100ml at all sites tested. Note: *Cottages using untreated lake water for human consumption should be advised the Ontario Drinking Water Quality Standard is 0 CFU/100ml. The Provincial Water Quality Objective of 100 CFU/100ml is used to assess the suitability of natural waters for recreational use.* 2. Continue monitoring Nitrogen levels and seek no net increase in levels over time, with target being in the acceptable range of between 200 – 500 µg/L at all sites tested.

	3. Continue monitoring Phosphorous levels and seek no net increase in levels over time. Target is to achieve a Phosphorous Concentration, averaged across all test sites, of less than 10 micrograms based on a 5-year rolling average. 4. Continue to monitor water quality, for E.coli, Nitrogen, and Phosphorous, 3 to 5 times per year at the test sites in conjunction with Rideau Valley Conservation Authority (RVCA). 5. Seek expert advice and take appropriate actions should there be any consistently high water quality results.

Educate Otter Lake Community & Visitors

Maintaining and improving the water quality of Otter Lake will rely on the actions of the property owners (on the lake as well as in the watershed) and lake users. Best practices for managing one's property, including streams, shorelines and septic systems, should be provided to the community to better understand what individuals can do to improve water quality.

	Actions
Objective #2 **Educate Otter Lake community & visitors about the lake's water quality and how to maintain and improve it.**	6. Report water quality results back to the community in the watershed (newsletters, website, OLLA AGM). 7. Develop and deliver an awareness program on: the impacts of fertilizers, pesticides, gasoline, unmaintained on-site sewage systems, and other matters on water quality. 8. Promote existing stewardship programs to the lake community to protect and enhance shorelines and protect water quality.

Reduce Nutrient Inputs

The most significant water quality concerns are associated with the input of nutrients to the lake, particularly phosphorous. Nutrients in the lake act in a similar way to those applied to a garden – they encourage plant growth. Prime sources include faulty on-site sewage systems, use of fertilizers on lawns, and runoff from lawns and farm fields. Phosphorous levels should be carefully monitored, and actions should be taken to reduce human inputs wherever possible.

	Actions
Objective #3 **Reduce the input of nutrients into the lake.**	1. Recommend that all new commercial and residential development and redevelopment uses sewage treatment systems that reduce or eliminate phosphorous to the greatest extent possible. 2. Continue to promote the voluntary septic system re-inspection program that the Township of Rideau Lakes introduced in 2007. 3. Work with the Township of Rideau Lakes to establish a mandatory sewage systems inspection program, with an associated educational program; and seek funding to provide financial assistance to landowners for repair or upgrades to their systems. 4. Support and recognize the farming and logging communities to continue best management practices within the Otter Lake Catchment Basin. 5. Promote existing stewardship programs to the lake community to protect and enhance shorelines and protect water quality.

3.2 Water Levels **Amendment April 23, 2017**

Goal – Measure, record and communicate water levels to Rideau Valley Conservation Authority (RVCA) and Otter Lake Landowners' Association (OLLA) members.

Measuring and Recording Water Levels

The natural fluctuation of water levels does not necessarily have a negative effect on the natural environment and can improve shoreline and wetland habitats around the lake. Although flooding has some environmental benefits, it can also cause shoreline erosion, and compromise sewage systems.

OLLA does not undertake any effort, either alone or in concert with any other party, to control or manipulate the water level on Otter Lake.

The natural rock ridge (depicted in Figure 3) limits how much water can outflow from Otter Lake. During drought conditions and extremely low water levels, there is little outflow through Otter Creek due to the natural rock ridge. Even though no water is flowing in Otter Creek during drought conditions, significant water losses continue in the summer months due to surface evaporation. RVCA has stated that lakes, like Otter Lake, can lose 1 to 2 cm, per day. On sunny days, when temperatures are at or above 30°C, evaporation rates on lakes can be as high as 2.5 cm/day.

In the 2006 survey, 50% of respondents disagreed or strongly disagreed with the statement, "Should water levels in the lake be controlled by artificial means", and 21% of respondents had no opinion. "Artificial means" refers to human-made dams or weirs.

OLLA has measured water levels, since 2003.

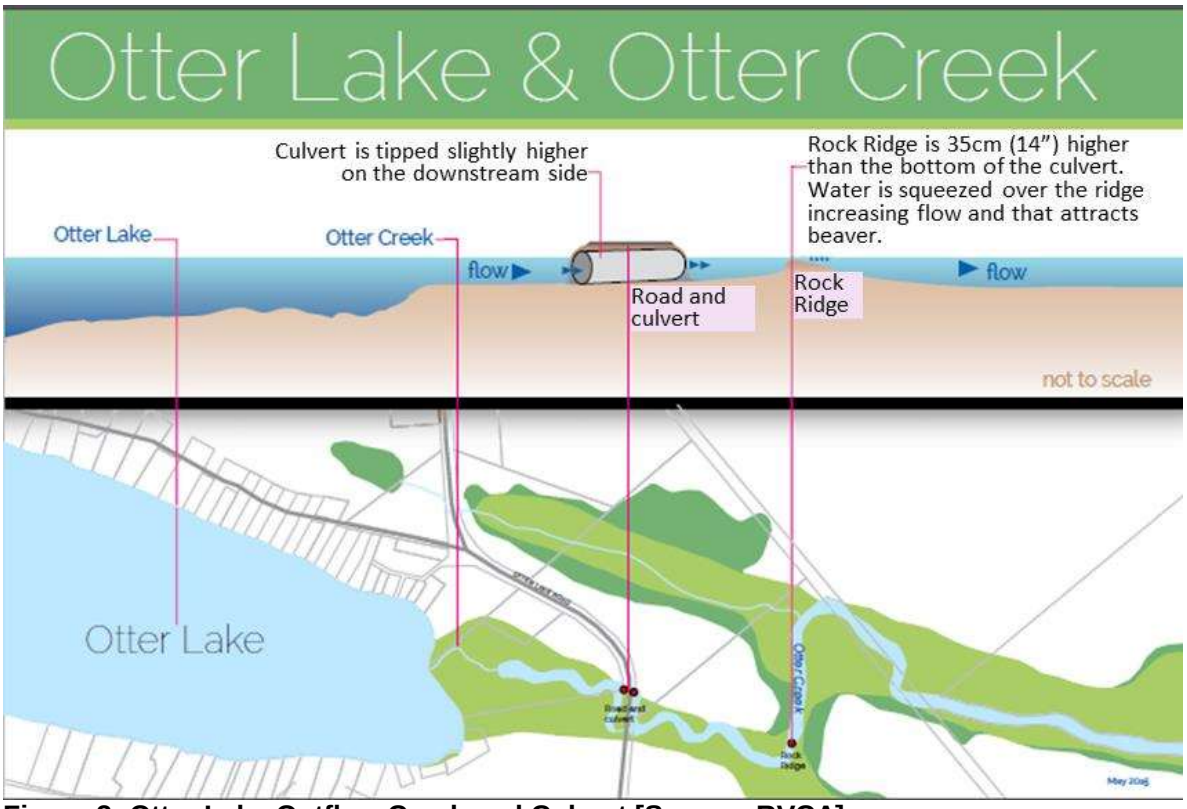


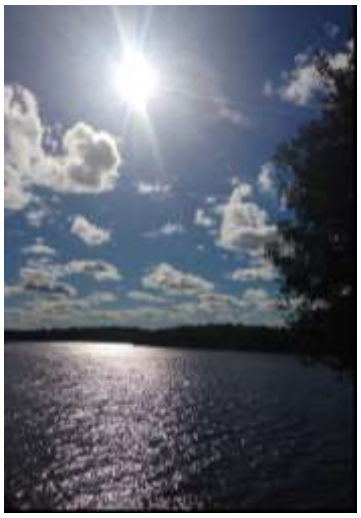
Figure 3: Otter Lake Outflow Creek and Culvert [Source: RVCA]

	Actions
Objective #4 **Monitor and address excessively high or low water levels.**	1. Continue to measure and record water levels on Otter Lake and communicate data to RVCA and post data on OLLA website. 2. Establish a standard measuring location on the lake. 3. Continue to leave to the forces of nature the natural flow of water into and out of Otter Lake. 4. Investigate and consider the value of bringing the Otter Creek Beaver Management Group under the umbrella of OLLA as a standing committee and amend the OLLA policy on water levels to reflect this. 5. Continue to monitor if there is a need for greater water out flow capacity from Otter Lake, than is currently provided by the existing culvert under Otter Lake Road.

<u>Educate Lake Community</u>

To ensure all landowners have an understanding and knowledge regarding the water levels monitoring program, it is important that the community receives current data.

	Actions
Objective #5 **Educate the community about water levels.**	1. Continue to report to the community on a regular basis (using OLLA website and newsletters).



3.3 Shoreline Health & Protection

Goal – Encourage the re-naturalization and retention of natural shorelines.

Re-naturalize Shorelines

Natural buffers of shrubs and trees can help filter water, reducing excess nutrients and particles from entering the lake. Excess nutrients can contribute to unwanted growth of aquatic vegetation or algae. Particles and eroding soils can reduce water clarity; and, over time, the settling particles can increase the rate of sedimentation, causing the lake to become shallower and changing the overall lake environment. Healthy shrubs and trees, with various heights, leaves, berries, fruits, and flowers, provide essential sources of food and shelter for so many species of wildlife. The shoreline environment – the very link between land and water – is used by over 90% of all life at some point during their lives. Ultimately, keeping our shorelines healthy keeps our lakes healthy.

In addition to protection and enhancing natural shoreline on the lake it is also important to maintain wood structure in the water. In terms of shoreline protection, wood structures in the water provide the following benefits:

- Protects shorelines by providing a barrier from wind and wave erosion.
- Absorbs wave energy produced by wind and power boats.
- Reduces sedimentation of the water caused by shoreline slumping due to bank erosion.
- Allows detritus to collect and settle on the lake or creek bed providing the substrate structure required for native aquatic vegetation to establish and outcompete invasive species.

Forested lakeshores also provide essential complex habitat through the perpetual process of shoreline trees falling into the water.

The RVCA Shoreline Naturalization Program is an established program that provides cost sharing and hands-on assistance to any waterfront property owner in the Rideau Watershed looking to naturalize their shoreline. The program provides project design, management and implementation, purchases plants and required tending materials on behalf of the landowner, the of which are as follows:

- Complimentary on-site visits with qualified staff that provide simple, cost-effective advice on “how to” protect your shoreline.
- Subsidized prices for native shoreline plants.
- Project planning and support including:
  – Development of shoreline planting plans and species lists
  – Ordering, shipping and handling of plants and tending materials
  – Planting advice and/or assistance-- full project management from start to finish
- Shoreline naturalization workshops, talks and project assistance for community or lake groups.

	Actions
Objective #6 **Re-naturalize altered shorelines and encourage the retention of natural shorelines.**	1. Establish a shoreline assessment program, as offered by Watersheds Canada “Love Your Lake”, to provide property owners with an assessment of the condition of their shoreline, and recommendations for improvement. 2. Develop an education program to inform landowners about the value and importance of natural shorelines, utilizing available RVCA pamphlets and leveraging tools such as Watersheds Canada’s: Shoreline Self-Assessment, and Action Checklist 3. Partner with RVCA to promote the RVCA’s Shoreline Naturalization Program.

3.4 Aquatic Plants

Goals – Identify, monitor and, control (where possible) aquatic plant species.

Aquatic Indigenous Plants

Aquatic plants and algae provide many important services to the lake environment, including oxygenating lake water, taking up available nutrients, filtering sun radiation, providing food sources and habitat for fish, amphibians, waterfowl, reptiles and invertebrates. Root systems of aquatic plants also aid in shoreline and lake bottom stabilization, removing sediment from the water and reducing the effects of wave action. Excessive vegetation growth and algal blooms can be detrimental to the lake ecosystem and can have aesthetic and recreational impacts affecting lake enjoyment. The State-of-the-Lake Report lists eight aquatic plants found to exist in Otter Lake in 2005. Field surveys conducted by RVCA, MOECC and MNRF since 1930 can be found in Appendices 1, 2 and 3 of the State-of-the-Lake Report.

	Actions
Objective #7 **Recognize the value of indigenous aquatic plants.**	1. Establish a volunteer-based committee to begin a formal species inventory listing. 2. Promote good stewardship practices and provide education and awareness about importance of phosphate-free detergents, regular septic maintenance and fertilizer-free properties via newsletters, website, presentations and workshops. 3. Provide information on targeted, effective and approved aquatic plant removal when required. 4. Encourage research into factors contributing to growth of aquatic plants by working with universities, RVCA and other partners.

Aquatic Invasive Plants

Plants that have been introduced from other geographical areas and other parts of the world may be considered “invasive species” if they threaten the natural environment, economy or society. Invasive species are not naturally occurring in local ecosystems and therefore can have drastic effects when introduced resulting in disrupting food webs, altering and degrading habitat, introduce parasites and disease, and lead to species at risk by pushing out native species that share the same habitat. Invasive species are the second biggest threat to biodiversity after habitat loss.

There has been no comprehensive study of aquatic invasive species (AIS) in and around Otter Lake. RVCA has an “Algae Watch” program and algal blooms and excessive aquatic plant growth should be reported for their research and monitoring. Continued inventories of AIS should be conducted and education programs provided to help understand how to control the spread of AIS.

	Actions
Objective #8 **Protect against introduction of aquatic invasive species (AIS).**	1. Establish a volunteer-based AIS identification and monitoring program. 2. Participate in the EDDMaps AIS Monitoring System provided by MNRF and OFAH for early detection, management and possible eradication. 3. Work with scientific communities/universities to understand how to control aquatic invasive species. 4. Ensure signs about responsibility to eliminate spread of AIS continue to be posted at boat launch area off Hwy 15. 5. Provide educational information about aquatic invasive species and the pathways for introduction via OLLA newsletters, website, public workshops, meetings and pamphlets.

3.5 Fish & Wildlife

Goal – Maintain healthy habitat and populations of fish and wild life in and around Otter Lake.

Otter Lake contains populations of small and large mouth bass, pike, catfish and a variety of "pan-fish", such as sunfish, pumpkinseed, perch and rock bass. Although Lake Trout and Splake were part of Ministry of Natural Resources and Forestry (MNRF) stocking initiatives for Otter Lake, all fish stocking stopped in 2003 when it was determined that lake temperatures in Otter Lake were not suitable for sustaining cold-water fish such as Lake Trout. The size of the fish population in Otter Lake is unknown at this time; a fish population assessment and spawning area survey would be beneficial.

There are numerous natural wetland areas around Otter Lake that are habitats for a variety of birds and other wildlife. The lake is currently home to about six loon pairs that nest in many of these wetlands. Great blue herons are often seen in and around our lake and wetlands and groups of Canada geese, mergansers and other water fowl raise their families on Otter Lake each year. Although a variety of wildlife species have been seen around Otter Lake, there is limited knowledge about the species and population levels of the wildlife in the Otter Lake watershed.

Forested lakeshores provide essential complex habitat through the perpetual process of shoreline trees falling into the water. This continuous recruitment of trees creates a wood-based physical structure in the littoral zone that is common on all pristine water bodies. Insects, fish, turtles, amphibians, birds, and other animals have also evolved with this abundance of near shore wood and it is essential to their life cycles. In addition to the benefits to shoreline protection, the benefits to aquatic ecosystems include:

Food Source

- Wood complexes are an important food source for invertebrates.
- Small fish feed on the abundance of invertebrates that are found around these structures.
- Larger fish, waterfowl and shorebirds all benefit from the abundance of invertebrates and small fish feeding around woody structures in the littoral zone.

Cover

- Cover from predators is essential for many fish and animals to successfully complete their life cycle.
- The nooks and crannies of wood complexes offer critters safety from predators while at the same time concentrating prey to make predators more efficient.
- Wood provides the structure on which many species must lay or attach their eggs, therefore these complexes provide quality spawning and nesting habitat.

Diversity

- Wood complexes in the littoral zone provide unique edge habitat along the shoreline.
- Edge habitats contain more species diversity and higher concentrations of species than the adjoining habitats themselves will have.
- Turtle species will use the wood to bask which is an important function for them as it helps them digest their food and the females to develop their eggs.




	Actions
Objective #9 **Protect fish and wildlife through education and partnerships.**	1. Request the Ministry of Natural Resources and Forestry to conduct a fish population assessment for Otter Lake. 2. Identify fish spawning areas in Otter Lake and Otter Creek. 3. Educate shoreline owners and visitors about fish habitat requirements, spawning schedules and near-shore and in-water activities that can disturb or destroy fish habitat and spawning sites, as well as importance of re-naturalization of shorelines. 4. Educate shoreline residents about best management practices to deal with species such as Canada Geese (e.g. replace grass areas with native ground cover and shrubs). 5. Work with Township of Rideau Lakes to ensure that developments to the official plan and zoning by-laws protect the natural areas and healthy habitats for fish and wildlife in the Otter Lake watershed.

3.6 On-site Sewage Systems, Water Quality & Re-Inspection

Goal – To Minimize Impact Through Education and Monitoring

Quantify numbers and types of systems on and near Otter Lake

Poorly constructed and maintained sewage systems pose a risk of nutrient and bacterial contamination of the lake and groundwater. In the last 20 years there have been rapid developments in sewage system technology especially for small lots and problem areas. Advanced secondary treatment options offer the benefit of discharging cleaner effluent into the soil compared to that from a leaching bed. There are also options available to mitigate the amount of phosphorus that is released from a sewage system such as the use of high mineral, low calcareous soil for the leaching bed. The 2007 re-inspection program conducted by the Mississippi-Rideau Septic Office, which included Otter Lake, has determined that there is a 56% deficiency rate. It follows that support and education for residents may be an appropriate mechanism to improve the collective performance levels. Determining numbers and types of systems currently in use is a first step and will assist OLLA to communicate the appropriate information to property owners, and ultimately to recommend and support the appropriate re-inspection program for Otter Lake.

	Actions
Objective #10 **Quantify the Systems on Otter Lake and Determine the Various Classifications**	1. Review Building Code Part 8 (On-site Sewage Systems) details and summarize in a pamphlet for public consumption. 2. Perform a field survey of lake residents, and/or obtain information from township, to determine type, age and numbers of systems and distribute the pamphlet. 3. Summarize data arising from the 2015 Shoreline Assessment with respect to existing system set-backs, the extent of vegetative buffer strips, and any sewage systems within the 1:100 year flood plain. 4. Summarize data and report.

Lobby for a mandatory re-inspection program

Surveys conducted by OLLA in 2006 and 2015 reveal that Otter Lake residents feel strongly that a form of re-inspection of systems on or near the lake is important to maintain water quality and protect residents from potential contamination from faulty systems. The 2015 survey indicates that 77% of responders would support a mandatory program. Furthermore, municipalities have the option to adopt a mandatory re-inspection program as outlined in Regulation 315/10 of the Ontario Building Code. The Township of Rideau Lakes has performed periodic inspections on a voluntary basis and reported results on the Township website. These results indicate a failure rate of 50-65% across several years and regions. Efforts will be made to lobby the municipality to create and apply a mandatory re-inspection program of waterfront properties within a 300 m distance from the high

water mark and/or where groundwater problems are encountered according to Ontario Geological Survey Groundwater Chemistry Data.

	Actions
Objective #11 **Lobby Principal Authorities for the Creation of a Mandatory Re-inspection Program**	1. Prepare an information package to include survey results, lake nutrient levels, and shoreline assessment results. 2. Research re-inspection models from other municipalities that have already implemented a suitable waterfront program. 3. Seek endorsement from Mississippi – Rideau Septic System Office. 4. Present information to Development Services Department at Township of Rideau Lakes with the goal of establishing a mandatory sewage system inspection program. 5. Monitor Township development decisions with respect to conformity to MOECC D-5-4 guidelines.

<u>Continue to monitor Phosphorus and Bacteria in support of efforts to improve sewage system performance and lake health and perform periodic random sampling to cover all areas of the lake</u>
Collectively, small contributions of phosphorus from septic systems can lead to visible water quality issues such as algae growth and a decrease in water clarity. Longer term effects such as a decrease in dissolved oxygen can result in stress to fish populations and promote the release of phosphorus from lake-bottom sediments. Phosphorus can be deposited in the lake from atmospheric dust, surface runoff and from the leaching action of sewage systems. Close monitoring over time can detect upward trends in nutrient levels which can be useful to determine potential impact from development. Bacteria testing can be useful to locate problem areas where point-source contamination is occurring. RVCA regularly samples at test sites on the lake and in Otter Creek. OLLA compliments these tests with a range of sampling at different sites.

	Actions
Objective #12 **Maintain and Expand OLLA Testing Program and Community Education**	1. Continue regular phosphorus and coliform bacteria testing and reporting. 2. Perform random testing for coliform bacteria at near-shore sites. 3. Perform periodic tests in inflow creeks to monitor upstream water quality. 4. Perform periodic tests in Otter Creek to monitor downstream water quality. 5. Report annually or immediately if E-Coli tests are above 20. 6. Educate community by providing information on when to pump out septic systems and holding tanks. 7. Review and report on the 2015 Ontario Geological Survey Groundwater Chemistry Data for the Otter Lake catchment area.

3.7 Development Control

Goal – Sustainable Development

To investigate existing planning tools used by the Township and by other municipalities in Ontario to determine the potential for improving planning decisions as they relate to the protection of water resources

The Provincial Policy Statement (PPS) requires municipalities to guide development in a manner that protects water resources. This can be done through a variety of development policies available to municipal planners. The Township Official Plan captures the intent of the PPS and the Township Zoning Bylaw spells out in more detail how development decisions are made. The Township delegates environmental assessment to the RVCA which deploys a detailed site-assessment mechanism to assess the site for the development being considered. The Township however is not bound by the opinion of the RVCA or other agencies such as Parks Canada and may over rule the report.

Otter Lake has characteristics of both mesotrophic and oligotrophic lakes and as such can be sensitive to development on the shoreline and within the watershed especially within a 300 meter distance from the lake, inflow creeks and wetlands. Otter Lake used to support a native Lake Trout population (which is an indicator species for healthy cold water lakes) but water chemistry analysis performed over the last 40 years by OLLA, the MNRF, and RVCA has demonstrated that the aquatic environment is no longer suitable for Lake Trout primarily because of low oxygen levels in the hypolimnion (deep water) during the late summer. This may be a reaction to development stress but other unknown factors may be contributing to their demise as well, such as destruction of spawning grounds. It is known that nutrients, especially phosphorus, can contribute to a decline in water quality. Residential units located on and near the lake can be significant sources of phosphorus through sewage systems and surface runoff. The rate at which phosphorus enters the lake is a function of many factors both natural and anthropogenic including the type of sewage system, soil conditions, setback and vegetative buffer strips. The 2010 MOECC Lake Capacity Assessment Handbook assumes that a 50% rise in phosphorus above the pre-development levels, is a target which will keep water quality within reasonable expectations of lake users. Lake survey data from OLLA and the MNRF indicate that cottage and home residential development has increased from 209 in 1974 to 295 in 2014. Trailer numbers in the 4 resorts have increased from 101 in 1974 to 195 in 2005. Also there is a trend towards seasonal cottages being converted to permanent homes which may contribute more nutrients measured on an annual basis.

Based on the 2010 MOECC Lake Capacity Assessment Handbook, development capacity is defined as the number of cottage, home and resort properties that the lake environment can support before nutrient levels exceed the 50% threshold. In a 2014 Report by Hutchinson Environmental Consultants, it is recommended that existing site-assessment protocol be supplemented with the use of lake capacity and recreational capacity data. OLLA is committed to encourage the municipality and government agencies to calculate the development and recreational capacities of Otter Lake and use this as tools to develop planning policy and decisions.

	Actions
Objective #13 **Quantify Residential Units, Farmland, Logging Operations, and Unevaluated Natural Areas in the Otter Lake Catchment Basin**	1. Determine numbers for each resident category, including commercial, within 300 meters of the high water mark. 2. Determine the area and type of farmland in the Otter Lake catchment basin. 3. Determine extent of logging operations within the Otter Lake Catchment Basin. 4. To encourage the MNRF in the identification, classification and zoning of unevaluated natural areas in the Otter Lake Catchment Area.

Evaluate Capacity and Recreational Models in Use in Ontario

Various capacity models have been implemented in other Ontario municipalities. Seguin Township, the City of Elliot Lake, and District Municipality of Muskoka are 3 municipalities that have implemented and use different types of capacity models in the planning process. The Township of Rideau Lakes uses site-assessment in their protocol which requires waterfront property to be inspected and "scored" by RVCA prior to issuing permits. This is a valuable tool in encouraging good shoreline and watershed stewardship. This process alone does not provide an estimate of development capacity for a waterbody nor is it entrenched in local planning policies. Planners and the scientific community recognize that lake capacity models have limitations. They are not capable of predicting with scientific certainty, what the development capacity of a lake will be. However most feel that they are a useful tool that can be used in making planning decisions that prevent the creation of "over capacity" lakes. Where lakes are classified by sensitivity to nutrient loading or some appropriate set of parameters, planners can create policy that is more site-specific and direct development where it may be less harmful.

	Actions
Objective #14 **Evaluate Existing Models and Systems of Lake Classification**	1. Work with RVCA and MNRF to investigate and evaluate the use and success of capacity models that have been implemented in Ontario. 2. Investigate and evaluate lake classification systems that have been used in Ontario. 3. Assess how the RVCA site assessment program as defined in: *The Assessment of Municipal Site Evaluation Guidelines for Waterfront Development in Eastern Ontario's Lake Country, 2014 (Hutchinson Environmental Consultants)* is used to review development applications in the Township. 4. Work with the Township to ensure that appropriate development standards are established, maintained and monitored, to ensure that new development and redevelopment will protect or restore water quality.

Develop an Otter Lake Capacity Model and/or Lake Classification System based on best practices deployed by existing municipalities

If best practices of other municipalities are determined to be suitable for Rideau Lakes, the appropriate modelling for Otter Lake could be developed which would provide a useful tool for directing environmental and planning decisions in the future.

	Actions
Objective #15 **Develop Appropriate Plan or Classification System for Otter Lake**	1. Advise Township Development Services of objectives. 2. Invite stakeholder to participate in the process. 3. Communicate results to stakeholders and OLLA. 4. Possible inclusion in Official Plan. 5. Include consultation with Rideau Lakes Networking Group.

3.8 Social & Recreational

Goal – A sense of community, active lake stewardship and respective behavior will be encouraged

Responsible Recreational Boating

Boating is an integral recreational activity on the Otter Lake – whether it is motorized or not, or whether it is to fish, tow skiers or tubers, or take pleasure cruises. In recent years, motorboats have been increasing in size and horsepower, and sometimes this has resulted in higher noise levels. There are some users who may not recognize the effect of their activity, including the impact of large wakes on shorelines and vessels moored at docks, as well as on non-motorized boats such as canoes and kayaks. Others may not be aware of legal requirements for boating, such as the legal speed limit of 10 km/h within 30m of shore [Canada Shipping Act; Boating Restrictions Regulations]. Excessive boat speeds and unsafe operation of any vehicle may endanger lives and the natural environment, including loon chicks and nesting habitats.

It is also very important especially if bass fishing close to shore that any "caught" hooks are retrieved and not cut and left where they may cause injury to humans or dogs swimming.

The results of the 2006 survey of landowners indicated that many aspects of recreational boating on Otter Lake were of considerable concern.

	Actions
Objective #16 **Encourage responsible and respectful boating behaviour**	1. Develop a Boating Code of Conduct to minimize negative impacts on the lake, shoreline, wildlife, safety of swimmers and peace and quiet. 2. Provide map of shoals and lake depths for safer boating.

	Actions
Objective #17 **Quantify recreational boat and seadoo use.**	1. Monitor recreational use and conduct a survey of boat launch use by non-residents.

Noise and Light Pollution

The peace and tranquility of cottage country is very important to many cottagers day and night.

There are times on a Saturday morning it is more like being in a subdivision in the city than at the lake with the lawnmowers, weed trimmers and other motorized equipment in use. With a more natural landscape we all enjoy less noise as well as less work when getting away to the cottage for the weekend.

The quiet and darkness of the shorelines is an important social component of cottagers' enjoyment of the lake as well. Excessive and unnecessary lighting detracts from natural ambiance of the lake and results in reduced visibility of the starscape. Unnatural lighting also affects sensitive lake biological systems, such as disrupting feeding and breeding behaviours of nocturnal and crepuscular species, for example bats, moths, walleye.

Retaining and enhancing dark skies are an essential element of the character of the lake and should be encouraged. Some owners may not be aware how far the floodlights, at the corner of their cottage is reflecting light out across the lake.

	Actions
Objective #18 **Retain and enhance dark skies.**	1. Promote awareness of the importance of best practices to help maintain a dark night sky. 2. Encourage all shoreline property owners to use "dark sky friendly" lighting. 3. Request owners of local cell phone towers to install light deflectors or some other means to minimize impact on area residents and effect on dark skies. 4. Work with Township of Rideau Lakes on better process for notifying community when new cell phone towers are being planned for the area and allowing for input.

<u>Sense of Community</u>

Many lake communities in Ontario hold events to promote a greater sense of community. Some of these events are used to raise money for specific projects, charities, etc.

OLLA hosted its first annual Family Day on June 7, 2015 at Camp Otterdale. This social event provided an opportunity for landowners to meet and mingle in an informal, fun atmosphere, as well as have an opportunity to become better informed on important matters concerning Otter Lake. Continuing this event and considering other events is recommended.

	Actions
Objective #19 **Promote a sense of community among Otter Lake landowners.**	1. OLLA to create a Social Committee. 2. Continue to hold the OLLA Annual Family Day as a social event as well as an opportunity to educate and promote lake stewardship. 3. Consider holding other events such as a sailing regatta and/or paddling regatta. 4. Promote OLLA membership and greater participation at the AGM. 5. OLLA to watch for and monitor developments that may impact the community (mail delivery, road names, etc.)

4.0 IMPLEMENTING THE SUSTAINABLE LAKE PLAN

The preparation of this plan is just the first step. The important work of implementation has yet to be undertaken, and we encourage everyone to engage in its recommended activities both as individual stewards of the lake as well as participation in OLLA activities.

Volunteers are needed to carry out new and ongoing initiatives identified in the Lake Plan. Please contact OLLA at postmaster@otterlake.org to lend your support.

For more information and updates on the Lake Plan please go to http://www.otterlake.org

5.0 List of Documents Relevant to Sustainable Lake Plan

Note: The following documents are available on the OLLA website, www.otterlake.org

- ✓ Summary of Action Items – Otter Lake Sustainable Lake Plan
  - This document is updated frequently so check it often.
- ✓ State-of-the-Lake Report for Otter Lake
- ✓ 2006 Survey Results of all Landowners
- ✓ 2015 Survey Results of all Landowners