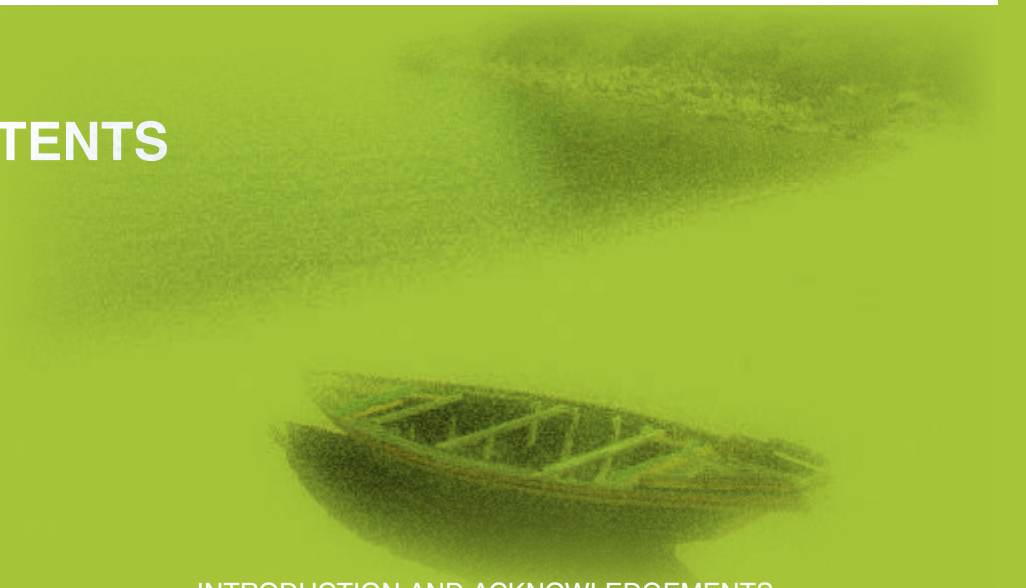
LIVINGSTONE LAKE
STEWARDSHIP PLAN

Recommendations for protecting our environment

TABLE OF CONTENTS



INTRODUCTION AND ACKNOWLEDGEMENTS

INTRODUCTION

The reasons for preparing this Stewardship Plan developed over time and because Livingstone Lake property owners were concerned about how to protect this environment we all love and enjoy.

In the early 2000s, residents were worrying about the two Livingstone Lodge properties (see *Social History of Livingstone Lake, Appendix 1*) that would likely be coming up for sale. There were more formal discussions at the annual lake picnic in 2003 and those present agreed to set up a steering committee to look at forming a lake association.

The Steering Committee met for the first time in May 2004 and over the next three months drafted a constitution, including a Mission Statement and Objectives (see *Appendix 2*). The constitution was ratified at the annual picnic on August 21, 2004. Thus, the fledgling Livingstone Lake Association was launched and an Executive Committee elected.

The new association initially worked on several issues of concern to lake residents, including successfully lobbying against a proposal to retrieve sunken logs from the back bay (see *Social History of Livingstone Lake, Appendix 1*).

In the process of dealing with these various issues, it became clear that a Lake Plan would help to guide the future actions of the association. A planning process would enable us to identify the natural integrity of the lake and put in place a strategy to protect it. It would also give us a unified voice to speak to officials, politicians, or others who could have an impact on our lake.

To that end, in 2008 the association applied for and received a $1,000 grant from the Township of Algonquin Highlands to assist with the undertaking of a lake plan.

The planning process started in earnest in 2009, helped by the release of the Federation of Ontario Cottagers' Associations (FOCA)'s Lake Planning Handbook.

In 2010, the association conducted a survey of all lake residents to identify their chief areas of concern.

With the information from the survey (see *Appendix 3*), the Planning Committee met with French Planning Services Inc. in the spring of 2011 for guidance on how to proceed with a lake plan. As a result of that meeting, the Committee agreed to create a Lake Stewardship Plan, first drafting the Vision and Principles (see page 3) as well as an outline, then starting work on the various chapters of the plan.

Each of the six chapters covers an area of concern that was identified in the 2010 survey, with each chapter providing general information, related stewardship tips for lake residents, related stewardship actions for Livingstone Lake Association and finally a list of references, including websites, which were sources of information.

Work on the Stewardship Plan continued over the next four years, leading to its completion and publication in 2015.

We consider the plan a living document. It is important that we keep it up to date and that it reflects changes in our circumstances and environment (see *Implementation of Stewardship Actions*, page 60).

It seems fitting to refer to the Mission Statement that was approved when the Livingstone Lake Association was constituted in August 2004 (see *Appendix 2*), namely "to foster a co-operative spirit for the enjoyment, protection and preservation of Livingstone Lake for future generations." This statement is still relevant and sums up the direction of the Stewardship Plan.

ACKNOWLEDGEMENTS

Thanks to all those involved in this plan. Writing was by Karen Hammond, Wayne Parker, Brian Wiese and Sally Wismer, all under the capable leadership of Lake Steward, Karen Hammond. We received invaluable input and guidance from Randy French of French Planning Services Inc. and referred constantly to the Federation of Ontario Cottagers' Associations' Lake Planning Handbook, the Coalition of Haliburton Property Owners' Associations' Handbook for Lake Stewards along with their other very helpful material, and many sample plans from other area lake associations. Design was provided by Amy McCarten's Toronto marketing agency, Myriad Inc. We are grateful for financial support from the Township of Algonquin Highlands and also from the members of the Livingstone Lake Association who have waited patiently for this plan to reach fruition.

LIVINGSTONE LAKE ASSOCIATION'S STEWARDSHIP VISION AND PRINCIPLES

VISION STATEMENT

Livingstone Lake is a small lake community with plentiful Crown lands and pristine water quality with a rare, self-sustaining lake trout population along with abundant other aquatic and wildlife species. It remains a quiet haven where present and future generations enjoy peace and tranquility, natural beauty and safe recreational activities while respecting each other and the environment.

PRINCIPLES

- **Protect Lake Character** – We understand the need to protect, enhance and rehabilitate the natural, social, physical and historical character of the lake.
- **Raise Awareness and Communicate** – We will emphasize a combination of raising awareness, communicating and voluntary compliance over legislative and regulatory constraints.
- **Adaptive Approach** – We will base our actions on current science and knowledge, and will adapt to new circumstances as they arise.

"The Township of Algonquin Highlands, in its Official Plan updated in 2010, has designated Livingstone Lake as highly sensitive to further shoreline development and at development capacity in terms of its water quality as it impacts lake trout."

LIVINGSTONE LAKE DESCRIPTION

Livingstone Lake is a relatively small body of water located about 24 km northeast of the village of Dorset in what was formerly Livingstone Township but is now part of the Township of Algonquin Highlands in the County of Haliburton. It is located at 45° 25' 30"N in latitude and 78° 43' 30"W in longitude. Access to the lake is available from an all-season road, Haliburton County Road 12.

There are currently 38 properties (four of them are undeveloped) abutting the shore of the lake as shown on the zoning map on page 5. Three of the property owners are full-time residents, while the rest are seasonal occupants.

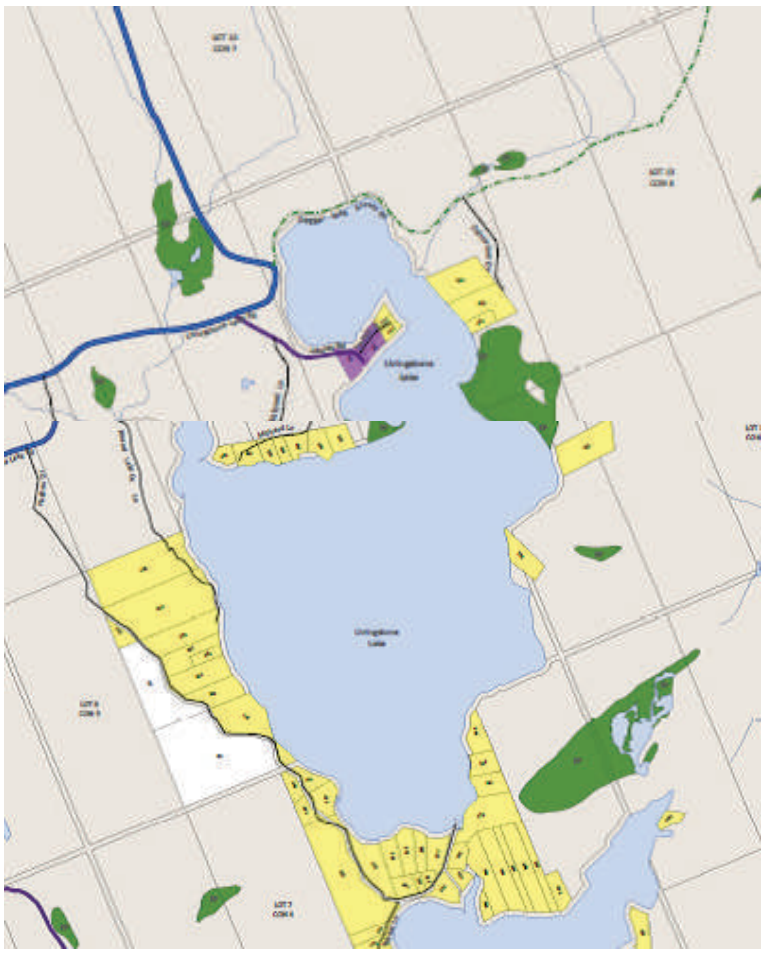
A brief history of current and past property ownership is included in *Appendix 1* at the end of the Plan.

LIVINGSTONE LAKE DESCRIPTION

Livingstone Lake is part of the South Branch Muskoka River sub-watershed, with headwaters further north in Troutspawn/ Wolf Lakes which flow into Livingstone via Livingstone Creek. At the south end, Livingstone Lake in turn drains into Bear Lake/Kawagama/ Lake of Bays via a short creek which drops about 23 metres over approximately 91 metres in length.

Approximately 2.1 by 4.1 km in size with a surface area of about 197 hectares, Livingstone Lake has two basins, one in the back bay and a larger, deeper basin near the middle of the main lake. The first is 20 metres deep and the larger is more than 40 metres deep. The lake has a shoreline circumference of 8.7 km. At least 50% of the lakeshore is wetlands or forested Crown land.

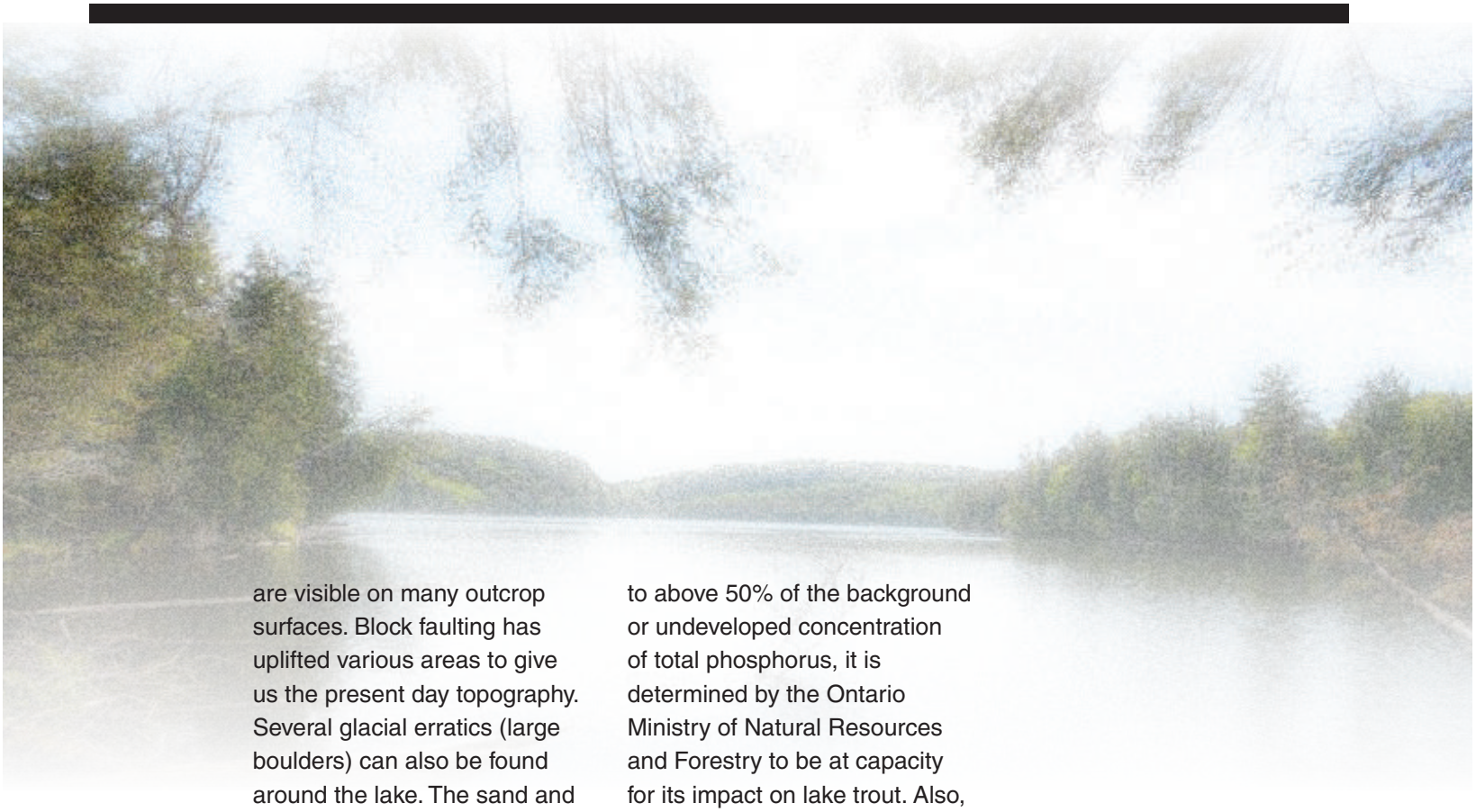
The lake rests on metamorphic rocks of the Grenville Province of the PreCambrian Shield. Rock dating in the general region shows these rocks to be at least 1.42 to 1.47 billion years in age. The largest rock exposure consists of a 50 m high cliff located on the eastern shore of the lake (see front cover). The area has been glaciated and glacial striae



Zoning Map – Livingstone Lake

- Shoreline Residential Type Two
- Crown Land
- Environmental Protection
- Rural
- Commercial/Industrial
- County Road
- Township Road
- Forest Road
- Private Road

Source: Township of Algonquin Highlands



are visible on many outcrop surfaces. Block faulting has uplifted various areas to give us the present day topography. Several glacial erratics (large boulders) can also be found around the lake. The sand and gravel in the area was likely deposited on the shores of an ancient glacial lake during the last receding ice-age.

The Township of Algonquin Highlands, in its Official Plan updated in 2010, has designated Livingstone Lake as *highly sensitive to further shoreline development and at development capacity* in terms of its water quality as it impacts lake trout.

A lake is determined to be at capacity through its phosphorus and/or dissolved oxygen content. If additional development would bring the phosphorus readings on a lake to above 50% of the background or undeveloped concentration of total phosphorus, it is determined by the Ontario Ministry of Natural Resources and Forestry to be at capacity for its impact on lake trout. Also, if the dissolved oxygen readings of a lake are at, or lower than 7 ppm, it is determined by the MNRF to be at capacity for its impact on lake trout. If either of these readings occurs, then no new development can take place. Development of existing, approved lots can take place but no new lots can be created. Livingstone Lake's dissolved oxygen content, according to the Ontario Ministry of the Environment, is generally at 7 ppm. With that information, the Township has designated Livingstone Lake as at capacity for development.

STEWARDSHIP OBJECTIVES, TIPS AND ACTIONS

"The quality of our water is affected by all that goes into it. Some of that occurs naturally but much of what affects water quality is directly caused by us."

1. WATER QUALITY

Lakes are categorized based on their condition or productivity level during their aging process, known as their trophic status. Eutrophication is a natural aging process of lakes from nutrient enrichment, which causes increased plant and algae productivity over time. Human activity increases the rate of aging causing drastic changes such as altered species composition and compromised drinking water quality.

Livingstone Lake is characterized as a dystrophic or tea-stained lake. It is actually lightly stained from the dissolved organic matter originating from its relatively large upstream drainage area. Tea-stained lakes, with high dissolved organic carbon, do not show the clear relationship between increased phosphorus

Livingstone Lake Mean Total Phosphorus Concentration (ug/l)

2007	4.5
2008	6.3
2009	5.0
2010	4.3
2011	5.5
2012	3.9
2013	5.5
2014	5.4

Source: Lake Partner Program. Dorset Environmental Science Centre. Ontario Ministry of the Environment and Climate Change.

and algae growth that is usually seen in other lakes in the Canadian Shield. Generally there can be more phosphorus in a dystrophic lake without the occurrence of algal blooms. The chemistry of these type of lakes is quite complex.

All surface waters are subject to nutrient, sediment and toxic contamination, some of which may come from the lake's own substrate or runoff from the landscape. Lakes are dynamic and fragile systems, responding not only to artificial stimulus but also to natural fluctuations. Basin size, volume, soil, bedrock and climate make up the lake's buffering capacity.

Shoreline development and land use changes, acid rain and climate change have negatively impacted the quality of lake water across southern Ontario. While there is data available, it is not consistent enough to make accurate assessments of how water quality is changing over time. Water quality sampling has been conducted sporadically and for differing purposes on these lakes,

There has not been a long history of water quality sampling for Livingstone Lake. Water clarity and phosphorus data have been collected by the Livingstone Lake Association since 2007 as part of the Ministry of the Environment and Climate Change's (MOECC) and the Federation of Ontario Cottagers Associations' (FOCA) Lake Partner Program. This program has also been monitoring calcium levels in area lakes since 2008.

Phosphorus

Our mean phosphorus content in 2014 was 5.4 ug/l. This is a good, unproductive (non-algal producing) reading and it is consistent with our readings for the previous six years. It means we do not have excessive nutrients in the lake and should not have problems with increased algae production. The deep and unproductive waters of the lake are typical of northern lakes and should provide excellent conditions to support a healthy lake trout population.

Livingstone Lake Clarity Readings (m)
(Annual Average Ice-free Secchi Depths)

2007	4.4
2008	2.8
2009	3.9
2010	3.8
2011	4.1
2012	4.6
2013	4.6
2014	3.8

Source: Lake Partner Program. Dorset Environmental Science Centre. Ontario Ministry of the Environment and Climate Change.

Water Clarity
Water clarity readings are also taken as part of the Lake Partner Program. Clarity is another indicator of changes in a lake that may not be seen by total phosphorus readings alone. Readings for water clarity (the depth at which a Secchi disk, lowered into the water, can be seen) have been done in the main basin since 2007 and average 4 metres in depth. These numbers indicate Livingstone has moderate clarity, somewhat less than other lakes in the area. We don't know why this is, but we do know that light penetration in a lake can be altered by dissolved organics or by sediments. These could simply be the natural state of the lake or they could be caused by human activity.

Dissolved Oxygen
Oxygen plays an important role in determining the type of organisms that will live in a lake. Some species, such as trout, need consistently high oxygen levels to survive. Livingstone's dissolved oxygen content decreases at depth. Its most current reading from 2009 shows less than 7 ppm of dissolved oxygen, lower than other area lakes with self-sustaining trout populations. The MOECC will be conducting new oxygen readings on area lakes starting in 2014. Livingstone Lake is scheduled to be done in 2015 (see *Livingstone Lake Description*, page 4).

Calcium
Calcium is a nutrient required, to varying degrees, by all

Lowering a Secchi Disk into the Water

Source: Lake Partner Program. Dorset Environmental Science Centre. Ontario Ministry of the Environment and Climate Change.

Livingstone Lake Calcium Concentrations (mg/l)

1988	2.9
2009	1.8
2010	1.9
2011	1.5
2012	1.9

Source: Lake Partner Program. Dorset Environmental Science Centre. Ontario Ministry of the Environment and Climate Change.

living organisms. For example, water fleas (not to be confused with the invasive, spiny water fleas), tiny organisms which are important members of aquatic ecosystems, are very sensitive to declining calcium levels. Crustacean zooplankton such as these use calcium to regenerate their body coverings as they grow. They eat algae and in turn provide food for larger organisms like fish. Crayfish use calcium in a similar manner.

Recent studies in Muskoka have shown that the survival of some zooplankton species is jeopardized when lake calcium concentrations fall below 1.5 mg/l. Many lakes on the Precambrian Shield in Ontario are nearing, or have recently crossed, this important threshold. The most currently available reading of calcium in Livingstone Lake is from 2012 at 1.9 mg/l. In 2011, the reading was 1.5 mg/l.

The causes of lake calcium decline are varied and are an active area of scientific research in Ontario and around the world. The main source of calcium for lakes is the bedrock and soils within their watersheds. In the mid-1900s, as acid rain intensified, it caused calcium to move from watershed soils into lakes faster than it could be replenished.

Acidic deposition is not the only stressor affecting calcium levels in soft-water lakes. Both the removal of calcium-rich timber and the re-growth of forests following harvesting place pressure on the available pool of calcium in soils. Harvested lumber takes calcium out of the ecosystem and new trees planted in their place use up calcium in the soil.

WATER QUALITY STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

Septic Systems

Septic systems are typically the largest single source of phosphorous in our lakes. Most septic systems will leak phosphorous after five to ten years. Regular pump-outs can prevent phosphorous from entering the lake.

Septic systems, outhouses and greywater pits require specific soil beds. Deep sandy soils are ideal because sand is a good leaching medium for waste and surface runoff. However, sandy soils are not good retainers of phosphorus. What goes into sandy soil usually goes out into the water because there are not enough iron particles to bind the phosphorus. Clay soils or exposed bedrock, on the other hand, are unsuitable because the waste has nowhere to go.

Where sandy soil is absent, bedrock or clay is usually blasted and/or removed and clean fill (sand, soil) is imported to the site.

*Septic System, Outhouse and Greywater Management Tips (*see also *Septic Health Resources, Appendix 13)*

- Be conscious of what substances you flush down the drain or toilet. Avoid putting fats and oils into your septic system or greywater pit.
- Never dispose of any toxic chemical waste down the toilet or drain or in your outhouse. Paints, oil, gasoline, antifreeze or chlorine can be disposed of at the Dorset Landfill site on specified Hazardous Waste Collection Days. Antibiotics and other medicines can be returned to your pharmacy for safe disposal.
- Have an effluent filter installed in your septic tank, to prevent solids from entering and clogging the leaching bed.
- Do not use septic tank cleaners. They do not replace the need for regular pumping. Additives can break down the solids sending them into the leaching bed. Additives also disrupt the beneficial bacteria.
- Use strainers in all your sinks, tubs and showers to capture hair and food waste.
- Purchase non-phosphate and other environmentally-friendly products for household cleaning, dishes and laundry. *Never use anti-bacterial soap or products containing bleach* – these soaps and similar caustic chemicals kill the

"Most septic systems will leak phosphorous after five to ten years."

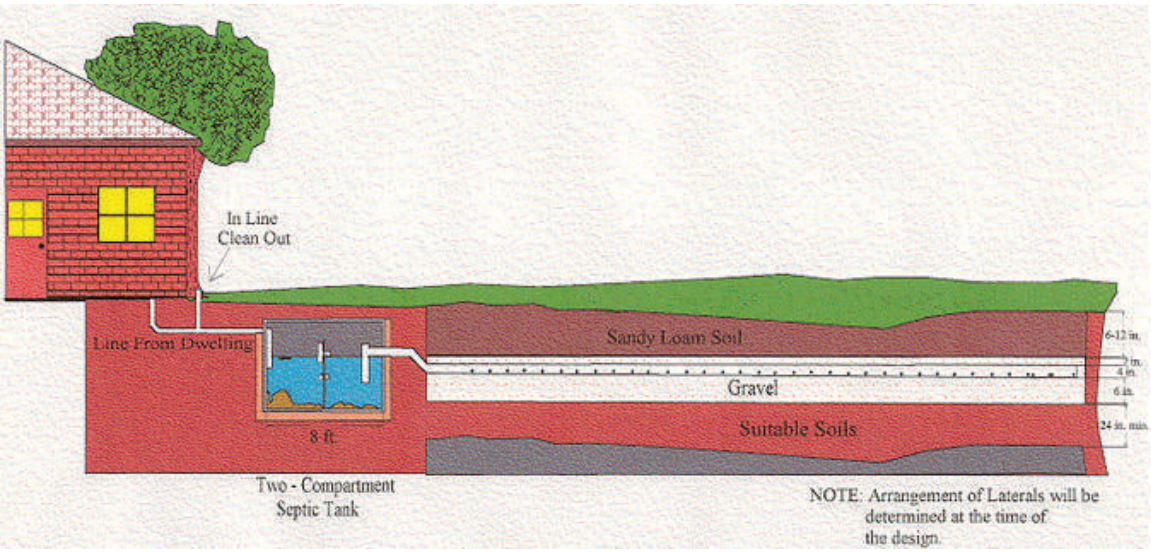


Diagram of a Typical Septic System

Source: VanDelden On-Site Wastewater Systems, West Boerne, Texas

beneficial bacteria in your septic system.

- Use alternative household cleaners such as baking soda and vinegar.
- Know the location of all the components of the septic system or greywater pit, and ensure that heavy vehicles are kept away. Do not drive or park on top of your septic bed. You will compact the soil, thereby limiting its permeability and possibly crushing your distribution pipes.
- Do not use snowmobiles over the leaching bed area in winter. This will reduce the snow cover's insulating effect and the weight of ATVs and snowmobiles will also compact the filtration material.
- Do not build patios, decks, parking areas or tennis courts in the area of the septic tile bed.
- Do not plant trees or shrubs on top of the septic tank or leaching bed because roots can clog pipes. Try native grasses and flowers.
- Avoid planting certain species of trees around the leaching bed area. Willow roots for instance can clog pipes and shade the septic area, thereby slowing evaporation.

Septic Pump-out Tips

- Pump out your tank on a regular basis (at least every three to four years). Some systems may require more frequent pumping.
- If you are unsure when your tank was last pumped, call a contractor to have it pumped this year. Then have it inspected in two years' time. This will provide the qualified technician with sufficient information to recommend how often your septic system should be pumped. Frequency will depend on use and household size.
- Use a long stick to measure the sludge and scum levels in your tank before pumping. The staff at Muskoka Septic Services recommends pumping-out when the scum level reaches 8 to 10 inches in thickness.
- Ensure access to the septic tank for proper maintenance and servicing.
- Check your system for leaks or odours annually and ensure any leaks are serviced immediately to minimize leaching into the lake.
- Inspect your tank during pump out and keep a detailed record of repairs.

Water Conservation Tips

- Reduce your water use to prevent sludge disruption in your septic tank. When the sludge is disrupted, the effluent cannot drain properly. The volume of water going through your septic system or greywater

pit affects the amount of nutrients like phosphorus or other pollutants being washed into the lake.

- Take shorter showers, rather than full baths. Install a low-flow showerhead. A low-flow aerator can cut the water flow by 50% without lessening the spray.
- Avoid overloading the septic system by washing laundry in small batches. Install a water-efficient, front-loading machine.
- Use dishwasher only with full loads.
- Brush your teeth with the tap off. Leaving the tap running while brushing your teeth can use up to 15 litres of water per minute.
- Fix leaky toilets and flush less often. Install a low- or dual-flush toilet.
- Do not water your lawn around the leaching bed area; extra water can reduce the bed's ability to absorb and treat waste water.
- Direct rainwater from roofs, patios and driveways away from the leaching bed to avoid system overload.

Natural Shorelines and Surface Runoff

Soil and plants in a naturalized landscape absorb storm water prior to it reaching the lake. If your property has paved or leveled surfaces, steep grades, and grass with no vegetated buffer, the resulting storm water runoff can contaminate the lake and surrounding habitat, as well as contribute to the erosion of your property.

Rain and melting snow create storm water trails that move down-slope towards the lake. Along its path, the water will collect surface contaminants, pollutants, nutrients, pathogens and sediments. Maintaining a natural shoreline will increase nutrient uptake by plants and reduce erosion and nutrients leaching into the lake.

"Maintaining a natural shoreline will increase nutrient uptake by plants and reduce erosion and nutrients leaching into the lake."

Runoff Reduction Tips

- Assess potential erosion hot spots on your property such as shorelines, stream banks, and areas with no natural deep-rooted vegetation (trees and shrubs). Plant native trees and vegetated buffers.
- Avoid clear-cutting trees and vegetation and do not remove more than 10% of the trees within 30 metres of the shoreline (see *Appendix 4*, Shoreline Tree Preservation By-Law Q&A).
- Prevent the loitering of Canada geese and the resultant accumulation of their droppings, by reducing grassed lawns and by planting and maintaining a buffer zone of thick and tall vegetation around your shorelines.
- Keep steep slopes naturally-vegetated to minimize the movement of surface runoff towards the lake. Trails and pathways should be curved to reduce direct discharge.
- Do not cover surfaces with non-porous materials such as pavement, concrete or rocks.
- Install rain barrels to capture excess rain from hard surfaces. Use this water on gardens and outdoor planters.
- Do not use salt on driveways and paths – use sand or environmentally-friendly products like calcium magnesium acetate or potassium acetate.
- Do not dump gas, oil, anti-freeze or other toxic chemicals on your property. During rain storms these chemicals can leach or drain into the lake. Take all household hazardous materials to the Dorset Landfill site on specified Hazardous Waste Collection days.
- Avoid using fertilizers or pesticides near the lake or water source. Choose eco-alternatives such as organics and compost.
- Be careful with soap. The use of soaps and other detergents – even those that are biodegradable – can harm or kill some wildlife species and create algae blooms if the suds enter the water directly. Soaps should always be phosphate-free and all dishwashing and bathing should be done on land, far away from shore.
- Prevent erosion of the shoreline by reducing your boat speed and your wake when near the shore.

Boats

Boats need to be managed to prevent contamination of the lake from alien and invasive species as well as toxic substances. See the *Safe Boating* chapter of this plan for tips on boat management.

WATER QUALITY STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Continue to participate in the Lake Partner (MOECC/FOCA) and Ice Watch (Environment Canada) programs. Consistently collect water quality information to gain a more detailed picture of how fresh water changes throughout the year and how Livingstone Lake is responding to changes in land use and efforts to improve its quality.
- Work to raise awareness of how Septics, Runoff and Boats affect lake water quality, offering advice and guidance where possible.
- Investigate the nature of headwater lakes and streams flowing into Livingstone Lake, in order to assess what impact they might have on Livingstone's water quality.

REFERENCES

At Capacity; what does it mean, is your lake at capacity? Gerry Moraal, Ministry of Natural Resources and Forestry, Minden, for Coalition of Haliburton Property Owners' Associations. 2010.

About Paint Lake; a community plan for the Paint Lake Residents. Paint Lake Ratepayers Association. 2005.

Lake Planning Handbook for Community Groups. Federation of Ontario Cottagers' Associations (FOCA), Haliburton Highlands Stewardship Council and French Planning Services Inc. 2009.

Lake Stewardship Plan Grace and Dark Lakes. Grace and Dark Lakes Cottagers Association. August 2006.

Lakeshore Capacity Assessment Handbook; protecting water quality in inland lakes on Ontario's Precambrian Shield. Ontario Ministries of the Environment, Natural Resources and Municipal Affairs and Housing. May 2010.

Living on the Edge; a handbook for lake stewards Haliburton Highlands. Coalition of Haliburton Property Owners' Associations. May 2011.

Living Sustainably in Seguin Township; a handbook on sustainable living practices for shoreline property owners. French Planning Services for the Township of Seguin.

Mountain Lake Stewardship Plan; a guideline for a healthy lake. Mountain Lake Property Owners Association.

Results of a Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009. Stephen Scholten, Ontario Ministry of Natural Resources and Forestry Bracebridge. 2010.

The Shore Primer; a cottager's guide to a healthy waterfront. Fisheries and Oceans Canada and Cottage Life.

A Shoreline Owner's Guide to Healthy Waterfronts. Federation of Ontario Cottagers' Associations (FOCA).

Take the Plunge; a guide to stewardship of Ontario's waters. Federation of Ontario Cottagers' Associations (FOCA). 2009.

Township of Algonquin Highlands Official Plan. Township of Algonquin Highlands, August 2003, rev. 2010.

WEBSITES

Coalition of Haliburton Property Owners' Associations. www.cohpoa.ca

Cottage Life magazine. www.cottagelife/environment

Federation of Ontario Cottagers' Associations. www.foca.on.ca/environment and www.foca.on.ca/lake-planning-land-use

Muskoka Watershed Council. Best Practices Series. www.muskokawatershed.org/resources

Ontario Ministry of the Environment and Climate Change. Lake Partner Program. foca.on.ca/lake-partner-program-overview

2. NATURAL SHORELINES AND WETLANDS

The zone where the water meets the land is the richest natural environment most of us will ever experience. Equally important, the waterfront is crucial to the lake's health, acting as lungs, doormat, cafeteria, and daycare for the lake, as well as a living retaining wall for the shore.

The shoreline is the transition area between land and water. Many species call it home, including frogs, turtles, snakes, fish, song birds, waterfowl, mammals, and many insects. They all need food and shelter and rely on a variety of plants, rocks, debris and fallen logs to provide them. Many animals and birds will not cross open areas, needing a corridor of dense vegetation to get from the top of your lot to the water's edge.

These natural features create a transition area or buffer zone between the shoreline and the adjacent upland development.

Benefits of Natural Buffers (plants, trees and shrubs)

- Slows surface and shoreline erosion and prevents silting of lakes and streams.
- Prevents surface runoff and contaminants from polluting the lake water and provides a second barrier for septic system effluent.
- Prevents water loss by increasing ground water absorption.
- Prevents algae growth by increasing nutrient absorption into the soil rather than the water.
- Provides food, shelter, nesting, nurseries and migratory corridors for fish, birds and other wildlife species, including species at risk, such as turtles.
- Shades and cools the shallow waters for fish and other aquatic creatures.
- Adds to the aesthetic character and value of your property and all lake properties.
- Increases privacy and enhances the feeling of a non-urban environment.
- Reduces maintenance time and costs.
- Reduces noise.
- Prevents Canada Geese from becoming nuisance animals.

Shore Components

The natural shore has four components, beginning underwater and extending far upland. Shore experts call these components the littoral zone, the shoreline, the riparian zone, and the upland zone. Each plays a critical role in keeping the lake healthy. *Altering any portion of this region affects the whole, diminishing its ability to support life on the lake.*

The littoral zone extends into the water, from dry land to the depth at which sunlight no longer penetrates to the bottom. Most aquatic species feed, spawn and nurture their young in the littoral zone.

The shoreline is where land and water meet. This area is a bridge for the many species that depend on both land and water.

The riparian zone is the land closest to the shore (also known as the buffer zone). Vegetation in the riparian zone prevents soil erosion, reduces runoff, shades and cools shallow water, provides food and shelter for wildlife and provides a buffer between the lake and human development.

The higher, drier ground called the *upland zone* is typically forested with the kinds of trees that take advantage of better drainage, including sugar maples, white and red pines, red oaks, ash, hemlock, balsam, and birches (see *Trees of Livingstone Lake, Appendix 5*). The deep roots of the trees stabilize the slopes, while their foliage buffers the shore from winds. The forest canopy also cools the area by maintaining shade and boosting humidity in the summer. In winter, it shelters deer, chickadees, porcupines, grouse, snowshoe hares and many other species.

In their natural state, the riparian and upland zones form a doormat so effective that one shoreline expert estimates only 10% of runoff actually makes it into the lake, and much of the sediment and other pollutants are filtered out through the layers of soil, decomposing needles and leaves and plant roots before reaching the water.

Wetlands

Wetlands are a combination of land and water, often known as marshes, swamps, bogs and fens. Marshes are the typical wetland dominated by lilies, cattails and/or rushes. Swamps are dominated by trees and/or shrubs, and fens and bogs are peat lands that develop over time as a result of stagnant waters.

Shorelines may also be considered wetlands. As well, shallow bays and inlets on a

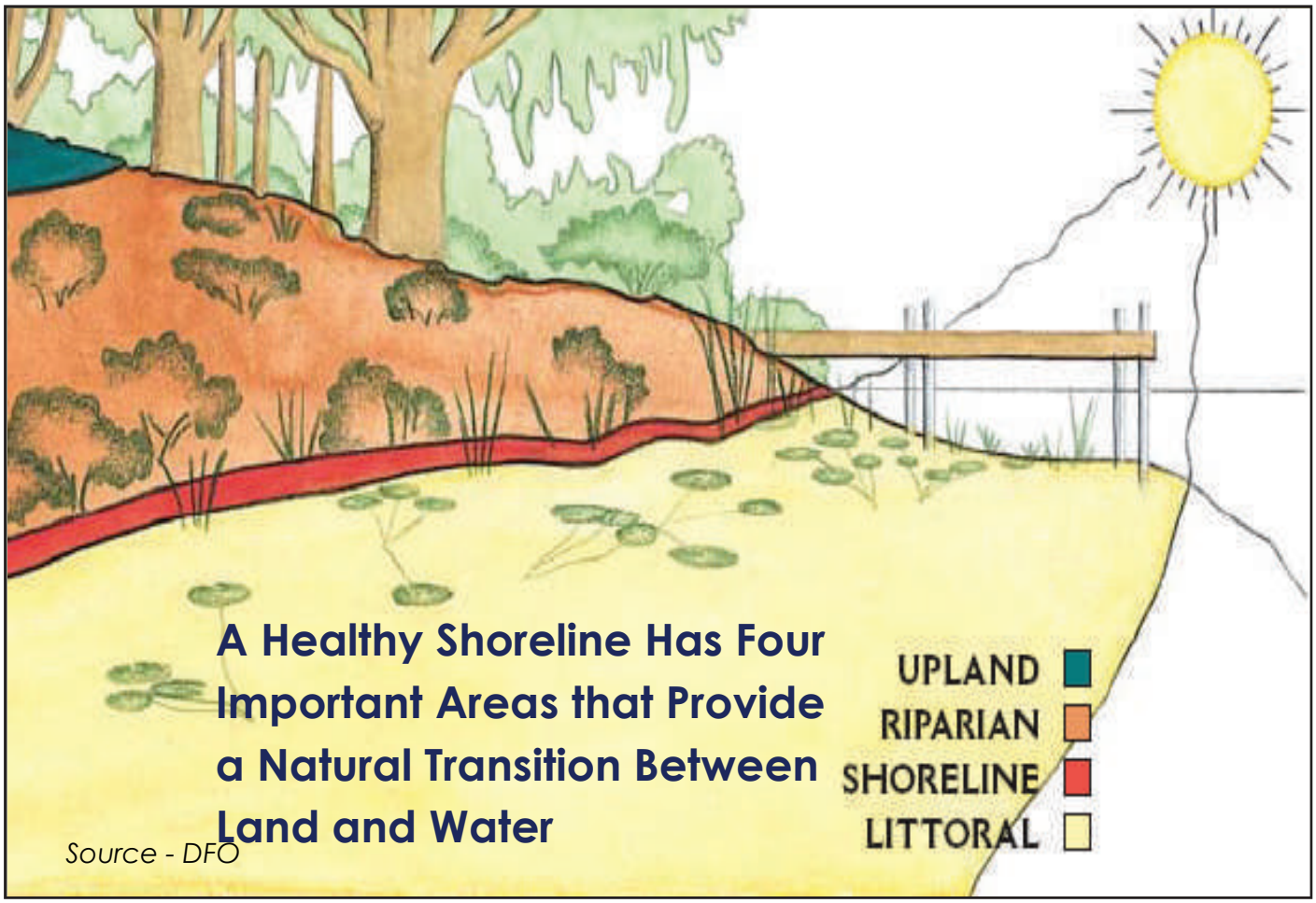
lake can be wetland areas, as can blocked rivers or segregated ponds on the land surrounding a lake.

Wetlands were once thought of as mosquito-infested wastelands and were best dealt with by draining, filling or paving. *We now know that wetlands are a vital part of a good quality environment and we need to protect them.* And, while mosquitoes do breed in swamps, so do their predators, such as dragonflies.

Among their benefits, wetlands:

- Provide water filtration by removing contaminants, suspended particles and excessive nutrients such as phosphorus.
- Improve water quality and renew water supplies.
- Are irreplaceable habitats providing nesting, feeding and a staging ground for waterfowl, reptiles and amphibians, and potentially, for species at risk.

Livingstone Lake has two observable wetlands as shown on the map on page 19. The one on the northwest corner of the lake is the inlet area of Livingstone Creek. This is the



Livingstone Lake Satellite View

Source: Google Earth

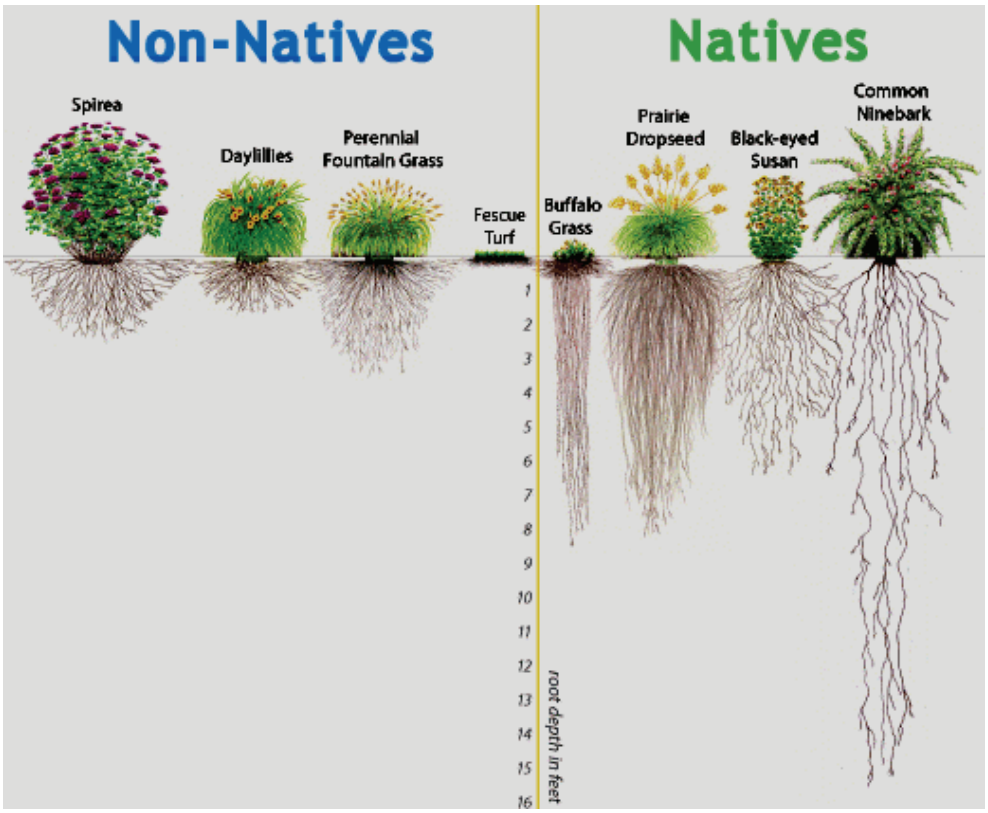
major water flow into the lake. The other, on the eastern shore, is a lowland drainage swamp slowly filling in with silt and sand from the higher land behind it. Both of these wetlands are vegetated with a variety of native wetland plants.

Significant portions of our shoreline also have wetland characteristics. Some of the shoreline is sandy as shown, some has been cleared for development and the rest is rocky with well-vegetated riparian areas. Approximately 50% of the lakeshore is wetlands or forested Crown land.

Erosion and Water Quality

Natural shoreline vegetation plays an important role in preventing soil erosion. Plant roots anchor the soil, preventing

> *"In their natural state, the riparian and upland zones form a doormat so effective that one shoreline expert estimates only 10% of runoff actually makes it into the lake"*



Source: Coalition of Haliburton Property Owners' Associations

shoreland from being washed away by currents, waves and rain. The roots of mature trees reach down to the upper levels of the water table. Dogwood and meadowsweet roots form a web that extends a half-metre downward. As illustrated above, native species are far more effective in protecting properties from erosion than the roots of turf grasses, which only reach eight centimetres below the surface. *Grass is considered to be a hard surface in that it does not have much more protective qualities than rock*.

As well as maintaining natural vegetation, uneven terrain is also important on the shoreline. Ridges, berms, hummocks and depressions catch and direct run-off, filter water, and help prevent erosion.

Despite their popularity, concrete shore walls or sloped rock do not prevent long term natural erosion. Both of these measures are expensive and temporary fixes. Major storms, ice damage and the effects of time eventually cause these to fail. Hardened shores in one place may also mean more erosion problems at neighbouring shoreline areas, when wave, flow and ice energy is deflected elsewhere. *Restoring the shoreline or leaving it in a fairly natural state is the best strategy for shoreline property owners to use against shoreline erosion.*

By preventing erosion and runoff we improve water quality. When soil and excess nutrients are washed into the water, fish spawning beds can be destroyed, dissolved oxygen is depleted and the growth of algae and aquatic plants is

accelerated. The dissolved oxygen content of Livingstone Lake is already low enough for the lake to be considered at capacity for development by the Ontario Ministry of Natural Resources and Forestry. (See *Livingstone Lake Description,* page 4 and *Water Quality,* page 7.)

These changes in water quality can lead to rapid eutrophication – the aging of a lake. Eutrophication of a lake ultimately changes the water quality and the kinds and numbers of species that can live there.

Keeping your shoreline natural is the most important contribution you can make to enhance our water quality, maintain the fish resources, and provide wildlife habitat. Over time, by doing the small things well, we can ensure our water quality is maintained or improved, our wildlife flourishes and our vision for the lake can be achieved.

Maintaining and Restoring Natural Shorelines

More landowners are learning about the value of natural shorelines. They are leaving the lawnmower and leaf blower at home, planting native species and restoring shorelines.

Some cottages have open areas between them and the lake because people want to enhance the view. We now know that this once acceptable behaviour threatens our water quality and we must rethink our need for a clear view. Quite pleasing results can be achieved by retaining a suitable number of native trees, shrubs and native ground flora along the shoreline. In some cases, the limbs of trees blocking views to the lake can be removed without removing the entire tree. The same technique can be used to bring more sunlight into the cottage at certain times of the year. Tall trees close to buildings and cars, possibly prone to windthrow, may be topped to a safer height (consult a professional arborist).

The County of Haliburton enacted a new by-law on shoreline tree management in 2013. The by-law applies to land within 30 metres of shore and its goal is to minimize the destruction of trees to protect water resources and sustain a healthy natural environment (see *Appendix 4*). Persons wishing to cut or trim trees on private shorelines within 30 metres of the high water mark should consult the Shoreline Tree Preservation By-Law 3505 or County officials.

How you protect or restore your shoreline depends on the conditions of the site and your

"Keeping your shoreline natural is the most important contribution you can make to enhance our water quality, maintain the fish resources, and provide wildlife habitat."

energy and resources. The simplest option is to leave your shoreline in its natural state. If your shoreline has already been altered, you can opt to restore it.

Check with the Township of Algonquin Highlands and/or the Ontario Ministry of Natural Resources and Forestry (MNRF) before making any changes or restorations to your shoreline. Noted below are some options to protect your shoreline from erosion while improving habitat.

Vegetated Buffer Zone
Plant native species of trees and shrubs with a variety of other aquatic and upland plants. The roots of native plants tend to grow much deeper than non-native species making them much better at absorbing nutrients like phosphorus and nitrogen before they reach the lake.

The following species are commonly found along shorelines in Haliburton.
Trees: eastern white cedar, eastern white pine, eastern hemlock, red pine (see *Trees of Livingstone Lake, Appendix 5*)
Shrubs: red-osier dogwood, meadowsweet, alder, Labrador tea
Wildflowers: cardinal flower, blue flag iris, tall meadow-rue, sweet gale
Aquatic plants: pickerelweed, white water lily, coontail

Many non-native species such as scotch pine can be invasive when introduced into an area where they didn't develop naturally. Take a look at the species growing in similar locations in our area. Those species should thrive on your property as well. Speak to local plant suppliers and/or visit some of the listed websites marked with an asterisk at the end of this section.

Loose Rock Buffer Zone
In some instances, loose rocks can be placed on a gradual slope and used to stabilize an eroding shoreline. Native shrubs and vines should be planted among the rocks to provide natural protection to absorb and dissipate wave action. Biodegradable erosion-control fabric can be effective when used with native plants; it holds the soil while allowing plants to grow through it.

Bioengineering Techniques
Vegetated geogrids and bundles of branches, or "wattles," staked into the bank will protect the shoreline from eroding. Live stakes or posts of willow or red-osier dogwood also work to stabilize eroding shorelines. Brush layers can be used on steeper banks where deeper reinforcement of the soil is needed.

SHORELINE AND WETLAND STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

Maintaining the Buffer

- Avoid changing wetlands or altering shorelines by blasting, replacing or removing fill and vegetation.
- Build a sand area for the kids away from the shoreline. Altering the shoreline by importing sand is not permitted.
- Keep your shoreline natural. Retaining walls destroy the shoreline edge and affect the littoral zones. Waves deflected off retaining walls stir up sediments and destroy vegetation which in turn decreases the dissolved oxygen necessary for fish to survive. And, the destruction of natural shorelines removes the protective travel corridor on which many species rely in their journeys between land and water.
- Keep 90% of the trees within 30 metres of the shoreline. Create viewing corridors by pruning trees and shrubs to create small windows. Only cut those branches that obstruct your view. Refer to the County of Haliburton's Shoreline Tree Preservation By-Law 3505 (see *Appendix 4*) before cutting or trimming any trees.
- Let the shoreline buffer grow by leaving a natural, low maintenance, undisturbed buffer up to 30 metres wide. If necessary, the buffer zone can be as little as three metres wide, as long as it contains a variety of native species. Plant additional native shrubs and trees to stabilize the soil and minimize erosion. Increase the width and size of your buffer with natural plantings where possible.
- Maintain the waterweeds. They hold sediment in place and provide critical food and shelter for aquatic life.
- Leave vegetation, rocks and fallen logs and branches in the water because they provide fish habitat, hiding places, feeding grounds, and spawning areas for both fish and other aquatic creatures, such as frogs and salamanders. Driftwood and fallen trees at the shoreline also act as a breakwater to prevent erosion.
- Limit trails and access points along the shoreline and focus your access to one general area. If possible, build a low rise boardwalk over vegetation and wetlands to protect unique vegetation communities and species habitat.
- When building docks, refer to Dock and Boathouse Construction by Fisheries and Oceans Canada listed in References at the end of this chapter.

- Ensure your docks and other structures occupy no more than 25% of your shoreline. Leave the remaining 75% or more in its natural state.
- Ensure all permits are approved prior to any work being done. Construction of shoreline structures will likely require a building permit from the Township of Algonquin Highlands and/or approval from the Ontario Ministry of Natural Resources and Forestry (MNRF). (See table, *Contact Information for DIY Projects*, page 42)
- Use untreated wood wherever possible to reduce water and soil pollution and hazards to your health.
- To maintain water quality, do not use chemical fertilizers, pesticides, or herbicides.

Boat Wake and Speed
(see also *Safe Boating*, page 46.)

- Don't cause wakes near the shore – it causes shoreline erosion, murky water, and can destroy fish spawning sites and waterfowl nests. *In Ontario, the law states that power-boaters must slow down to 10 km per hour within 30 metres of shore or face fines of up to $500.*
- Stay out in deeper waters and away from other boats and structures.
- Position your passengers throughout your boat instead of at the stern in order to reduce the amount of wake you create.

SHORELINE AND WETLAND STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Continue to participate in the Lake Partner (MOECC/FOCA) and Ice Watch (Environment Canada) programs. Consistently collect water quality information to gain a more detailed picture of how fresh water changes throughout the year and how Livingstone Lake is responding to changes in land use and efforts to improve its quality.
- Get to know the local habitat by conducting a shoreline assessment to inventory wetlands, streams, drainage courses, riparian vegetation and habitat.
- Promote a greater understanding of the importance of shoreline ecosystems and how they can be protected or restored.
- Encourage the adoption of shoreline buffer zones using native plants and the restoration of developed shorelines. Make a commitment to keep 75% of our shoreline in a natural state.

REFERENCES

Beach creation for residential use. Fisheries and Oceans Canada Ontario Operational Statement, version 3. 2007

Dock and boathouse construction. Fisheries and Oceans Canada Ontario Operational Statement, version 3. 2007.

Lake stewardship plan Grace and Dark Lakes. Grace and Dark Lakes Cottagers Association. August 2006.

Living on the edge; a handbook for lake stewards Haliburton Highlands. Coalition of Haliburton Property Owners' Associations. May 2011.

Living sustainably in Seguin Township; a handbook on sustainable living practices for shoreline property owners. French Planning Services for the Township of Seguin.

Mountain Lake stewardship plan; a guideline for a healthy lake. Mountain Lake Property Owners Association.

Preserving and restoring natural shorelines. Landowner Resource Centre. 2000.

The shore primer; a cottager's guide to a healthy waterfront. Fisheries and Oceans Canada and Cottage Life.

A shoreline owner's guide to healthy waterfronts. Federation of Ontario Cottagers' Associations (FOCA).

A shoreline owner's guide to lakeland living. Lakeland Alliance

Take the plunge; a guide to stewardship of Ontario's waters. Federation of Ontario Cottagers' Associations (FOCA). 2009.

WEBSITES

*websites with information on native plants and species

*Cottage Life magazine. www.cottagelife/environment

County of Haliburton. http://haliburtoncounty.ca/services/planning-and-gis/shoreline-tree-preservation-bylaw/

*Evergreen Canada. http://nativeplants.evergreen.ca/search/guided.php?province=ON

Federation of Ontario Cottagers' Associations. www.foca.on.ca/environment and www.foca.on.ca/lake-planning-land-use

*Georgian Bay Biosphere Reserve. http://www.gbbr.ca/our-environment/species-at-risk

*Muskoka Watershed Council. Best Practices Series. http://www.muskokawatershed.org/wp-content/uploads/2011/12/Shoreline_Guide1.pdf

*Ontario Federation of Anglers and Hunters. www.invadingspecies.com

*Ontario Ministry of Natural Resources and Forestry. http://www.MNRF.gov.on.ca/en/Business/Species/2ColumnSubPage/276503.html

*Shoreline restoration using native plants, Haliburton Master Gardeners. www.haliburtonmastergardener.ca

Lake Trout

Source: Paul Vecsei, flickr

> *At least two studies, based on a broad range of data from Ontario lake trout lakes, indicate anglers are reaping harvests well in excess of levels that biologists say are sustainable.*

3. LIVING WITH NATURE

We see Livingstone Lake as a quiet haven with pristine water quality and a rare, self-sustaining lake trout population along with abundant other aquatic and wildlife species. We hope it will remain this way for future generations to enjoy its peace, tranquility and natural beauty. However, we know that many species are threatened. We know specifically that our lake trout are struggling for survival and we can observe that our loon population appears to be disrupted. While we expect everyone will value and conserve all native species, we have focused on only a few in this section with an emphasis on lake trout and waterfowl, particularly loons.

Lake Trout

Lake trout are found in just 1% of the lakes in Ontario, with a large number of these lakes found in the Haliburton and Bancroft areas. The lake trout is indigenous to North America and is a slow-growing, late to mature fish, adapted to the deep, cold, well-oxygenated Canadian Shield lakes.

The primary native sport fish species in Livingstone Lake was brook trout. Lake trout are not native to the lake but were introduced in 1968 and stocked regularly by the Ontario Ministry of Natural Resources and Forestry (MNRF) until 1995. At that time, stocking was discontinued due to the presence of a small number of naturally-reproducing lake trout. It is currently MNRF policy to not stock when there are naturally-reproducing fish populations. Smallmouth bass became established in the lake at some time between the MNRF's 1959 and 1971 lake surveys, probably through an intentional but unauthorized introduction.

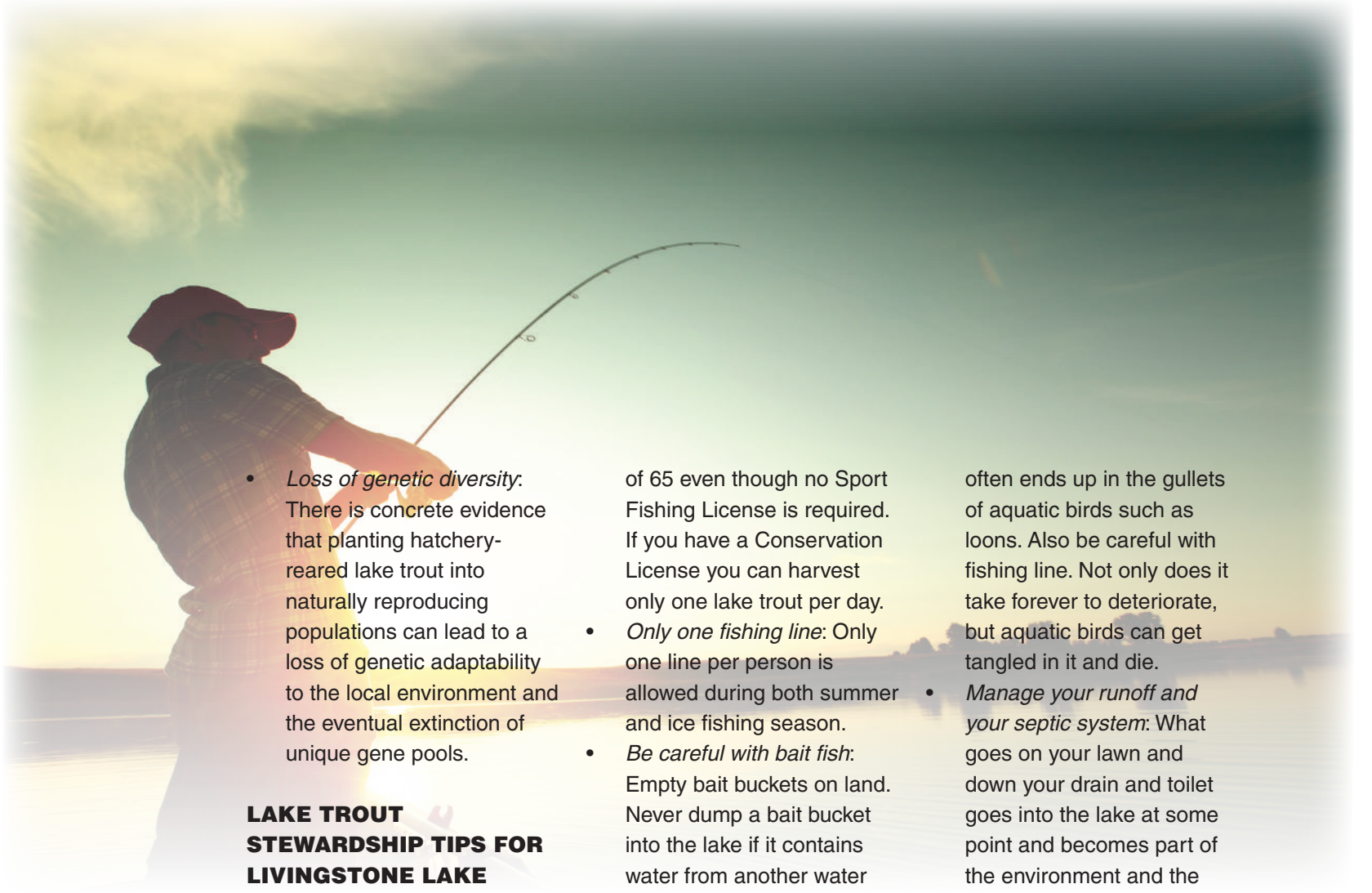
A Summer Profundal Index Netting (SPIN) survey was conducted on Livingstone Lake in 2009 by the Bracebridge office of the MNRF to assess the status of the lake trout population 14 years after the cessation of stocking (see *Appendix 6*). The results of this survey show Livingstone Lake currently supports a modest, introduced, self-sustaining population of lake trout. There are probably only between 100 and 300 catchable-sized fish in the lake. Stocked lake trout, last planted in 1995, are now almost absent from the population. The deep water habitat for lake trout is fairly good however and the lake is capable of supporting this small, self-sustaining population.

Lake trout are often compared to the canary in the coal mine, whose survival, and that of the miners, depends on safe, noxious-gas-free air. As with the canary, the extra-sensitive lake trout will not survive in oxygen-starved, polluted water.

The Township of Algonquin Highlands, in its Official Plan updated in 2010, has designated Livingstone Lake as *highly sensitive to further shoreline development and at development capacity* in terms of water quality and its ability to support lake trout. A lake is determined to be at capacity through its phosphorus and/or dissolved oxygen content. If the dissolved oxygen readings of a lake are at, or lower than 7 ppm, it is determined to be at capacity. Livingstone Lake's dissolved oxygen content according to the Ontario Ministry of the Environment and Climate Change is generally low at 7 ppm and is therefore designated as at capacity for further development by the Township of Algonquin Highlands.

There are four main threats to the sustainability of the lake trout and the sport fishery:

- *Overfishing*: At least two studies, based on a broad range of data from Ontario lake trout lakes, indicate anglers are reaping harvests well in excess of levels that biologists say are sustainable.
- *Ecological changes*: Rock bass and smallmouth bass have been introduced in lake trout lakes in north-eastern Ontario (including Livingstone Lake). Lake trout growth declines significantly due to competition with bass for food.
- *Environmental/habitat degradation*: The loss of lake trout due to acidic precipitation has been well documented. Global climate change also raises concerns because changes in physical properties of lakes may change the fish community structure.



- *Loss of genetic diversity*: There is concrete evidence that planting hatchery-reared lake trout into naturally reproducing populations can lead to a loss of genetic adaptability to the local environment and the eventual extinction of unique gene pools.

LAKE TROUT STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

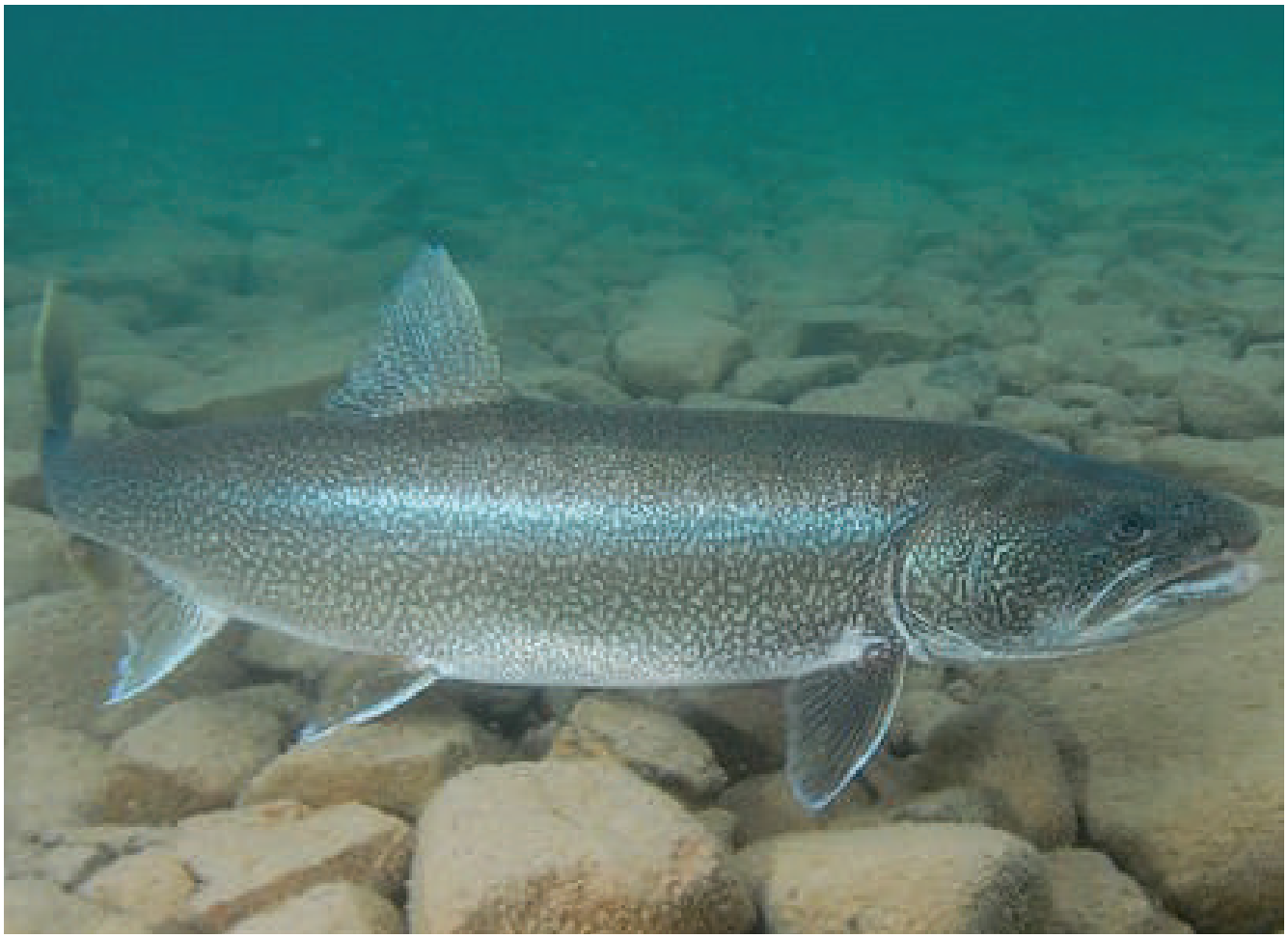
- *Respect the slot size*: Currently on Livingstone Lake, only lake trout outside the slot size (40 - 55 cm or 15.7 - 21.7 in) can be kept for eating. Anything within the slot size must be released back into the lake.
- *Respect the catch limit*: The holder of a Sport Fishing License can harvest a maximum of two lake trout per day. This limit applies also to fishers below the age of 18 or over the age of 65 even though no Sport Fishing License is required. If you have a Conservation License you can harvest only one lake trout per day.
- *Only one fishing line*: Only one line per person is allowed during both summer and ice fishing season.
- *Be careful with bait fish*: Empty bait buckets on land. Never dump a bait bucket into the lake if it contains water from another water body. It is illegal to dump live fish from one water body into another.
- *Don't cause wakes near the shore*: Wakes cause shoreline erosion and murky water and can destroy fish spawning sites and waterfowl nests. In Ontario, the law states that power-boaters must slow down to 10 km hour within 30 metres of shore or face fines of up to $500.
- *Be careful with fishing equipment*: Do not use lead sinkers. Lead tackle often ends up in the gullets of aquatic birds such as loons. Also be careful with fishing line. Not only does it take forever to deteriorate, but aquatic birds can get tangled in it and die.
- *Manage your runoff and your septic system*: What goes on your lawn and down your drain and toilet goes into the lake at some point and becomes part of the environment and the food chain. Algae growth from phosphorus loading depletes dissolved oxygen as it decays, impacting lake trout habitat. (See *Water Quality,* page 7 and *Natural Shorelines and Wetlands* page 16).

In summary, if we all support and practise these suggestions, we can expect the current lake trout population to survive and provide fishing experiences for our children and grandchildren for years to come.

LAKE TROUT STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- *Changes to the fishing season*: The Livingstone Lake Association supports the Coalition of Haliburton Property Owners' Associations in requesting that the MNRF change the current lake trout season closing date to mid-August from its current date of September 30th. Female lake trout feed voraciously at the end of the summer in preparation for spawning in late October or early November; hence they are more susceptible to being caught. Loss of potential spawners can quickly deplete the trout productivity of a lake.
- *Enhance spawning activities*: As part of the SPIN survey in 2009 and a follow-up trout spawning survey by the MNRF in 2011 (see *Appendix 7*), it was determined that there are several spawning beds on Livingstone Lake where lake trout gather in the fall. Shoal enhancement is a relatively easy, low-cost activity and may have benefits to help lake trout spawn.

Lake Trout



Common Loon

Source: All About Birds, The Cornell Lab of Ornithology Josh Merrill, MN, Gunflint Lake, July 2009

Waterfowl/Loons

Canada geese, common merganser, various varieties of ducks and the common loon all nest and raise their young on Livingstone Lake. Since waterfowl live and nest on various sections of the lake, their survival is dependent on the quality of the water, varieties of fish and surrounding plants on or near the edge of the lake. Their food ranges in size from tiny aquatic microbes to fish. This interconnected food chain continuously deposits higher concentrations of pollutants in each animal until reaching the last link -- waterfowl.

Bird Studies Canada has been tracking the common loon across the country through the Canadian Lakes Loon Survey since 1981. Participants collect information on the numbers of breeding pairs and what influences their reproductive success on particular lakes across the country. Livingstone Lake residents have been collecting data for the Canadian Lakes Loon Survey since 1987.

Waterfowl reproductive success is an excellent measure of the health of a lake. Bird Studies Canada has found that when it comes to the reproductive success of common loons in Canada: the west is best, bigger is better, acid is bad and the clock is ticking. That is, the number of chicks that adult loons raise to independence is highest in British Columbia and the Prairie provinces compared to Eastern Canada; is higher in larger lakes than in smaller ones; is lower where lake acidity is higher; and is lower now than it was 20 years ago.

Various pollutants have been blamed for the lower reproductive success of some waterfowl but it is most noticeable in the loon population since it has been studied the most. But rather than killing loons outright, pollution of their environment can simply make them bad parents. Adults with higher concentrations of pollutants in their bodies incubate their eggs and feed

their chicks less often, resulting in fewer chicks fledged and reaching adulthood. One of these pollutants is methyl mercury, a neurotoxin which causes the chicks and adults to become lethargic, resulting in poor survival in the wild. Methyl mercury is created when inorganic compounds (formed indirectly by the burning of fossil fuels) react with elemental mercury in the environment.

Adult loons typically return to the same lake every year. So breeding pairs and chicks feed almost exclusively on the lake where they nest. The decline in reproductive success therefore is as likely due to problems on their home lake as compared to where they spend the winter or during their migration.
Our observations on Livingstone Lake show there has not been a successful breeding pair since 2011 and it has been even longer since we have seen any chicks survive. The loon(s) that come here are not staying the entire summer but going from lake to lake. Since 2011, we have had only a single loon most of the time.

There are three main threats to waterfowl/loon sustainability:

- *Lake pollutants like acid rain/mercury emissions/ lead poisoning*: Acid rain continues to be a concern but the rate of acid precipitation emissions is being reduced and some lakes are improving. Mercury is converted to methyl mercury by certain types of bacteria and then enters the food chain through various chemical pathways. Higher lake acidity helps methyl mercury form and persist, as do higher temperatures. Bacteria produce more methyl mercury in acidic, warmer environments. Lead poisoning is caused by waterfowl feeding on the lake bottom and ingesting lead sinkers from broken fishing lines.
- *Global warming*: Global warming is increasing seasonal temperatures and decreasing precipitation. With the rise in temperature, the evaporation from wetlands is anticipated to increase causing a reduction in waterfowl habitat.
- *Environmental/habitat loss*: A lake's natural shoreline provides food, shelter, nesting and nurseries for waterfowl. Leaving the shoreline in its natural state keeps habitat loss to a minimum and provides a protected connection between water and land for species that depend on that shelter for their survival.

WATERFOWL/LOON STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

- *Fish responsibly*: Do not use lead sinkers. They can end up in the gullets of waterfowl leading to lead poisoning and death. Also be careful with fishing line. Discard broken line in the garbage, not in the lake. It takes forever to deteriorate and aquatic birds can get tangled in it and die.
- *Manage your runoff and your septic system*: What goes on your lawn and down your drain and toilet goes into the lake at some point and becomes part of the environment and the food chain. (See *Water Quality*, page 7 and *Natural Shorelines and Wetlands*, page 16)
- *Avoid shoreline erosion*: Keep tree cutting and weed pulling to a minimum. Removal of trees, rocks, weeds and debris can be devastating to waterfowl populations. These structures provide not only a place to rest, feed and look after their young but also provide habitat to protect them from predators. (See *Natural Shorelines and Wetlands*, page 16)
- *Leave nests alone*: If you observe a waterfowl

Wood Turtle

Source: Wikipedia

nest, stay away and do not disrupt any nesting activities. Do not approach or disturb any nesting birds.

- *Don't cause wakes near the shore*: Boat wakes cause shoreline erosion and murky water and can destroy fish spawning sites and waterfowl nests. In Ontario, the law states that power-boaters must slow down to 10 km per hour within 30 metres of shore or face fines of up to $500.

WATERFOWL/LOON STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Continue to support our participation in Bird Studies Canada's Canadian Lakes Loon Survey.

Other Species

There are many other species that are an integral component of the environment at Livingstone Lake. Whether it is the diversity of wildlife, including birds, mammals, reptiles and amphibians, or the variety of trees and plants that comprise habitat for the wildlife, all contribute to the health and diversity of the lake and provide a source of recreational viewing and enjoyment for lake residents. Of course, there have been and will continue to be changes over time from competition among species as well as the effects of human habitation and climate change. At the same time, it is important to recognize that some of these species are more at risk of disappearing than others; that invasive, non-native species are making their way into Haliburton County and threatening lake ecosystems; and that there are steps that landowners and lake associations can take to contribute to the preservation and continued diversity of our lake ecosystem.

Species at Risk

The Haliburton Highlands Land Trust, which is a leading organization in inventory and education in this field, has identified 23 species of flora and fauna as being under siege or at risk in Haliburton County. These are specifically:

Flora:
American Ginseng
Butternut tree
Engelmann's Quillwort

Fauna:

Reptiles and Amphibians

Five Lined Skink (lizard)
Eastern Hog-nosed Snake
Eastern Milksnake
Eastern Ribbonsnake
Blanding's Turtle
Snapping Turtle
Spotted Turtle
Stinkpot Turtle
Wood Turtle
Chorus Frogs

Birds

Bald Eagle
Bobolink
Canada Warbler
Chimney Swift
Common Nighthawk
Golden-winged Warbler
Olive-sided Flycatcher
Peregrine Falcon
Whip-poor-will
Barn Swallow

The above list has continued to grow in recent years. Although many of these species have been more closely linked to the southern part of the County, several on the list have been observed at Livingstone Lake. In addition, almost all turtle species in this area are threatened because of habitat loss or road mortality.

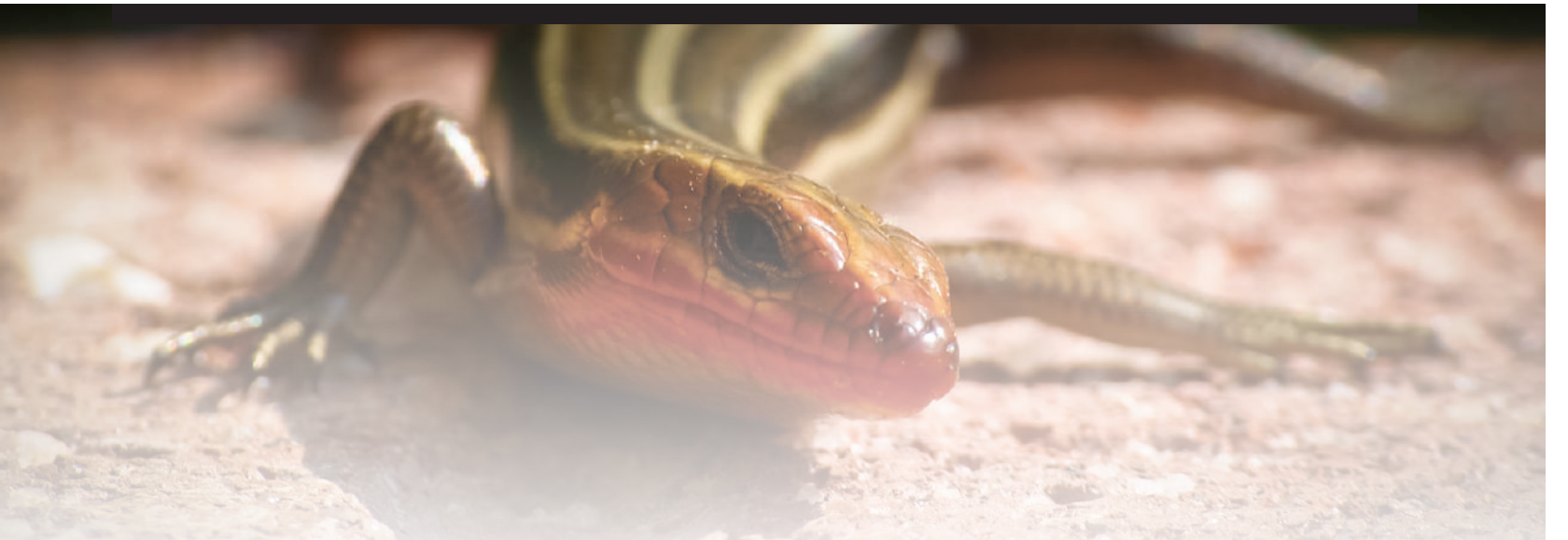
Invasive Species

Invasive plants monopolize land and nutrients while invasive animals compete with native species for food and space. Some invasives can even be dangerous. Several have been identified in Haliburton County through data collected from anglers, conservation officers, cottagers and residents, specifically:

Rainbow Smelt *
Spiny Water Flea *
Zebra Mussel
Rusty Crayfish
Asian Longhorn Beetle
Emerald Ash Borer
Purple Loosestrife
Giant Hogweed
Dog Strangling Vine
Beech Bark Disease
White Nose Syndrome (on bats)

* identified as present in Livingstone Lake

Again, as with species at risk, most of these invasives are more closely associated with the southern parts of the County, although the Ministry of Natural Resources and Forestry has confirmed the first two listed above as being present at Livingstone Lake. Also, it is important to recognize that these and other invasive species are continuing to spread to areas where they did not previously exist, mainly through boats, fishing tackle/bait, firewood, clothing and equipment. Once established, these species can disrupt, or even take over local forest ecosystems and be extremely difficult or impossible to remove. Prevention is therefore the best defence.



OTHER SPECIES STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

- *Become informed*: Do what you can by consulting illustrations and descriptions contained on websites (see Websites section following) so that you can recognize which species are at risk and which invasive species have been identified in Haliburton County. You can also learn more about how you can help specific species such as turtles.
- *Report sightings*: Report sightings (dead or alive) of species at risk to Haliburton Highlands Land Trust at admin@haliburtonlandtrust.ca or 1-705-457-3700, and sightings of possible invasive species to the Invading Species Hotline at 1-800-563-7711. In both cases, details of location and time sighted, as well as photos are helpful.
- *Contact the Lake Steward and/or other Association members*: If you have any unusual sightings, questions or concerns about any species, including the trout or waterfowl/loon populations on Livingstone Lake, contact the Lake Steward and/or other Association members monitoring various species.
- *Keep boat and fishing tackle clean*: After visiting any other water body (both inside and outside Haliburton County), ensure that you properly clean your boat and fishing tackle. Refer also to bait fish tips under Lake Trout section above.
- *Clean boots, clothing and equipment used in other jurisdictions*: Make sure that seeds and soil are removed from boots, clothing, and equipment (e.g. ATVs, shovels, trucks) before bringing them into the Haliburton region especially from Toronto and Southern Ontario.
- *Avoid transporting firewood, yard waste and garden material*: Firewood, yard waste and garden materials are high risk especially if they come from Southern Ontario.

OTHER SPECIES STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Continue to communicate with the Haliburton Highlands Land Trust, the Coalition of Haliburton Property Owners' Associations, Haliburton County, MNRF, MOECC, FOCA, Toronto Zoo Adopt-a-Pond Program and other bodies to keep up to date on species at risk and invasive species.
- Provide information and help raise awareness about species at risk and invasive species, and the

role these play in ensuring the health and diversity of the Livingstone Lake ecosystem.

- Work on developing inventories of species of birds, mammals, reptiles, amphibians, trees and plants known to exist in the Livingstone Lake area.

REFERENCES

Bird Watch Canada, number 62, Winter 2013.

Canada's Recreational Fisheries – The Invisible Collapse. Summary of an extensive study of recreational fishing, 2002.

Living Sustainably in Seguin Township; a handbook on sustainable livings practices for shoreline property owners. French Planning Services for the Township of Seguin.

Mountain Lake stewardship plan; a guideline for a healthy lake. Mountain Lake Property Owners Association.

Ontario's Lake Trout - in Peril? Article from the 2001/02 Annual Report to the Legislature from the Environmental Commissioner of Ontario.

Ontario's Wildlife. Dave Taylor, The Boston Mills Press.

Results of a Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009. Stephen Scholten, Ontario Ministry of Natural Resources and Forestry Bracebridge, 2010.

Species at Risk and Invasive Species. Livingstone Lake Association Newsletter, issue 7, 2011

We Can Help Protect Threatened Turtles. Livingstone Lake Association Newsletter, issue 8, 2012

WEBSITES

Bird Studies Canada. Canadian Lakes Loon Survey. http://www.bsc-eoc.org/volunteer/clls/index.jsp?targetpg=cllsreports

Coalition of Haliburton Property Owners' Associations. http://cohpoa.org/CHA%20Documents.htm (re Invasive Species)

County of Haliburton. http://haliburtoncounty.ca/services/forestry

Federation of Ontario Cottagers Associations. http://www.foca.on.ca/Invasive_Species

Haliburton Highlands Land Trust. http://www.haliburtonlandtrust.ca/wildlife/species-at-risk/

Ontario's Invading Species Awareness Program. http://www.invadingspecies.com/

Ontario Ministry of Natural Resources and Forestry. http://www.MNRF.gov.on.ca/en/Business/Biodiversity/index.html

Toronto Zoo. http://www.torontozoo.com/Adoptapond/turtletally.asp

Township of Algonquin Highlands. www.algonquinhighlands.ca/documents/Official Plan OFFICE CONSOLIDATION 23-Nov-2011.pdf

"We were attracted to our lake because of its beauty, peace and recreational opportunities."

4. DEVELOPMENT AND LAND USE

We live in a complicated world. Gone are the days of bark canoes and soft moccasins on the waters and lands surrounding Livingstone Lake. Increasingly we tax the natural order of nature with human development, land use and its resulting waste stream. And yet, we were attracted to our lake because of its beauty, peace and recreational opportunities. We are now stewards of this legacy for future generations yet unborn. We must carefully protect the needs of our lake environment with commitments to responsible use and development. This section of the Livingstone Lake Stewardship Plan deals with important legislative responsibilities and governance that have been established to protect and enhance both the enjoyment of our land and the value of our investments.

The two most important development issues to a lake resident are forestry and the potential for subdividing the shoreline as both can have a significant impact, negative or positive, on the enjoyment and value of property owned on Livingstone Lake. This document outlines the basic issues surrounding the forestry process and restrictions of property subdivision. According to the Township, Livingstone Lake is at capacity by virtue of water quality measures as they affect our trout populations. Parameters are in place deeming the perimeter of the lake at capacity and limiting further subdivision of property (see *Livingstone Lake Description*, page 4).

Development, especially within the waterfront and along the shoreline, can have a negative impact on the natural environment, degrade water quality and harm the social

environment by reducing the number of places to go to enjoy a wilderness experience. A balance is therefore sought that allows for development that will sustain natural and social environments in the long term.

To manage these development issues, it is important that the Livingstone Lake community understand and participate in the development process to protect the social and natural environment of our lake.

Understanding the Government Structures

- The Ministry of Natural Resources and Forestry (MNRF) has jurisdiction and responsibility for the management of all aspects of land use, forestry and water resources on Crown land and adjacent areas.
- Haliburton County regulates the creation of lots, approves subdivision applications, condominium applications, severance applications, amendments to the local official plan and adopts amendments to the Haliburton County Official Plan (see References at the end of this chapter and *Appendix 10*).
- Algonquin Highlands regulates the use of private lands. It approves zoning by-law amendment applications, minor variance applications, and adopts amendments to the local official plan (see *Appendix 10*).

Crown Land Use Policies and Regulations, Province of Ontario

The following describes current land uses around the lake and in the watershed, and provides a review of Ministry of Natural Resources and Forestry policies for Crown land.

About 80% of all lands within the Livingstone Lake watershed

"We are especially fortunate as our proximity to Algonquin and Dividing Lake Provincial Parks provides us with an extra level of consideration in policy and decisions that affect the larger area."

Source: Link-Belt Forestry Equipment

are Crown-owned as shown on the Zoning Map on page 5. The area surrounding Livingstone Lake is almost completely Crown land and private lands on Livingstone Lake are often adjacent to or almost totally surrounded by Crown lands. Therefore, Crown land use regulations play a significant role in the management and future development of the lands on Livingstone Lake. We are especially fortunate as our proximity to Algonquin and Dividing Lake Provincial Parks provides us with an extra level of consideration in policy and decisions that affect the larger area.

Within the watershed, a wide range of activities are carried out on Crown lands and waters, and these activities are subject to the following policy documents and legislation:

- Ontario Living Legacy Land Use Strategy
- Bracebridge-Parry Sound Forest Management Plan
- Public Lands Act
- Lakes and Rivers Improvement Act

Ontario's Living Legacy Land Use Strategy

Ontario's Living Legacy (OLL) Land Use Strategy (MNRF, 1999) outlines the intended strategic direction for the management of Crown lands and waters throughout Ontario. The Zoning Map on page 5 shows the Crown lands affected by the OLL (see also *Appendix 8*). According to the OLL Land Use Strategy and the Crown Land Use Atlas Policy Report, the Crown land around Livingstone Lake is designated as a General Use Area.

General Use Areas

- A full range of resource and recreational uses can occur in General Use Areas.
- Governance of these areas occurs in the broad context of maintaining ecological sustainability.
- There is an extensive set of legislation, policy and

guidelines that govern activities and use of these lands including Area of Concern guidelines.
- In a GUA, Crown land can only be sold for mineral exploration and development.

Enhanced Management Areas
- Planning in a GUA must also consider impacts on adjacent land use designations such as Enhanced Management Areas.
- EMAs are governed by more detailed land use directions because they are deemed to have special features or values.
- There is one EMA in our area; east of Livingstone Lake between Hinterland Creek and the Dividing Lake and Algonquin Provincial Parks.

Algonquin Review Area
- Livingstone Lake is not within the Algonquin Review Area which covers Crown lands east and north of Livingstone directly abutting Algonquin Park. This area exists to ensure non-compatible uses and activities are not established and that inappropriate and inadvertent access to the Park is not created.
- When reviewing land use applications for this area, the MNRF considers the land use intent and a variety of factors and requirements on a site-specific basis in addition to land use policy.

Bracebridge/Parry Sound Forest Management Plan
- Land use planning in General Use Areas occurs primarily through the forest management planning process.
- This planning process is considered sufficient to manage a full range of land uses for GUAs because it must consider a broad range of objectives that provide specific direction for the protection of natural values.
- On Crown lands forestry is carried out in accordance with regional Forest Management Plans.
- These plans have a 20-year planning horizon and are reviewed every five years to provide the location of areas that are to be harvested or tended and to identify sensitive features such as Areas of Concern and prescribe mitigation measures to avoid or minimize impacts.
- The Livingstone Lake watershed is within the management area known as the Bracebridge/Parry Sound District Forest. The current Forest Management Plan is the 2009 – 2019 Plan.
- The second five years of the Plan, from 2014 to 2019, has been approved after completion of the required review process in October 2013. The Livingstone Lake Association Executive provided comments and input during the review process. A replacement Plan covering 2019-2039 will be developed during 2018 and we will participate during the comment period.

Public Lands Act
- The MNRF is responsible for the management of Crown land under the Public Lands Act, which includes acquisition, disposition and management of Crown waters and lands and shorelands (see *Appendix 8*).
- The Public Lands Act states that 25% of all Crown shorelines be set aside for public recreation and access.
- Shorelands are defined as lands covered or seasonally inundated by the water of a lake, river, stream or pond.
- Dredge is defined as the removal or displacement of material from any

> *Forestry operations are prohibited within 30 to 90 metres of the shoreline of Livingstone Lake*

shorelands but does not include removal or displacement relating to the installation of service cables, heat loops or water intakes for private residences.

Lakes and Rivers Improvement Act (LRIA)

- The purpose of this act is to provide for the use of water and to regulate improvements on Crown, municipal and private lands that forwards, holds back or diverts water (see *Appendix 8*).

Observations on Provincial Land Use Policies

- There are overlaying Crown land policies that complicate the interpretation of Crown land management direction.
- Because more than 25% of Livingstone Lake shoreline is Crown land, the Public Lands Act will not prevent the disposition of shoreline areas. However, the OLL prohibits the disposition of Crown land for new cottages or hunt camps.
- Forestry operations are prohibited within 30 to 90 metres of the shoreline of Livingstone Lake following the Area of Concern guideline applying to the slopes of cottaging lakes and streams.
- Only one area is allocated for selective forestry operations in the immediate vicinity of Livingstone Lake under the current 2009-2019 Forest Management Plan. This area is located behind the eastern shore of the lake. Monitoring of these operations by the MNRF and the corporations having a Sustainable Forest License (SFL) is essential to the protection of natural values.
- Dividing Lake Provincial Park contains remnants of a significant old growth

stand of eastern hemlock and white pine that is comparable to the few remaining stands in Ontario that are located in Algonquin Park.

- Work permits are required for docks, boathouses, dredging, filling, shoreline alteration and construction of bridges or water crossings, pursuant to the Public Lands Act (see *Appendix 8*).
- Approvals for dams and water crossings are required by the Lakes and Rivers Improvement Act (see *Appendix 8*).
- All citizens have right of access to Crown land, including that on Livingstone Lake. In recent years we have seen a rapid increase of the use of these lands by ATVers, snowmobilers and campers seeking wilderness playgrounds. This use can be noisy, polluting and often destructive of vegetation and wildlife. At inception, these Crown land use directives most certainly were not anticipating this level of activity or incursion. Guidelines are needed to limit access and regulation to protect the area from further loss of wilderness.

Local Government, County of Haliburton and Township of Algonquin Highlands

Livingstone Lake is located in the Township of Algonquin Highlands. It is one of four municipalities in the County of Haliburton. Both the county and the local township levels of municipal government implement development approvals and regulations affecting Livingstone Lake (see *Appendix 10*).

Some of the work conducted by these two levels of local government has implications for the development and well-being of our lake. The municipality strives to develop policies that will protect the natural environment, support and encourage a sound and healthy economy and guide sustainable resource use and development. Lake communities can support and strengthen these policies by participation in the land use planning and development process.

Building a positive relationship and working in partnership with them will help us resolve issues that come up from time to time. There are a number of ways we can engage with them to work constructively for the betterment of the lake community and the broader community.

DEVELOPMENT & LAND USE TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

- Participate in the Livingstone Lake

CONTACT INFORMATION FOR DIY PROJECTS

			What do I want to do?		
Who do I need to call?	**Build or repair a dock**	**Cut down a mature tree**	**Build a new building on my lot or renovate or add an addition to my existing cottage**	**Alter the shoreline by clearing and/or adding new material**	**Install or make changes to my septic system**
Ontario Ministry of Natural Resources and Forestry	For a crib dock, contact the MNRF at https://www.ontario.ca/rural-and-north/crown-land-work-permits			If removing vegetation, dredging, building a beach or a retaining wall, contact the MNRF at https://www.ontario.ca/rural-and-north/crown-land-work-permits	
Township of Algonquin Highlands	For all other docks contact, David Rogers Chief Building Official/ Bylaw Enforcement Officer Phone: 705-489-2379 (Stanhope) 705-766-2211 (Dorset) or E-mail: drogers@algonquinhighlands.ca	Contact David Rogers Chief Building Official/ Bylaw Enforcement Officer Phone: 705-489-2379 (Stanhope) 705-766-2211 (Dorset) or E-mail: drogers@algonquinhighlands.ca	Contact David Rogers Chief Building Official/ Bylaw Enforcement Officer Phone: 705-489-2379 (Stanhope) 705-766-2211 (Dorset) or E-mail: drogers@algonquinhighlands.ca		
Haliburton, Kawartha, Pine Ridge Health Unit					To get a permit, call the Haliburton Office at 705-457-1391 or visit their web site at http://www.hkpr.on.ca/InfoSet/Environments/SewageSystems.aspx

Association to stay abreast of issues and opportunities in order to protect and enhance the value and enjoyment of your property.

- Be aware of the values, vision, principles, priorities, and concerns of your lake community via your Lake Stewardship Plan, Livingstone Lake Association, or fellow property owners.
- Become familiar with the Official Plans for the County and the Township as well as municipal by-laws.
- Know who to call when building or making changes to your property. See table on page 42, *Contact Information for DIY Projects* for reference.

DEVELOPMENT & LAND USE ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

Province of Ontario

- Contact MNRF about Crown land policies on hydro development, commercial tourism and mineral exploration and development to ensure

the association is aware of and has an opportunity to participate in any new development proposals.

- Participate in future Forest Management Planning processes for forestry operations near Livingstone Lake to protect its remote setting. Involvement by the association will also help to ensure appropriate areas are allocated for forestry operations in the 2019-2039 Forest Management Plan.

DEVELOPMENT & LAND USE ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

Local Government

- Maintain on-going and positive communication with the Reeve, and/or Deputy Reeve and Ward Councillor.
- Continue to invite the Reeve and/or Ward Councillor to attend our annual general meeting.
- Participate in strategic planning sessions and in the Official Plan review every five years.
- Participate in public consultation sessions and meetings for development proposals, official plan review, zoning and by-law development and amendments, strategic planning, amendment applications and lot creation proposals that have implications for Livingstone Lake.
- Provide information about local candidates for municipal council and encourage property owners to vote.
- Check the News and Events page of the Township website regularly for upcoming events and meetings of interest.
- Subscribe to the local papers to keep abreast of local news.

REFERENCES / WEBSITES

Ontario:

- Ontario, Lakes and Rivers Improvement Act (Regulation 454/96)
- Ontario, Public Lands Act, Chapter 413, Part 1, 3 (re Crown shorelines and public recreation and access)
- Integrated Plan for Land and Resource Development (Frost Centre Plan), 1980 (Designated Use Areas) - http://crownlanduseatlas.MNRF.gov.on.ca/supportingdocs/PlanLeslieFrost.pdf
- Ontario's Living Legacy (OLL) Land Use Strategy (MNRF, 1999), Crown Land Atlas - http://crownlanduseatlas.MNRF.go.on.ca/. Reference Number, G362.

County of Haliburton:

- Jane Tousaw, Director of Planning, Haliburton County – jtousaw@county.

haliburton.on.ca: 705- 286-1333 ext. 222

- The Official Plan – the following documents are available to be downloaded in pdf format from the County's web site:
  - Official Plan Text
  - Schedule A – Environment + Fish & Wildlife Habitat (19.5Mb)
  - Schedule B – Resources Map (7.5Mb)
  - Schedule C – Settlement Patterns Map (8Mb)
  - Base Map (3Mb)
  - Land Ownership Map (5.4Mb)
- http://www.haliburtoncounty.ca/: 705-286-1333

Township of Algonquin Highlands:

- Angie Bird, Chief Administrative Officer – abird@algonquinhighlands.ca: 705- 489-2379
- David Rogers, Chief Building Official/Bylaw Enforcement Officer -- Phone: 705-489-2379 (Stanhope) or 705-766-2211 (Dorset) or e-mail: drogers@algonquinhighlands.ca
- http://www.algonquinhighlands.ca/: 705-489-2379 info@algonquinhighlands.ca
- Municipal Council – http://www.algonquinhighlands.ca/?cat=council&page=Overview
- Official Plan and Zoning By-laws – http://www.algonquinhighlands.ca/?cat=services&page=bulding&subPage=official

Sources & Acknowledgements

- Jane Tousaw, Director of Planning, Haliburton County
- Carol Moffatt, Reeve, Township of Algonquin Highlands.

Source: BoatSmart!

5. SAFE BOATING

Everyone has the right to enjoy a safe, fun time on the water. Everyone also has a responsibility to respect and share waterways with wildlife, swimmers, divers, other boaters and watercraft ranging from canoes and sail boats to float planes.

Livingstone Lake is a small lake where we can almost always see clearly from shore to shore while on the water. Nevertheless, we need to operate our watercraft in a safe, responsible and sensitive manner to respect other people and the environment we are charged with protecting.

Because we are a small lake, power boats that make repeated runs in front of the same cottages can be very annoying because of swells and noise. Small, un-powered boats and swimmers can be put in danger if people don't watch their wakes. So when boating and when towing skiers and boarders, vary your route frequently to void multiple runs in the same area, and always have a spotter in the boat with you.

We have many watercraft on the lake since most property owners have more than one and most people have both powered and non-powered craft. At the present time, there are no Personal Water Craft (PWCs) on Livingstone Lake.

All Canadian boaters are now required by federal law to carry a Pleasure Craft Operator Card (PCOC) commonly known as a boating licence when operating a motorized boat, regardless of engine size, length of boat or age of operator. Boaters found not carrying a Pleasure Craft Operator Card face a minimum $250 fine. The law applies to all Canadian waters, in all provinces and territories.

If you do not have a PCOC, the official Transport Canada accredited boat licence exam is available online or in-person from BOATsmart!® Canada. When you pass the boating licence exam, your permanent

BOATsmart!® operator card is good for life.

Following are a number of topics covered in the Boat Smart study guide and other publications.

Required Boat Safety Equipment

Part of being prepared for a safe boating trip is to make sure that you have all the required boat safety equipment on board. All boats are required by law to carry specific boat safety equipment at all times. Depending on the size and type of boat this equipment can include:

- Bailing device
- Anchor
- Manual propelling device
- Axe
- Life ring
- Fire extinguisher
- Re-boarding device such as a ladder

Kits containing the required equipment can be purchased at most marine supply stores including general merchandise stores such as Canadian Tire.

Personal Safety Equipment

Boaters are required to carry personal safety equipment on their boats at all times depending on the size and type of boat. Operators should inform all passengers of where the safety equipment is located on board and how to use it. Personal Safe Boating Equipment Includes:

- Personal Floatation Devices (PFDs) & Lifejackets
- Buoyant Heaving Line
- Emergency Kit
- Flashlight

The most important piece of personal safety equipment is the lifejacket or PFD. Regardless of size of boat or engine, there must be one, properly fitted and approved floatation device on board for each passenger.

About 90% of people who drown in recreational boating incidents are not wearing a lifejacket or PFD. Even if you have one on board, conditions like rough winds, waves and cold water can make it very hard, if not impossible, to find it and put it on when needed. Worse yet, if you unexpectedly fall into the water, the boat (with your lifejacket or PFD on board) could be too far away to reach especially if it's a light craft like a canoe or kayak. Always wear your lifejacket or PFD when on or near the water. It could save your life.

There are three types of flotation devices approved for use in Canada:

Source: Oak Orchard Canoe Kayak Experts

- *Lifejackets*: Life jackets are designed to turn an unconscious person face up in the water and are considered the safest floatation device.
- *Personal Flotation Devices (PFDs)*: PFDs are more comfortable to wear and are designed to keep a person afloat but are NOT designed to turn an unconscious person face up in the water.
- *Inflatable PFDs*: These are becoming more popular because they allow for unrestricted movement and are more comfortable in hot weather. When considering Inflatable PFDs, keep in mind that:
    - Inflatable PFDs are only approved for use by persons 16 years or older who weigh more than 36 kilograms.
    - Inflatable PFDs must be worn at all times while on deck or in the cockpit of an open vessel.
    - Inflatable PDFs must be readily available to persons below deck on vessels equipped with cabins.
    - Inflatable PFDs are approved for certain uses only. For example, inflatable PFDs are not approved for use on Personal Water Craft, for towed water sports or for use on sailboards.

Boat Navigation Equipment
Certain navigation equipment is required on board and operators must know how to use it properly. Boat Navigation Equipment Includes:

- Sound-signaling devices such as:
    - Mechanical (floatless) whistle
    - Horn
    - Portable compressed-air horn, and/or
    - Bell
- Navigation lights

Cold Water Immersion
Boaters should be prepared if they or someone else on board is unexpectedly immersed in cold water. Being prepared can help your inclination to panic and increase your ability to survive. 1-10-1 is an easy way to remember the first three phases of cold-water immersion and the approximate time each phase takes.

The 3 Phases of Cold Water Immersion: 1-10-1:

- Cold Water Shock – 1 minute
    - Cold water shock

occurs when a person experiences sudden immersion into water 15°C or below. Cold water can paralyze your muscles making it very difficult to put on a lifejacket or PFD in the water, so it is very important that you are wearing one the entire time you are boating.

- During cold water shock a person will gasp for breath and may experience muscle spasms and a rise in heart rate and blood pressure. The instant muscle spasms and gasp reflux causes a person to involuntarily ingest water and drown. A rise in heart rate and blood pressure can result in a heart attack or stroke.
- You should concentrate on avoiding panic and getting control of your breathing. Wearing a lifejacket during this phase is critically important to keep you afloat and breathing.

- Cold Incapacitation - 10 minutes
  - Over the next 10 minutes you will lose the effective use of your fingers, arms and legs for any meaningful movement. Swim failure will occur within these critical minutes.

- Hypothermia - 1 hour
  - Even in ice water it could take approximately 1 hour before becoming unconscious due to hypothermia. You should learn techniques of how to delay hypothermia, self-rescue, and calling for help in order to increase your chances of survival. In hypothermia, your core body temperature drops below normal levels resulting in weakened muscular functions, reduced coordination and slowing mental functions.

Heat Escape Lessening Position (H.E.L.P.)

If you do find yourself alone and immersed in cold water, use the Heat Escape Lessening Position (H.E.L.P.) to reduce heat loss from your core body temperature and delay side effects of hypothermia. H.E.L.P. is performed as follows

- Cross your arms tightly against your chest.
- Draw your knees up and against your chest.
- Keep your head and face out of the water.

Alcohol and Boating

Boaters should never consume alcohol while boating. Boating while impaired is an offence

Source: clipartpanda

under the Criminal Code of Canada. All boaters need to operate their boats safely and remember to leave the beer on the pier! Alcohol is a factor in more than 40% of boating related fatalities. Boater fatigue caused by hot sun, wind, noise, vibration and boat motion can quadruple the effects of alcohol on water versus when you are on land. Boat operators with more than 80 mg of alcohol per 100 ml of blood are liable to the following fines:

- 1st offence: at least $600 fine
- 2nd offence: at least 14 days of imprisonment
- 3rd offence: at least 90 days of imprisonment
- The maximum sentence may vary depending on provincial statutes.

Never cruise with booze!

Watching Your Wake

Those of us with our pleasure craft licence are familiar with general boat safety and etiquette but we may not be as familiar with the impact of boat wake:

- Loons and other birds that nest along the shore choose locations that are protected from waves caused by the prevailing winds. Because boat wake can come from any direction, it can swamp the nests and drown young birds, particularly in May and June.
- Inexperienced swimmers and young children will not be in the water when wind-driven waves are high. However, they could be toppled by boat wake.
- Boat wake churns up sediment in shallow water releasing nutrients that promote weed growth and algal blooms which, in turn, lead to depleted oxygen levels that harm fish.
- Boat wake can cause shoreline erosion.
- Boat wake can cause docks and moored boats to rock severely and pull mooring hardware.

The larger the wake, the greater potential for these undesirable side effects. The size of the lake also affects the potential for problems. The greater the distance the waves are created from shore, the more opportunity they have to dissipate before reaching shore. In a small lake like Livingstone, boat wake can cause a lot of damage.

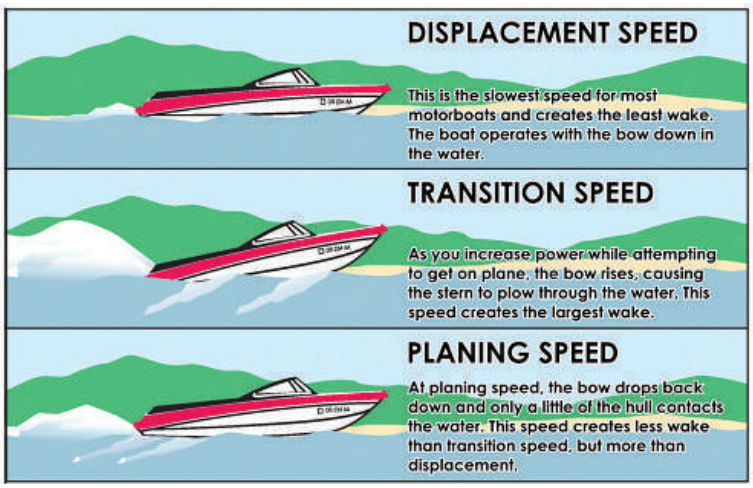
- A wave that is 12.5 cm high when it reaches the shore does not cause significant damage. Waves at this level are created by boats operating at speeds under 10 km/h.
- The Small Vessel Regulations of Canada stipulate that the legal speed limit for all motor boats is 10 km/h within 30 metres of any shore.
- A wave that is 25 cm high is

four more times destructive than a 12.5 cm wave. Runabouts and water ski boats produce a 25 cm high wave at the stern of the boat when at planing speed.

- 62.5 cm waves are 25 times more destructive than a 12.5 cm wave.
- Wakeboard boats create a wake of half a metre (50 cm) or more. The large waves produced by wakeboard boats do not always have the distance needed to dissipate before reaching shore on many lakes.

How You Can Be Wake Wise

- Be aware of the size of your wake during displacement (leaving the dock), transition (getting up to speed) and planing (cruising) speeds.
- Position passengers/cargo throughout the boat to reduce the time spent in transition speed.
- Look behind you to see and understand the impact of your wake on shorelines, docks or other structures. Adjust your speed and direction accordingly.
- Respect the shoreline zone. Reduce your speed to less than 10 km/h within 30 metres of any shore including narrow channels.
- Water-ski, tube and wake-board well away from all shorelines. Try to make use of the entire length of the lake.
- Don't tow skiers or boarders around canoes, kayaks, sailboats or small outboards. They may cross your rider's path, and your wake can capsize them.
- Consider the size of the wake produced when purchasing a new boat.



Source: Pike Lake Community Association

Clean and Green Boating

Recreational boaters can take action for cleaner lakes and better health. Switching to a new four-stroke outboard engine means a substantial reduction in your fuel costs and a significant improvement in the quality of our air and water compared to an old, conventional two-stroke outboard engine.

As much as 30% of the fuel used in conventional two-stroke engines passes through the combustion chamber unburned, directly into the water. That's the equivalent to pouring one third of the fuel straight into the lake! In addition to water pollution, running a two-stroke engine releases smog-forming emissions that are known to be harmful to the environment and our health. Four-stroke outboard engines are:

- 90% cleaner
- 50% more fuel efficient
- 50% quieter

Remember that dumping live bait, such as fish bait or crayfish into a lake is one way you risk bringing invaders into an area where they do not belong. This can cause serious harm to the food chain and local ecosystem. Invasive exotic species are plants, fish, shellfish and even tiny algae or bacteria that enter into waters that are not their natural home. They then multiply and crowd out the plants and animals that belong there.

You can also do your part by keeping your hull clean. This is very important if you operate your boat on a lake or river and then tow it over land to use in another area. Rinsing or cleaning your hull after use or before entering new waters helps to remove spores and other invasive organisms.

Use Environmentally Friendly Cleaners

- *All-purpose cleanser*: Mix 30 ml of baking soda or borax, 30 ml of tea tree essential oil, 125 ml of vinegar, 15 ml of biodegradable dish soap and 2 litres of hot water. Spray on the surfaces you plan to clean.
- *Chromium*: Rub with baking soda. Rinse and polish with vinegar in hot water.
- *Deck and floor*: Pour 250 ml of vinegar in 2 litres of water.
- *Drain*: Pour 60 ml of baking soda in the drain, followed by 60 ml of vinegar. Let it rest for 15 minutes, then pour in a full kettle of boiling water.
- *Mould*: Add 60 ml of borax and 30 ml of vinegar to 500 ml of hot water. Spray the mixture to eliminate germs.
- *Toilet*: Pour 125 ml of baking soda and 125 ml of vinegar into the toilet bowl. The foaming reaction cleans and deodorizes. Brush and flush.
- *Window and mirror*: Mix 2 ml of liquid soap, 45 ml of vinegar and 500 ml of water in a spray bottle. Use a cotton rag or old newspapers to clean and shine.
- *Wood (polish)*: Mix 30 ml of edible linseed oil, 30 ml of vinegar and 60 ml of lemon juice in a glass pitcher. Rub the solution into the wood with a soft rag until it is clean. To store the solution, add a few drops of vitamin E from a capsule and cover.

SAFE BOATING STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

- Make sure to have your Pleasure Craft Operator Card (PCOC) with you whenever you are in your boat.
- Have all the required boat safety equipment on board.
- Always wear your lifejacket or PFD when on or near the water.
- Have on board all required navigation equipment and know how to use it.
- Be prepared for unexpected immersion in cold water.
- Never consume alcohol while boating.
- Avoid shoreline erosion – watch your wake and propeller wash. Reduce your speed to less than 10 km/h within 30 metres of any shore.
- Switch to a four-stroke outboard engine.
- Check fuel tanks and motors regularly for leaks. Keep the motor maintained regularly.
- Handle fuel, oil and other chemicals with great care and have an action plan to deal with spills. Even small fuel spills in the water are enough to kill some aquatic species and contaminate drinking water. If your gas tank is detachable, fill it away from the water.
- Avoid transferring alien species. Before you launch your boat in the lake, drain water from motor, live wells, bilge and bait buckets and scrub the hull bottom to avoid transferring any alien species. Do not drain into the lake.
- Inspect your boat, trailer and all accessory equipment that has been in the water when removing your boat from another lake. Remove all plant and animal material before leaving the launch.
- Wash your boat, tackle, downrigger cables, trailer, and other equipment with hot water, or spray with high pressure water before transporting your boat to another water body. Or, let your boat dry out in the sun for five days.

- Use the least toxic paint you can find to paint the hull.
- Use environmentally friendly cleaners on your boat.
- Don't litter. Keep disposal containers on-board, as well as containers for any reusable items.
- Pick up any trash you see floating in the water.

SAFE BOATING STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Keep Livingstone Lake property owners informed of changes to legislation and regulations regarding boating safety.
- Promote a greater understanding of how boating can impact water quality and shoreline ecosystems and what steps we can take to protect them.

REFERENCES

Boat right be polite. Lake of Bays Association, Recreation and Safety Committee, 2005.

Safe boating guide. Transport Canada, 2012 – and/or- www.tc.gc.ca/publications/en/tp511/pdf/hr/tp511e.pdf

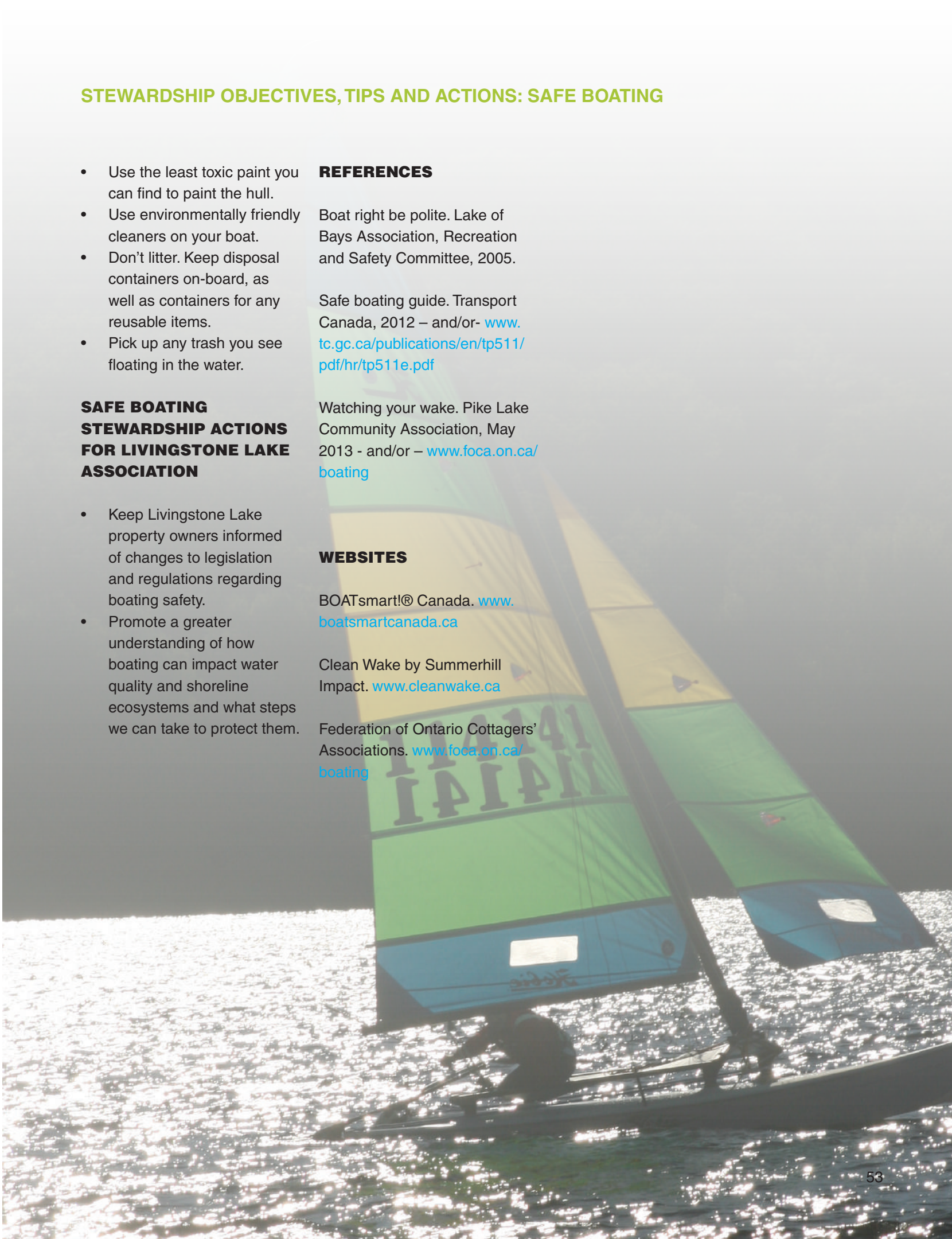
Watching your wake. Pike Lake Community Association, May 2013 - and/or – www.foca.on.ca/boating

WEBSITES

BOATsmart!® Canada. www.boatsmartcanada.ca

Clean Wake by Summerhill Impact. www.cleanwake.ca

Federation of Ontario Cottagers' Associations. www.foca.on.ca/boating



Source: 123rf

6. RECREATION AND RELAXATION

If we ask ourselves why we spend time at Livingstone Lake, the answer usually comes down to a combination of recreation and relaxation. Although these words may have different meanings for different people, there are certainly some commonalities among the resident lake population. Some of these became obvious during the 2010 Livingstone Lake survey (see *Appendix 3*).

One of the questions on the survey asked residents to rank what was most important to them in terms of their personal enjoyment of Livingstone Lake. Most highly-valued were water quality, natural shorelines/ wetlands, scenery (including the significant amount of Crown land on the lake) and wildlife, subjects that we have covered in earlier chapters of this Stewardship Plan. Of equal importance, however, were *peace and tranquillity* and *recreational activities*.

When asked on the survey about their participation in recreational activities, most residents put swimming, reading and nature appreciation (including night-sky viewing) at the top of their lists. Other favourites were various water activities (especially non-power boating and fishing) and socializing, as well as winter activities and other special pursuits such as gardening, painting and photography.

RECREATION AND RELAXATION STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

What tools do we have to ensure that we and our lake neighbours can follow both active and passive pursuits in ways that are *safe and considerate of the needs and wishes* of others and that also maintain the overall peace and tranquillity that so many of us believe is an integral part of living at Livingstone Lake? We have talked about several of these tools in the other chapters of this plan, especially *Living with Nature* and *Safe Boating*. In this section, we have added a few additional ideas that can enhance recreation and relaxation for all of us at Livingstone Lake.

Night Skies

One of the observations that many of us often make during evenings at the lake

is that we can actually see the stars. Indeed, many of us become amateur star-gazers, enjoying the various seasonal constellations so apparent given the absence of light pollution that characterizes the cities from which we come. As lake residents therefore, it is important for us to recognize that outdoor lights shine for great distances along the lake shoreline and can affect the personal enjoyment that our neighbours have of night skies. In addition, bright lighting can be detrimental to the night-time habits of fish, animals and insects by changing their ability to navigate and migrate and also their time dedicated to foraging, mating and feeding.

Tips for Enjoying Night Skies

- Update old outdoor light fixtures with dark-sky-friendly lights.
- Avoid floodlights, and use lights only where needed.
- Aim lights down to keep light from where it is not needed (up or sideways) by using caps and reflectors.
- Use motion sensors and timers so that lights are on only when needed.
- Reduce or eliminate decorative lights especially along shorelines and on docks.

Noise

Noise is defined as unwanted sound. In today's world, we are besieged with human-created sounds, some of which could be considered inconsistent with the quiet, relaxing and natural environment of cottage country. Indeed, in addition to the high value placed on peace and tranquillity (see above), many of our 2010 Survey respondents cited noise as having a negative impact on personal enjoyment at Livingstone Lake, perhaps more so because it is a known fact that noise does carry across water. Sound is measured in decibels (dB), with conversational speech tending to be around 60 dB. Continuous

exposure to sounds over 85 dB can cause hearing loss, and anything above 130 dB passes the pain threshold.

At the same time, there is no question that noise is a by-product of some of our cottage activities. Whether it's kids swimming, families water-skiing, chain saws buzzing or construction projects moving forward, these and other actions are part of cottage living, and no one would advocate trying to suppress them. All we really need to do is be considerate of our neighbours while engaging in any noise-generating activities.

Tips for Handling Noise

- If you have a construction project underway or need to use your chain saw (110 dB) or other power tools (as we all do at times), consider the time of day. Don't start too early in the morning, and try to take regular time off so that your neighbours don't get a long stretch of buzzing or banging.
- Be aware that the faster your boat goes, the noisier it gets and the bigger the wake it creates. See also *Safe Boating*, page 46 for other tips related to boating and wakes.
- Be aware that even the quietest conversations held in a boat can often be heard clearly on the shore.
- Although there is no law banning Personal Water Craft (PWCs), many Livingstone Lake residents have voiced their disproval of these vehicles.
- If you are planning a social gathering that you think may generate more noise than usual, take a moment to communicate with your nearest neighbours in advance, and make sure that the festivities and noise (music, singing) stop at a reasonable hour.
- Take care when playing your favourite music that it is not loud enough for your neighbours to hear.
- Refer to the Township of Algonquin Highlands noise by-law if dealing with severe, recurring noise problems (visit, http://www.algonquinhighlands.ca/documents/Noise_By-law_2013-30.pdf).

Fire Safety

Campfires are one of the recreational activities that many of us enjoy during summers at the lake. We therefore need to recognize that forest fires are also a fact of life in cottage country. This fact hit close to home at Livingstone Lake in 2012 when a fire erupted on the west shore very close to one of the residences. Several years earlier there was also an incident involving a smouldering campfire on the top of the big cliff and, on another occasion, the complete destruction by fire of a cottage on the east shore. Whether fires are triggered by lightning strikes, improperly-extinguished campfires, malfunctioning woodstoves or other causes, it is essential

that lake residents take every precaution both indoors and outdoors to prevent but at the same time be prepared for the eventuality of a fire.

To this end, during 2013-14, the Livingstone Lake Association developed a *Fire Response Plan*, including a list of Fire Safety Dos and Don'ts that have been included here as *Appendix 11*. As part of that process, the Association also developed an incentive plan for the purchase of some basic fire fighting equipment. As a result, twelve individual families at Livingstone Lake purchased Polytank Back Tanks in preparation for responding to any eventual fire.

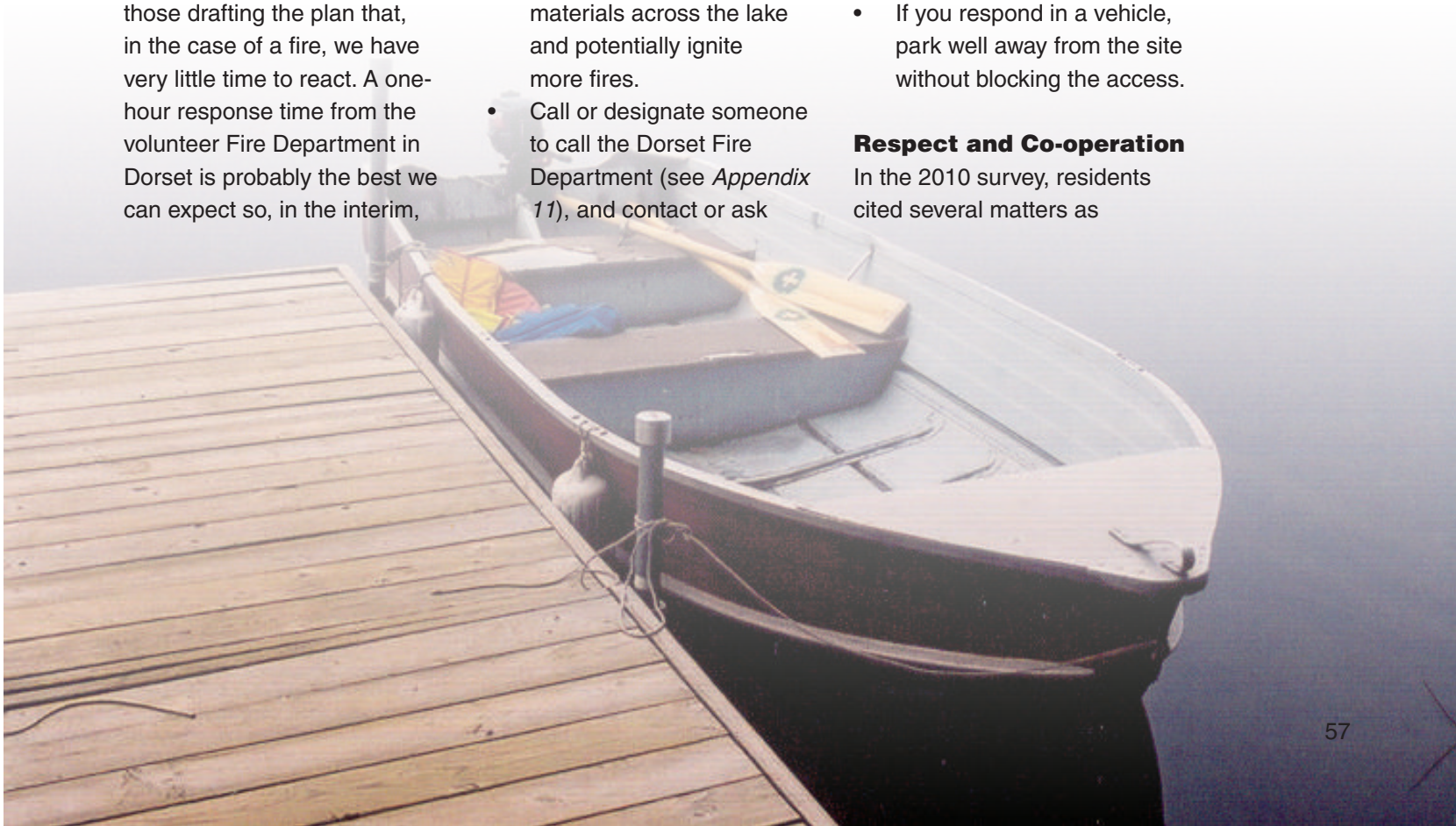
In terms of other specific ways that residents might respond to a fire, it became clear to those drafting the plan that, in the case of a fire, we have very little time to react. A one-hour response time from the volunteer Fire Department in Dorset is probably the best we can expect so, in the interim, fire responders at Livingstone Lake must concentrate on working to contain a fire until the professional fire-fighters arrive.

Tips for Fire Safety/Reponse

- Review the list of Fire Safety Dos and Don'ts in *Appendix 11*.
- If you smell or see smoke, don't ignore it. Find the source and enlist the help of others. Fire knows no boundaries and even a small forest fire could destroy much of our lake environment. The lake is a barrier to many small fires but in windy conditions, it is not enough. The strong updrafts in and over a fire can sweep up burning debris, and even a moderate breeze could easily transport the burning materials across the lake and potentially ignite more fires.
- Call or designate someone to call the Dorset Fire Department (see *Appendix 11*), and contact or ask someone else to contact as many other lake residents as you can to help in organizing the containment response.
- If the fire is in a dwelling or other structure, make sure that no one remains inside. Minutes count and lives are at stake.
- If you are called, please respond with as many able-bodied persons as you can. Bring shovels, rakes, buckets, hardhats, water backtanks, chainsaws, pumps (and fuel) and any fire hose or garden hose that you may have. If there is a cottage nearby, we may be able to string the hoses together and apply it directly to the fire or use it to refill the backtanks mentioned above.
- If you respond in a vehicle, park well away from the site without blocking the access.

Respect and Co-operation

In the 2010 survey, residents cited several matters as



having a negative impact upon their personal enjoyment of Livingstone Lake. Some such as water pollution, shoreline erosion, vegetation removal, boat traffic and wake, noise and light pollution, we have covered above or in other chapters. We do not have the space here to deal with other items such as firearm usage, ATVs, dirt bikes and snowmobiles. Nor can we get into details about issues such as the many unwelcome uses of the gravel pit at the north end of the lake or proposals such as the one (never acted upon) for underwater logging in the back bay.

We can, however, suggest that virtually all of these negative influences can be mitigated through communication among lake residents as well as a spirit of co-operation and respect for each other and for the lake ecosystem. We hope that that spirit as well as Stewardship Plan tips will be passed on to any relatives, friends or other individuals using or renting our properties (see *Appendix 13*).

RECREATION AND RELAXATION STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

- Promote a greater understanding of how certain issues can negatively influence the personal enjoyment of some members, and what steps we can take to mitigate them.
- Keep Livingstone Lake property owners informed about any matters or proposals that might have a negative influence on personal enjoyment and activities at Livingstone Lake.
- Work with the Ontario Ministry of Natural Resources and Forestry, the Township of Algonquin Highlands and other appropriate agencies to help deal with issues that negatively influence residents' personal enjoyment and activities at Livingstone Lake.

REFERENCES

About Paint Lake; a community plan for the Paint Lake Residents. Paint Lake Ratepayers Association. 2005.

"Dim wits: Smart strategies for cutting the cottage wattage on your lake." David Zimmer. Cottage Life. September/October 2002.

Lake Stewardship Plan Grace and Dark Lakes. Grace and Dark Lakes Cottagers Association. August 2006.

Living Sustainably in Seguin Township; a handbook on sustainable living practices for shoreline property owners. French Planning Services for the Township of Seguin.

Mountain Lake Stewardship Plan; a guideline for a healthy lake. Mountain Lake Property Owners Association.

Take the Plunge; a guide to stewardship of Ontario's waters. Federation of Ontario Cottagers' Associations (FOCA). 2009.

WEBSITES

Algonquin Highlands, Township of. http://www.algonquinhighlands.ca/documents/Noise_By-law_2013-30.pdf

Coalition of Haliburton Property Owners' Associations. www.cohpoa.ca

Cottage Life magazine. http://cottagelife.com/94788/environment/tips-environment/the-top-sources-of-noise-pollution-at-the-cottage AND http://cottagelife.com/92692/environment/wildlife/3-key-ways-that-light-pollution-negatively-impacts-nature

Federation of Ontario Cottagers' Associations. http://foca.on.ca/wp-content/uploads/2013/06/Take_the_Plunge_NOISE_Chapter_by_Andy_Metelka.pdf AND http://foca.on.ca/wp-content/uploads/2013/06/Night-Skies.pdf

STEWARDSHIP OBJECTIVES, TIPS AND ACTIONS: RECREATION AND RELAXATION

> *"We pulled together all of the actions identified for the Lake Association, including how we can maintain this plan as a living document."*

IMPLEMENTATION OF STEWARDSHIP ACTIONS

In the preceding pages we covered the six areas of concern that were identified in the 2010 Livingstone Lake Survey. We provided general information about each area, as well as Stewardship Tips for Livingstone Lake Property Owners and Stewardship Actions for Livingstone Lake Association. To provide an overall perspective of where we go from here, we pulled together all of the actions identified for the Lake Association, including how we can maintain this plan as a living document.

STEWARDSHIP ACTIONS FOR LIVINGSTONE LAKE ASSOCIATION

1. Water Quality

- Continue to participate in the Lake Partner (MOECC/FOCA) and Ice Watch (Environment Canada) programs. Consistently

collect water quality information to gain a more detailed picture of how fresh water changes throughout the year and how Livingstone Lake is responding to changes in land use and efforts to improve its quality.

- Work to raise awareness of how Septics, Runoff and Boats affect lake water quality, offering advice and guidance where possible.
- Investigate the nature of headwater lakes and streams flowing into Livingstone Lake, in order to assess what impact they might have on Livingstone's water quality.

2. Natural Shorelines and Wetlands

- Continue to participate in the Lake Partner (MOECC/FOCA) and Ice Watch (Environment Canada) programs. Consistently collect water quality information to gain a more detailed picture of how fresh water changes throughout the year and how Livingstone Lake is responding to changes in land use and efforts to improve its quality.
- Get to know the local habitat by conducting a shoreline assessment to inventory wetlands, streams, drainage courses, riparian vegetation and habitat.
- Promote a greater understanding of the importance of shoreline ecosystems and how they can be protected or restored.
- Encourage the adoption of shoreline buffer zones using native plants and the restoration of developed shorelines. Make a commitment to keep 75% of our shoreline in a natural state.

3. Living with Nature

- Support the Coalition of Haliburton Property Owners' Associations in requesting that the MNRF change the current lake trout season closing date to mid-August from its current date of September 30th. Female lake trout feed voraciously at the end of the summer in preparation for spawning in late October or early November; hence they are more susceptible to being caught. Loss of potential spawners can quickly deplete the trout productivity of a lake.
- Support shoal enhancement as a relatively easy, low cost activity that may have benefits to help lake trout spawn. As part of the SPIN survey in 2009 and a follow-up trout spawning survey by the MNR in 2011 (see *Appendix 7*), it was determined that there are several spawning beds on

Livingstone Lake where lake trout gather in the fall.

- Continue to support participation in Bird Studies Canada's Canadian Lakes Loon Survey.
- Continue to communicate with the Haliburton Highlands Land Trust, the Coalition of Haliburton Property Owners' Associations, Haliburton County, MNRF, MOECC, FOCA, Toronto Zoo Adopt-a-Pond Program and other bodies to keep up to date on species at risk and invasive species.
- Provide information and help raise awareness about species at risk and invasive species, and the role these play in ensuring the health and diversity of the Livingstone Lake ecosystem.
- Work on developing inventories of species of birds, mammals, reptiles, amphibians, trees and plants known to exist in the Livingstone Lake area.

4. Development and Land Use

- Contact MNR about Crown land policies on hydro development, commercial tourism and mineral exploration and development to ensure the association is aware of and has an opportunity to participate in any new development proposals.
- Participate in the 2019-2039 Forest Management Plan processes for future forestry operations near Livingstone Lake to protect its remote setting. Involvement by the association will also help to ensure appropriate areas are allocated for forestry operations.
- Maintain on-going and positive communication with the Reeve, and/or Deputy Reeve and Ward Councillor.
- Continue to invite the Reeve and/or Ward Councillor to attend the association's annual general meeting.
- Participate in strategic planning sessions and in the Official Plan review every five years.
- Participate in public consultation sessions and meetings for development proposals, official plan review, zoning and by-law development and amendments, strategic planning, amendment applications and lot creation proposals that have implications for Livingstone Lake.
- Provide information about local candidates for municipal council and encourage property owners to vote.
- Check the News and Events page of the Township website regularly for upcoming events and meetings of interest.
- Subscribe to the local

papers to keep abreast of local news.

5. Safe Boating

- Keep Livingstone Lake property owners informed of changes to legislation and regulations regarding boating safety.
- Promote a greater understanding of how boating can impact water quality and shoreline ecosystems and what steps we can take to protect them.

6. Recreation and Relaxation

- Promote a greater understanding of how certain issues can negatively influence the personal enjoyment of some members, and what steps we can take to mitigate them.
- Keep Livingstone Lake property owners informed about any matters or proposals that might have a negative influence on personal enjoyment and activities at Livingstone Lake.
- Work with the MNRF, the Township of Algonquin Highlands and other appropriate agencies to help deal with issues that negatively influence residents' personal enjoyment and activities at Livingstone Lake.

Continuing Actions for Livingstone Lake Association

- Continue to update the lake history (see *Appendix 1*) to fill in gaps in knowledge of past events and to record changes of ownership and other lake happenings.
- Review the Stewardship Plan every three to five years, identifying any updates or changes in information to ensure that it remains a living plan.

APPENDIX 1: Social History of Livingstone Lake

To some extent, the history of Livingstone Lake is shrouded in the mists of time, although, thanks to the efforts of several current lake residents, we have been able to shed some light on times past. There would appear to have been four key developments that have brought Livingstone Lake to where it is today: the Round Lake Hunting and Fishing Company, the advent of lumbering, Livingstone Lodge and the sale of Crown lands.

Members of the Round Lake Hunting and Fishing Company, circa 1912

The Round Lake Hunting and Fishing Company

The first recorded historical event occurred in 1888 when the Round Lake Hunting and Fishing Company (often referred to as the Hunt Club and whose members were mainly from the Kitchener-Waterloo area) purchased 220 acres from the Ontario Government at $1 per acre, covering much of the west shores of Round Lake (now called Livingstone Lake), Bear Lake and down the Bear River to Hollow Lake (Kawagama Lake). The group's log cabin is believed to have been built originally circa 1867 as part of the lumber camp depot on Fletcher Lake, but, after the cabin was sold to the Hunt Club, it was disassembled, transported and reconstructed on its present site at the northern end of the west shore. At that time, access to the club lands on Livingstone Lake included a long trek up from Hollow/Kawagama Lake, through Bear Lake, by portage up to Round/Livingstone Lake. Club usage continued up until the 1950s, but by the late 1960s/early 1970s, thanks to the building of what is now Hughes Road in from County Road 12 (initially to allow equipment in to construct the dam at the south end of the lake), a few of the remaining club members were looking after disposal of the property. The original acreage

was subdivided and sold off to, among others, families of former club members, such as Charles ("Chappy") Boehm and son Dick Boehm (now the Scotts, brothers Don and Gord); Dr. Fred Hughes and son Jeremy who later subdivided and sold a lot to Harris/McDonald (now the Kotajarvis); and Dr. Fred's brother, ("Old") George Hughes (now sons Paul and Mark, plus sons Fred and George on the adjacent lot).

In the early 1970s, Hunt Club lands on the east shore of the lake (east of the dam) were sold to the McHenrys (now McHenry/Surtel) and the Broadbents, the latter subdividing and selling their property in the mid-1990s (now the McCartens, the Loves and Durocher/Hammond). In the late 1970s and 1980s, more west shore club lands were sold to Albert Gang (now the Pupletts); Bob Van Strepin (later the Jacksons, now the Stones); and to the Wieses who sold the southerly part of their lot to Van Strepin (later several owners including the Karl Parkers, and now Johnsons). As for the remaining west shore club lots (between the Pupletts and the Stones), these have seen several owners over the years although all properties have been in the same hands for most of the last fifteen years (the Fittons, the Cowleys, and Nancy Hughes who is no relation to the Hunt Club Hughes).

The abandoned Hunt Club log cabin was in substantial disrepair by the late 1970s, but was rescued and preserved by the Wieses for use as their summer cottage. In 1997, it was purchased by the Wayne Parkers, who have continued the preservation and added to the original clubhouse, making it their very comfortable year-round home. During the Wieses' tenure, the property was made more accessible by a lane cut through the bush from County Road 12. That road was later named Round Lake Company Lane as a fitting tribute to the Round Lake Hunting and Fishing Club that had purchased land on the lake more than a century earlier.

Lumbering

Another early development that had some bearing on the course of events at Livingstone Lake was the advent of lumbering. Unfortunately, we have so far been able to glean very little information in terms of when cutting began and how many times the Livingstone area has been cut over, although our best guess is that the initial cut took place approximately 1868 to 1888. We do know that the Round Lake Lumber Company had a mill on the west side of what many of us call the back bay, as well as a settlement that included two cabins on the north shore point separating the back bay from the main lake; the most easterly one is thought to have been the residence of the mill foreman. There was also another larger dwelling across the channel on the northeast shore, thought to have been the residence of the mill superintendent. We know that the mill burned down in the 1950s, and that the land, then leased by National Lumber Company, reverted back to the Crown.

Vestiges of the mill still remain along the west shore of the back bay, and, if one looks closely along the edges of Millyard Lane (past the former mill yard off Laurel Road), you can still uncover the remains of the bark slabs that were removed from trees felled in that area. In addition, the former superintendent's house is still standing on the northeast shore, having been for many years the summer cottage of the Stoddart family (later the Hetheringtons, now the Gendrons). Adjacent to that structure, the younger Stoddarts built another cottage (later owned by the Bracks, the Dixons, and now by Fizzell/James). In the back bay itself, the milling operation left behind

many sunken logs which a company dealing in antique timber wanted to harvest during 2006-2007. However, a strong protest from lake property owners led to the withdrawal of the company's application.

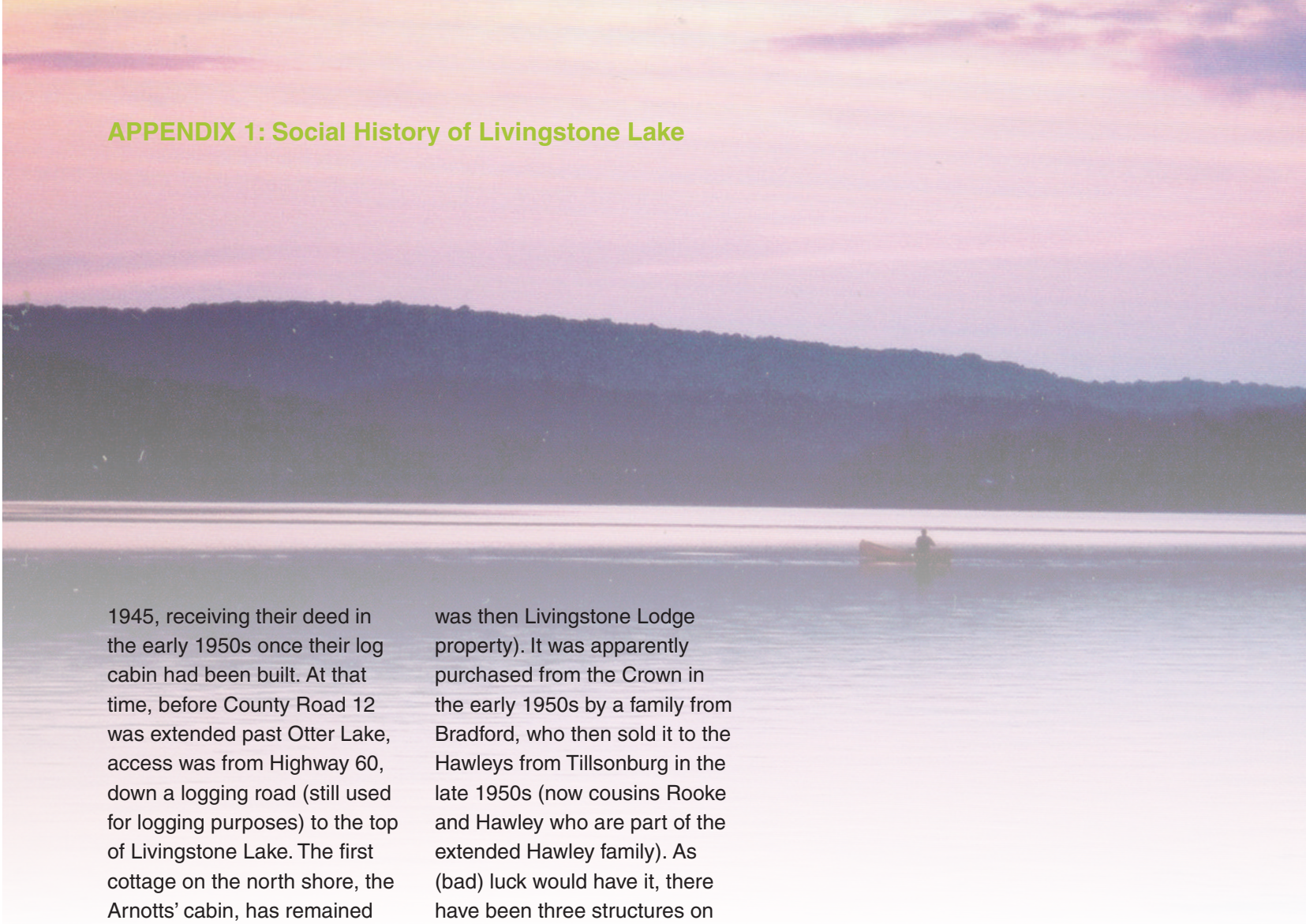
Livingstone Lodge

Of course, no history of Livingstone Lake would be complete without mention of Livingstone Lodge. It was in 1945 that Steve Kopys purchased the land on the east shore from the Crown, and began erecting the main lodge buildings and adjacent cabins. At some point after the demise of the lumbering activities, Steve also took possession of the company's property on the mainland north shore, including the two cabins mentioned above. Annie joined him sometime early in the 1950s, and together they added several other structures as well as an addition to the most westerly of the two original cabins, making it into their residence and the lodge office. Over the years, Steve and Annie Kopys played host to many fishing and hunting groups, as well as many evenings of music and dancing that lodge guests and other lake residents enjoyed. The Kopys also sold off two of the former lumber company lots facing the back bay (at the entrance to what is now Hazelnut Lane) to the Friedays and Wilkinsons (now the Farahs).

Following Steve's death in 1987, Annie carried on operating the lodge until her passing in December 2009. By that time, she had already sold the former foreman's residence to Gord Farah (now the Loves) and in 2007 the east shore main lodge property to the Dubés who have restored and renovated most of the buildings for their family's use. In 2010, the Dubés also purchased the remaining portion of the mainland lodge property and have turned the lodge office/residence (now named "Annie's Place") and one of the outbuildings into comfortable summer cabins. In addition, the boathouse has been rescued for boat and other storage, and the Livingstone Lake Association now holds its Annual General Meeting there every year on the third Saturday in August.

Sale of Crown Lands

Last, but certainly not least, there was the Ontario government's sale of Crown lands following World War II. Lots were sold to the public with the stipulation that a building to a certain minimum size had to be erected within a specified length of time or the land would revert to the Crown. Seven lots were surveyed on the north shore east of Livingstone Creek. One of the first of these was sold to the Arnotts, who paid a $10 deposit in November



1945, receiving their deed in the early 1950s once their log cabin had been built. At that time, before County Road 12 was extended past Otter Lake, access was from Highway 60, down a logging road (still used for logging purposes) to the top of Livingstone Lake. The first cottage on the north shore, the Arnotts' cabin, has remained in the family and has recently been restored and expanded by the Wieses. Other purchasers in the 1950s included the Schiedels (now Scott/McLaren), the Yellands, the Armstrongs (now the Bettgers and the Stouffers), the Wismers and the McDermotts/Bruces (now the Adams), all of whom erected buildings as per government requirements.

Before the north shore settlement began, however, there was already a log cabin on the east shore, just at the base of the big cliff (and south of what was then Livingstone Lodge property). It was apparently purchased from the Crown in the early 1950s by a family from Bradford, who then sold it to the Hawleys from Tillsonburg in the late 1950s (now cousins Rooke and Hawley who are part of the extended Hawley family). As (bad) luck would have it, there have been three structures on that site: the original cabin which burned down in 1969, followed by its replacement which, in 2005, was so severely damaged by a falling tree that it had to be demolished and replaced in 2006.

The one other area on the lake where there were Crown land sales was on the point at the end of what is now Hazelnut Lane. From what we can gather, this area was originally part of the lumber company lands which reverted to the Crown after the mill closed. Apparently, one of the buildings on the

lake side of that strip of land had been a lumber company house that was purchased by the Hedleys as part of a Crown lot, although the building burned down at some point and was replaced with a Viceroy structure (later purchased and expanded by the Tauntons, now the Bolligers). On the back bay side of that point, a cottage was built sometime in the late 1950s (again, presumably on land purchased from the Crown), then sold to the Reids, who subsequently subdivided to create a lot for their relatives, the Lambes.

No history is complete without reference to the odd bit of folklore that has at times been associated with the lake. For example, it has been suggested that, in the early 20th century, famed Canadian painter Tom Thomson (associated with the Group of Seven artists before that group's official formation) may have passed through Round Lake on one of his canoe trips from Canoe Lake just up the way in Algonquin Park. Even before that, in the late 18th or early 19th century, it is possible that British-Canadian fur trader, surveyor and map-maker David Thompson passed this way in his search for the most effective waterway connecting the Ottawa River to Georgian Bay. We'll likely never know for sure whether these visits ever took place, but we do have it on good authority that Kitchener, Ontario, native and cook, Edna Staebler, did vacation at the lake in company with her father who was a Round Lake Club member. They would have stayed at the club's cabin, and it's entirely possible that some of her famous Food That Really Schmecks recipes were compiled and written in this environs.

As the above outline suggests, there have been many changes at Livingstone Lake over the past 120 years, but what has not changed is the special place that this lake has in the hearts and minds of all who have visited or resided here during this time period. In our 2010 survey, respondents commented on such features as the lake's natural, serene beauty and the fact that there is still considerable undeveloped Crown land with undisturbed shorelines. They remarked on special places such as the cliff/rock face on the east shore of the lake, with its changing light patterns at different points during the day, its amazing vistas (from the top), the birds nesting on the rocks, and its offer of sheltered swimming and fishing. Also noted was the marsh/creek at the north end of the lake, offering a great habitat for birds, animals and other natural phenomena and a quiet, peaceful place to explore in a canoe.

So, that's the history of Livingstone Lake as best as we can determine at the present time. Because there are still gaps in our knowledge of past events, and because changes in ownership and other events will add to the lake's annals, it is our hope that we can continue to update this chronicle as the years go by.

REFERENCES

In addition to email, phone and in-person conversations with many current lake residents, the following sources have made possible this first attempt at a lake history:

History of Livingstone Lake: 1945 to the Present. Susan and Brian Wiese, 2012

History of the Round Lake Hunting and Fishing Club. Wayne Parker, Livingstone Lake News, 2012.

Livingstone Lodge and the Kopys. Beth Adams Bow, Livingstone Lake News, 2010.

The Schiedels' Story: A Conversation. Beth Adams Bow, 2013.

60 Years at Livingstone Lake. Susan Wiese, Livingstone Lake News, 2008.

An interview with George Hughes. Beth Adams Bow, 2008.

APPENDIX 2: Livingstone Lake Association Constitution - Mission and Objectives

MISSION

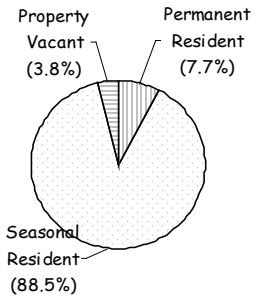
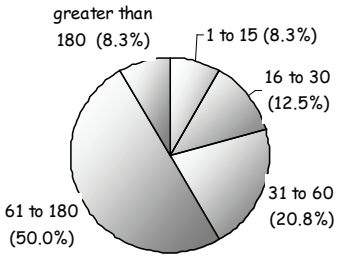
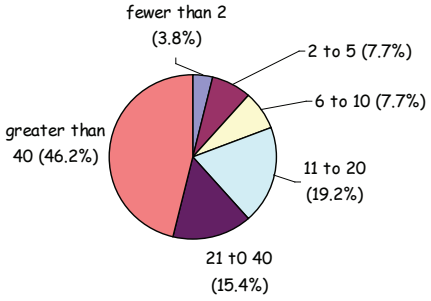
The mission of the Livingstone Lake Association is to foster a co-operative spirit of stewardship for the enjoyment, protection and preservation of Livingstone Lake for future generations.

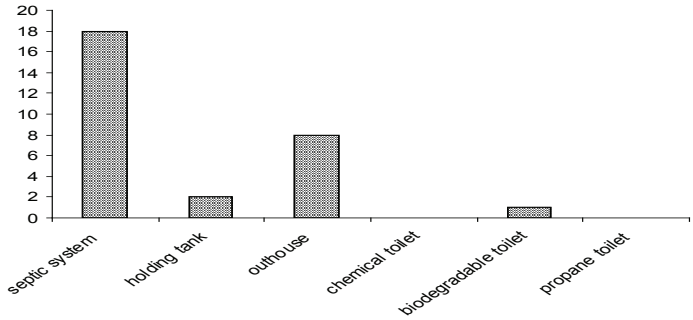
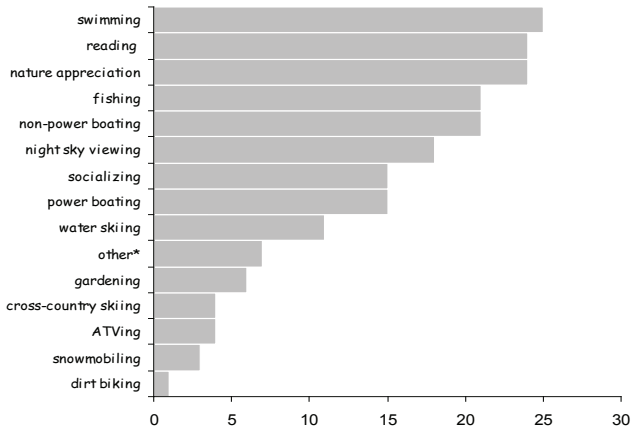
OBJECTIVES

a) To provide a formal mechanism for a common voice.
b) To observe and respect each other's rights and opinions.
c) To establish and maintain an organizational structure to help support the mission and transact the business of the Association.
d) To register the Association with the Federation of Ontario Cottage Associations (FOCA) in order to take advantage of the benefits of the collective voice of the Federation.
e) To facilitate good communication among Lake property owners.
f) To provide a network for sharing resources among owners.
g) To disseminate information regarding ways and means to protect and preserve the Lake's environment.
h) To promote, protect and represent the interests of all Livingstone Lake property owners to government agencies and other organizations.
i) To preserve Livingstone Lake as a quiet haven.

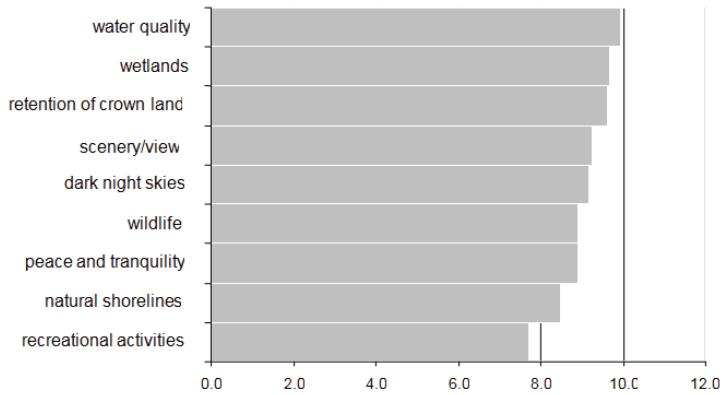
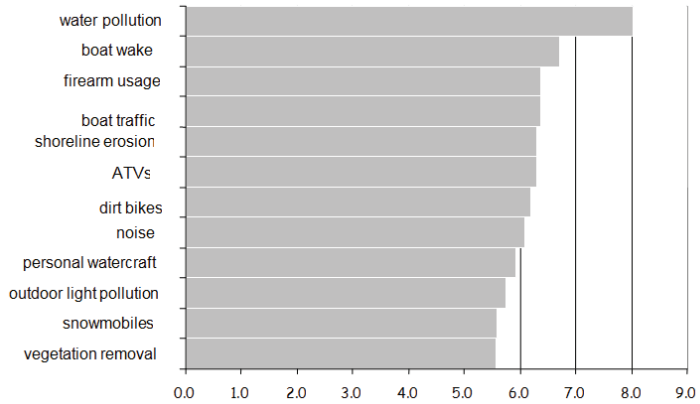
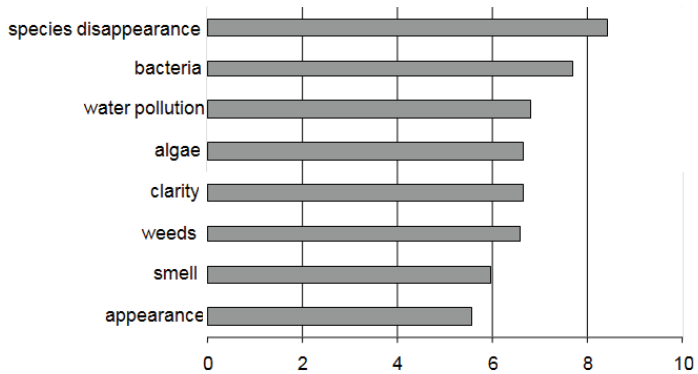
APPENDIX 3: Results from Survey of Livingstone Lake Residents, 2010

LIVINGSTONE LAKE SURVEY (2010)

1. Residency Status	
2. Use of Property (# of days per year)	
3. Property Ownership in Family (# of years)	

4. Black Water Disposal (# of respondents)	
5. Grey Water Disposal (# of respondents)	Septic system 20 Holding tank 0 Other* 5 * disposal in the woods
6. Last Time Septic Serviced	< 1 year ago 6 1 to 3 years 7 4 to 10 years 6 1 to 20 years 0 Don't know 1 * some respondents did not answer this question
7. Participation in Recreational Activities (# of respondents) * "other" includes snowshoeing, painting and photography	
8. Types of Watercraft	a) Motorized Watercraft Total 2-stroke 4-stroke 31 18 13 b) Number of watercraft per household (average 3.92)

APPENDIX 3: Results from Survey of Livingstone Lake Residents, 2010

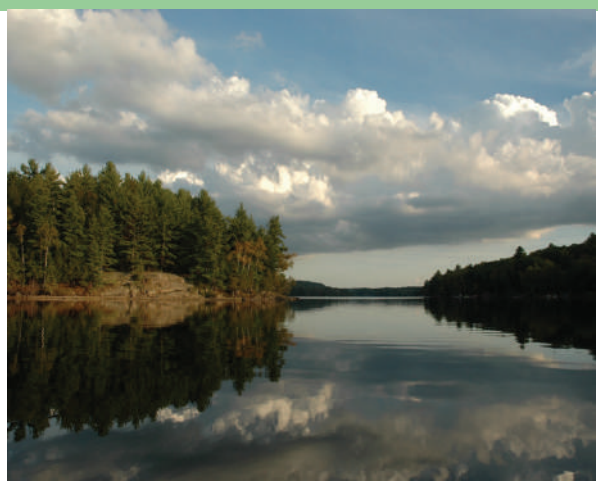
9. Importance to Personal Enjoyment (average out of 10 where 10 is the most valued)	
10. Negative Impact on Personal Enjoyment (average out of 10 where 10 is the most negative)	
11. Water Quality (opinion)	excellent 5 good 20 fair 1 poor 0
12. Water Quality Concerns	

APPENDIX 4: Shoreline Tree Preservation By-Law Q&A, County of Haliburton

APPENDIX 4: Shoreline Tree Preservation By-Law Q&A, County of Haliburton

THE COUNTY OF HALIBURTON
SHORELINE TREE PRESERVATION

August 29, 2012



Shoreline Tree Preservation By-law

The Shoreline Tree Preservation By-law No. 3505 applies to all lands, in the County of Haliburton, that are within 30 metres of a watercourse. The goal is to minimize the destruction of trees, in order to protect our water resources and sustain a healthy natural environment.

What is the Shoreline Tree Preservation By-law?

The Shoreline Tree Preservation By-law No. 3505 governs the removal or injuring of all trees with a diameter of 10 cm or more. Diameter is measured 1.37 metres from the ground.

How will I know if cutting would be allowed?

If you are not sure if the tree you wish to remove meets one of the exemptions in By-law No. 3505, you can consult a professional, such as an Qualified Arborist or Qualified Tree Marker, to confirm that the tree needs to be removed.

As support for your decision, it is recommended that you take pictures prior to the removal or pruning of trees.

Would I need a Permit to remove a tree on my property?

No.

Will I still need permission to remove a tree on the municipal shore road allowance in front of my property?

Yes. The Shoreline Tree Preservation By-law No. 3505 anticipates that there are certain situations where the removal of trees on the municipally owned shore road allowance is appropriate.

However, By-law No. 3505 does not change current obligations. Therefore, you still need to obtain permission from the local municipality prior to removing trees on the portion of the shore road allowance, owned by the local municipality.

Will I be able to apply for relief from the By-law?

Yes. By-law 3505 allows for relief to be granted. A written request for relief must be submitted to the County. The request is required to identify the nature and extent of the relief; include a site plan/diagram and describe the proposed removal/cutting.

County Council would make a decision on the application for relief. You are encouraged to consult with a Qualified Arborist or Qualified Tree Marker in the preparation of the request for relief.

The County of Haliburton 11 Newcastle St, Minden Ontario K0M 2K0 http://www.haliburtoncounty.ca P: 705.286.1333 F: 705.286.4829

THE COUNTY OF HALIBURTON
SHORELINE TREE PRESERVATION

August 29, 2012

What exemptions are allowed under the By-law?

The following are exemptions to By-law No. 3505:

- work on any tree(s) with a trunk diameter of less than 10 cm, as measured at 1.37 metres from ground level;
- hazard tree removal;
- removal of dead, dangerous, diseased or severely injured trees or stumps;
- emergency work removal;
- pruning or removal of trees in accordance with professional practices;
- removal authorized or permitted under a municipal building permit;
- removal of any tree within 5 metres of a dwelling or septic system;
- removal of trees for a driveway provided it is no more than 5 metres in width; and
- removal of trees for a pathway to the water provided it is no more than 5 metres in width.

Refer to Section 3 of the Shoreline Tree Preservation By-law No. 3505 for the details of these exemptions.

Are there other exemptions?

Yes there are other exemptions for:

- trees removed by the County or a Lower-tier Municipality or a local board of the County or Lower-tier Municipality
- trees removed under an approved site plan, plan of subdivision or development permit.
- trees that are in woodlots and woodlands regulated by the County Forestry By-law No. 3196.

Are there any limitations on the exemptions?

Yes. If there are steep slopes on your property, stumps and root systems must remain in order to stabilize the soil and ground cover.

In areas adjacent to spawning beds, no trees of any size can be removed, except under a written plan prepared by a Qualified Arborist or Qualified Tree Marker.

What would I do if I suspected that a tree was being removed illegally?

Contact the County of Haliburton, in writing, at Box 399, 11 Newcastle St., Minden ON K0M 2K0 or by email.

County Enforcement staff could order an owner or any other person to stop the injury or removal of a tree. The written notice/order also provides information on what the owner will be required to do to correct the violation – including, if necessary, ordering the offender to replant trees.

Anyone who contravenes the Shoreline Tree Preservation By-law No. 3505, and is found guilty of an offence, is subject to a fine under the Provincial Offences Act.

Once convicted of an offence under By-law No. 3505, a person is liable to a fine ranging from $500 to $100,000.

How would the By-law be enforced?

The County appoints designated officers for the enforcement of By-laws. These officers are responsible for performing inspections, issuing orders, and laying charges as required.

The County of Haliburton 11 Newcastle St, Minden Ontario K0M 2K0 http://www.haliburtoncounty.ca P: 705.286.1333 F: 705.286.4829

APPENDIX 5: Trees of Livingstone Lake

Eastern White Pine Needles and Cone *Source: pinterest.com*

Trees are the largest organisms in the Livingstone Lake landscape. Wildlife and smaller plants depend on trees for their survival as we do. We often take trees for granted, paying attention to them in autumn when the colours are at their peak, but for the most part we spend very little time considering how valuable they are to us during their life and even afterwards. Since the beginning of time, trees have furnished us with two very essential necessities – food and oxygen. As life on earth evolved, they provided additional assets such as shelter, medicine and tools.

There are dozens of species of trees found in and around Livingstone Lake, from the tall Eastern white pine to the blooming pin cherry. Trees are an important part of our biodiversity. They shade our homes, provide food and habitat for birds and animals and help fight climate change.

Source: A Holiday Queen's Blog

Sugar Maple

The blanket of trees surrounding Livingstone Lake consists of both Coniferous and Deciduous trees. The majority of the forests around the lake are in the final stages of their growth. As a result, the trees we see on the hills and around our cottages are on average 50 or more years old. And most of them will still be here long after we are gone.

Coniferous Trees

There are four main varieties of pine in the forests around us. The *eastern white pine* is usually the tallest in the forest and also historically the most important. Its soft, clear wood and tremendous size established its value in our history as ideal for all types of products. The *red pine* is sometimes confused with the white but counting the number of needles in its bundles (3 vs. 5 for the white pine) makes it easy to identify. The *jack pine* is not as recognizable as the other two nor does it grow as large. It has two needles spread into a V. *Scots or scotch pine* is a non-native tree that now also forms part of our landscape. Its two needles are longer than jack pine and more twisty and prickly.

Eastern white cedar is another easily recognizable tree. Somewhat resistant to rotting and deterioration, cedars were often used by farmers to form their fence lines. Along with *balsam fir, eastern hemlock, tamarack (larch)* and the various types of *spruce* trees they complete the major coniferous trees in our forests.

Deciduous Trees

The deciduous trees of our forests provide the magnificent fall colours we come to expect. Dominating the hills surrounding our lake, they provide rich hues of yellow, orange and red in autumn.

The various varieties of maples provide the largest selection of colours in the fall. *Sugar maple* is the source of maple syrup and the tree whose leaf appears on the Canadian flag. *Red maple, silver maple, mountain maple* and *striped maple* (sometimes called moose wood) are also found around our lake.

The *white birch* trees of our area are immediately familiar to everyone. Hardly ever reaching the heights and sizes of the pines, they were important trees for native people, being used for building, transportation and firewood. *Yellow birch* and *silver birch* are also present and survive and flourish to significant ages. Many of us have noted that the white birch trees in our area are dying. This is likely the result of the bronze birch borer which infests and kills mature birch trees.

Poplar, aspen, alder, some oaks, beech, basswood, ash, ironwood, serviceberry and *cherry* can also be found growing around the lake.

Trees are essential to life and make up an environmental front line. Our existing forests and the trees we plant work together to make a better world. Here is a list of reasons why trees are so important.

- *Trees produce oxygen*. A mature leafy tree produces as much oxygen in a season

as 10 people inhale in a year.

- *Trees clean the soil.* Trees filter sewage and chemicals, reduce the effects of animal wastes and clean water runoff into streams and the lake.
- *Trees control noise pollution.* Trees muffle noise almost as well as a stone wall.
- *Trees slow storm water runoff.* Flooding is dramatically reduced by forests or by planting trees. (See also *Water Quality*, page 7 and *Natural Shorelines and Wetlands*, page 16.)
- *Trees are carbon sinks.* To produce its food, a tree absorbs and locks away carbon dioxide in the wood, roots and leaves thereby reducing airborne carbon dioxide, one of the causes of global warming.
- *Trees clean the air.* They intercept airborne particles, reduce heat and absorb pollutants such as carbon, sulphur and nitrogen dioxides.
- *Trees shade and cool.* Shade from trees reduces the need for air conditioning in the summer and reduces heating costs in the winter.
- *Trees act as windbreaks.* A reduction in wind reduces the drying effect on soil and vegetation and helps keep topsoil in place.
- *Trees fight soil erosion.* Tree roots bind the earth and their leaves break the force of wind and rain on soil.
- *Trees increase property values*. Trees beautify a property or neighbourhood. Trees can increase the value of a home or cottage by 15% or more.

TREE STEWARDSHIP TIPS FOR LIVINGSTONE LAKE PROPERTY OWNERS

- Landscape naturally.
- Prune trees and shrubs to create viewing corridors rather than removing the entire tree. Only cut those branches that obstruct your view.
- Remove dead or diseased trees only when necessary and do so carefully to protect mature trees and undergrowth.
- Keep 90% of the trees within 30 metres of the shoreline. Refer to the County of Haliburton's Shoreline Tree Preservation By-Law 3505 before cutting or trimming any trees. (See *Appendix 4*.)
- Replace any removed trees along the shoreline with native trees or allow the area to naturally regenerate itself.
- Protect young trees with wire mesh or agricultural drains to deter wildlife from feeding on the young shoots and bark.

REFERENCES

Common pests of trees in Ontario. Ministry of Natural Resources and Forestry, 1991.

Trees of Algonquin Provincial Park. Ministry of Natural Resources and Forestry Ontario, published by the Friends of Algonquin Park, 1996.

Upnorth 1993 by Doug Bennett and Tim Tiner. Reed Books Canada, 1993.

WEBSITES

About.com. http://forestry.about.com/od/treephysiology/tp/tree_value.htm?p=1

Savatree, The Tree and Shrub Care Company. http://www.savatree.com/whytrees.html

Tree People, Los Angeles. http://www.treepeople.org/top-22-benefits-trees

APPENDIX 6: Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

Results of a Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

File Report

Stephen Scholten
Ontario Ministry of Natural Resources
Bracebridge

2010

Livingstone Lake is located in Livingstone Township within the Bracebridge administrative area of the Parry Sound District of the Ministry of Natural Resources. It is approximately 197 hectares surface area, with a maximum depth of 37 meters and mean depth of 13 m. Water clarity is moderate, with a secchi depth reading of about 4 m. Access to the lake is available from an all season maintained municipal road (Livingstone Lake Road).

The primary native sport fish species was brook trout. Lake trout were not native to the lake. Lake trout were introduced in 1968 and stocked regularly until 1995 at which time stocking was discontinued due to the presence of a small proportion of naturally reproduced fish (Table 1). Smallmouth bass became established some time between the 1959 and 1971 surveys, probably through an intentional, but unauthorized introduction. Rainbow smelt were documented for the first time in 1978.

A number of fish community and population and habitat assessments have been conducted on Livingstone Lake including lake trout population assessments in 1978 (Chalk 1978) and 1997 (Thomas 1997), lake trout spawning observations in 1985 and a brook trout stocking assessment in 1992 (Dosser 1996). Temperature and dissolved oxygen profiles have been collected on a regular basis.

The 1992 stocking assessment caught no stocked brook trout, but nine natural brook trout were caught. As a result, stocking of brook trout was discontinued. This assessment also caught 6 lake trout and a large number of rainbow smelt (182).

The 1997 lake trout assessment used the Spring Littoral Index Netting (SLIN) protocol. The catch rate indicated a high abundance of lake trout, but 18 of the 21 lake trout caught were of hatchery origin. It was recommended that stocking could be continued, but the presence of some naturally reproduced fish prompted a decision to manage the lake for natural reproduction. Consistent with that management decision a slot size limit (limit of 2, none between 40-55 cm) was implemented with the Southern Region Natural Trout Strategy at about the same time.

A Summer Profundal Index Netting (SPIN) project was conducted on Livingstone Lake in 2009 to assess the status of the lake trout population 14 years after the cessation of lake trout stocking.

Methods

The SPIN protocol was followed (Sandstrom and Lester 2007). Gear consisted of gill net gangs comprised of 8 panels, each 8 m long. Mesh sizes were 57, 64, 70, 76, 89, 102, 114 and 127 mm stretched measurement (2.25, 2.5, 2.75, 3.0, 3.5, 4.0, 4.5 and 5.0 inch) with a random arrangement of mesh sizes.

Nets were set in the summer when the lake was thermally stratified. Nets were set for 2 hour periods. Effort was allocated, proportional to area, in depth strata of 6-10, 10-20, 20-30 and >30 m.

Captured fish were tallied by the net number and mesh size in which they were caught. Sport fish were sampled for length and weight. Scales and pectoral rays were collected for age determination. All other species were counted and measured for fork length only. All fish were released alive if possible. A fin punch was collected from brook and lake trout for possible genetic analysis.

Temperature-dissolved oxygen profiles were collected to determine the depths at which suitable lake trout habitat occurred.

Finally, lake bathymetry data was collected using a Garmin 430 GPSMap depth sounder.

APPENDIX 6: Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

Results

Netting occurred on July 29 and 30, 2009. At the time the lake was thermally stratified with the thermocline occurring between 6 and 10 m deep (Table 2, Figure 1). Suitable temperatures and dissolved oxygen levels for lake trout occurred from the thermocline to the deepest point of the lake. Weather was fair on both days.

A total of 19, 2-hour sets were completed; four in less than 10 m deep, eight in the 10-20 m stratum, four in 20-30 m and 3 greater than 30 m (Table 3, Figure 2). Some sets overlapped stratum boundaries.

A total of eight fish of three species were caught (Table 4); four lake trout, one brook trout and three white suckers. The lake trout were caught in the main basin in the 6-10 (1), 10-20 (1) and >30 m(2) depth strata. The brook trout was caught in the north basin. Three of the four lake trout were live released; one lake trout and the brook trout were dead in the nets.

Analysis of lake trout abundance was performed using the SPIN Support System (Figure 3). Raw catch data were corrected for net selectivity and weighted by the area of each depth stratum to obtain a mean catch rate of 0.25 fish/net set (S.D.= 0.53). Using the relationship between catch rate and density for populations where cisco are absent (small body conversion, Figure 4), yielded an estimate of 1.4 lake trout/ha (<300 mm FL) or a population estimate of 156 fish (68% CL = 0-383).

The lake trout ranged from 374 to 520 mm FL and 500 to 1450 g round weight (Table 5). Ages were determined to be 5, 6, 7 and 11 years old. All were of natural origin, as indicated by their age and the absence of any fin clips. The brook trout was 310 mm and also of natural origin.

An updated bathymetric map is shown in Figure 2.

Discussion

The two days of netting effort were sufficient to determine the status of the lake trout population. The standard error of the catch rate estimate was high but many more net sets would have been required to reduce it significantly or to increase the sample size of measured fish substantially.

The distribution of net sets was roughly proportional to the area in each stratum; all lake trout habitat was adequately sampled.

The SPIN protocol was designed specifically to assess lake trout populations but also samples species that use similar habitat. Smallmouth bass were not caught as they occupy the shallow, warmer water not sampled by this method. Rainbow smelt were not caught either. They are a cold water species and occupy the same habitat as lake trout but they are generally only vulnerable to the smallest of mesh sizes. The 1992 assessment, which caught a large number of smelt used mesh sizes of 25 to 64 mm; whereas the smallest mesh used in this survey was 57 mm. Smelt are probably still common in the lake.

Brook trout continue to persist in the lake in small numbers despite the presence of non-native smallmouth bass. It is likely that they originate largely from the major inflow, Livingstone Creek, which supports a resident brook trout population. No brook trout spawning habitat or spawning activity has been documented in the lake itself.

Livingstone Lake supports a modest population of naturally reproduced lake trout. There are probably only between 100 and 300 catchable-sized fish in the lake. Stocked trout, which

dominated the catch in 1978 and 1997 (Table 6) were absent from the catch in 2009, though a small number probably persist. The methods used in 2009 differed from 1997, but the abundance of naturally reproduced fish has not obviously increased in the absence of stocked fish, as was hoped.

The 1978 report found it surprising that the occurrence of natural fish was so low considering that the habitat for lake trout appears to be fairly good; that continues to be the case. The ability of a lake to support a natural lake trout population is largely dependent on the amount and quality of deep water habitat. Juvenile lake trout tend to occupy deeper waters than adults in order to avoid predation. However, if the area of deep water is limited, the level of dissolved oxygen in the deep waters is too low or water clarity is low, juveniles will be forced to live in shallower waters and be subject to predation by adults. In general, the larger the volume and area of water greater than 30 m deep, the higher the levels of dissolved oxygen and the greater the water clarity, the better will be recruitment of natural lake trout.

The size of the hypolimnion and oxygen concentrations for lake trout lakes in Parry Sound District are compared in Figure 5. Livingstone Lake is in about the centre of the range for lakes with natural populations and similar to lakes that have moderately productive populations such as Grass, Long and Camp Lake.

Water clarity in Livingstone Lake averages about 4 m; it is lightly stained from dissolved organic matter which originates from its' relatively large watershed. The clarity is the lowest of eight natural lake trout lakes of similar size and dissolved oxygen levels in Parry Sound District (Figure 6). The lower clarity may be contributing to the lower than expected abundance of natural lake trout.

Livingstone Lake, like many developed lake trout lakes in the area, has populations of non-native smallmouth bass and rainbow smelt. Both species can affect the productivity of lake trout populations through complex interactions between predators and prey (Vander Zanden et al. 2004). Bass divert much of the food produced in the shallow littoral areas from lake trout to themselves. Smelt are themselves food for lake trout, but can prey on young trout or compete with them for zooplankton prey.

The 1978 report suggested that the amount and quality of spawning habitat be investigated. Observations were done in 1985; habitat was described as being good, but no quantitative measurements were made and no fish were seen. In 1993, four lake trout were observed in one evening of observations. Additional night observations of spawning activity and documentation of the quality of habitat should be done. Depending on the results, there may be benefits to improving the habitat.

The small sample of measured lake trout precludes making detailed interpretations about the population structure. In the absence of a large bodied prey species such as cisco, the growth potential of the lake trout is limited, resulting in a typical 'small-bodied' population where fish mature at a relatively small size and seldom grow larger than 55 cm long and more than 1.5 kg in weight.

The fishing regulations that apply to Livingstone Lake are the standard slot size used on many lakes in Fisheries Management Zone 15; no lake trout between 40-55 cm. Only one line may be used when angling through the ice to try to reduce catch and release mortality. The current growth trajectory for Livingstone Lake trout results in most fish growing quickly into the slot but slow growth after maturity result in few growing larger than the slot size. Current angling effort for lake trout has not been quantified, but it is believed to be relatively low, largely due to the restrictive nature of the slot size.

There are two main management options, with variations, for the lake trout of Livingstone Lake. The lake could continue to be managed for a self-sustaining population. With this option supplemental stocking should not be done as it could interfere with the recruitment of naturally reproduced fish. The abundance of lake trout may not increase greatly from its present level and only a modest fishery could be supported. The current regulation is very restrictive and could be retained to maximize the abundance of the population or relaxed to achieve more of a balance between protecting the population and allowing harvest. An effort could be made to enhance spawning areas but the amount and quality of deep water nursery area may be more of a limiting factor for the productivity of the population. However, shoal enhancement is a relatively easy, low cost activity and may have benefits.

Alternatively, the lake trout population could be managed on a put-grow-take basis; stocked with no expectation of natural reproduction occurring. This is what was essentially occurring when the lake was being stocked previously. The previous SLIN survey showed that a relatively high abundance of lake trout could be attained and the 1985-1993 voluntary creel survey documented that a considerable amount fishing effort was being supported. In this scenario, the slot size limit would be removed and the zone-wide default season (Jan. 1 – Sep 30) or a year round open season, that is applied to many other stocked lakes, could be regulated. As the population in Livingstone Lake is introduced there is no genetic heritage value to protecting the reproducing population and the productivity of the population and value to society could be improved.

Historically, much lake trout stocking was considered supplemental; stocking to enhance abundance in a lake with a reproducing population. In many lakes though, the practice was essentially put-grow-take stocking as no special effort was being made to protect the native stock such as restricting harvest or stocking compatible genetic strains. Supplemental stocking is now generally discouraged because of its impact on native populations (Olver et al. 1991). A variation of put-grow-take stocking that uses a suitable genetic strain, possibly of local origin, may be a reasonable option for Livingstone Lake.

As a designated lake, the hypolimnetic dissolved oxygen criterion to protect lake trout habitat is applied to Livingstone Lake. If the long term mean volume-weighted hypolimnetic dissolved oxygen (MVWHDO) concentration is less than 7 ppm, or modelling predicts that the development of existing lots will cause it to fall to less than 7 ppm, MNR recommends to the municipality that no new development be permitted on the lake. That is currently the case for Livingstone Lake; although the long term average has been very close to the 7 ppm level. There is currently no distinction between natural and put-grow-take stocked lakes in how the criterion is applied. It is possible that in the future the two lakes types could be treated differently or that continued sampling indicates that additional development could occur.

In summary, Livingstone Lake currently supports a small, introduced, self-sustaining population of lake trout. Stocked lake trout, last planted in 1995, are now almost absent from the population. The deep water habitat for lake trout is fairly good and the lake is capable of supporting a modest self-sustaining population. There may be opportunities to enhance spawning areas for lake trout, though efforts may not translate into adult population improvements because of the limitations of juvenile habitat. Resumption of lake trout stocking would increase the abundance of lake trout and its ability to support a fishery; though possibly at the sacrifice of the natural reproduction that currently occurs. A change from a ‘natural’ to a put-grow-take’ designation does not currently, but potentially has implications for how policies to protect lake trout habitat are applied; specifically shoreline development restrictions to protect hypolimnetic oxygen levels.

References

Chalk, S. 1978. Livingstone Lake, Livingstone Township, lake trout netting program – 1978. Ontario Ministry of Natural Resources, Bracebridge.

Dosser, S. 1996. Stocking assessment of six brook trout lakes in the Bracebridge Area, 1992. File Report. Ontario Ministry of Natural Resources, Bracebridge. 15 p.

Olver, C.H., R.L. DesJardine, C.I. Goddard, M.J. Powell, H.J. Reitveld and P.D. Waring. 1991. Lake trout in Ontario: management strategies. Lake Trout Synthesis, Management Strategies Working Group. Ontario Ministry of Natural Resources. 90 p.

OMNR, 2005. Inland Ontario lakes designated for lake trout management. Ontario Ministry of Natural Resources. Peterborough, Ontario.

Sandstrom, S.J. and N. Lester. 2007. Summer Profundal Index Netting Protocol: a lake trout assessment tool. Ontario Ministry of Natural Resources, Peterborough, Ontario. Version 2007.2, 25 p + appendices.

Thomas, B. 1997. Livingstone Lake: 1997 Spring Littoral Index Netting. Summit Environmental Services, Bracebridge, Ontario. 3 p.

Vander Zanden, M.J, K. A. Wilson, J.M. Casselman and N.D. Yan. 2004. Species introductions and their impacts on North American Shield lakes, in *Boreal Shield Watersheds: Lake Trout Ecosystems in a Changing Environment*, Gunn, J.M., Steedman, R.J. and Ryder, R.A. Eds., Lewis Publishers, Boca Raton, FL, Chap. 14.

APPENDIX 6: Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

Table 1 Stocking history of Livingstone Lake, 1968 to present.

Year	Species	Strain	Age	Number	Fin Clip
1983	Brook Trout		Sub-adults	300	NC
1986	Brook Trout			100	NC
1991	Brook Trout	Hills Lake	Yearling	500	RP
1968	Lake Trout		Yearling	4000	AD
1971	Lake Trout		Yearling	5000	RP
1972	Lake Trout		Yearling	5800	
1973	Lake Trout		Yearling	5800	AD
1974	Lake Trout	Lake Manitou	Yearling	5500	LV
1976	Lake Trout	Lake Manitou	Yearling	5800	RV
1979	Lake Trout	Lake Superior	Yearling	5800	LV
1980	Lake Trout	Lake Superior	Yearling	5450	NC
1982	Lake Trout	Lake Manitou	Yearling	4000	RP/RV
1983	Lake Trout	Lake Manitou	Yearling	1800	AD
1984	Lake Trout	Lake Manitou	Yearling	5800	LV
1985	Lake Trout	Killala Lake	Yearling	3800	LP
1989	Lake Trout	Killala Lake	Yearling	3000	LP
1991	Lake Trout	Killala Lake	Yearling	3400	RV
1995	Lake Trout	Killala Lake	Yearling	2000	LP

Table 2 Temperature and dissolved oxygen profile, Livingstone Lake, July 29, 2009.

Depth (m)	Temp (°C)	D.O. (ppm)
0	21.3	8.3
1	21.3	8.5
2	21.3	8.5
3	21.2	8.5
4	21.2	8.6
5	20.1	8.7
6	18.1	8.9
7	14.4	8.5
8	12.6	7.9
9	10.6	8.2
10	9.4	8.3
11	8.9	8.4
12	8.1	8.6
13	6.9	9.0
14	6.6	9.1
16	6.1	9.3
18	5.8	9.2
20	5.5	9.2
22	5.3	8.9
24	5.1	8.8
26	5.0	8.5
28	4.9	8.4
29	4.9	8.1

Table 3 Net set summary, Livingstone Lake SPIN, 2009.

Net Set	Date	Depth (min)	Depth (max.)	Set Time	Lift Time	UTM East	UTM North
1	29-Jul-09	11	18	10:25	12:25	678768	5025819
2	29-Jul-09	7	10	11:02	13:01	678320	5025468
3	29-Jul-09	23	23	11:31	13:40	678971	5025173
4	29-Jul-09	31	32	11:58	14:00	678521	5024871
5	29-Jul-09	10	14	12:18	14:20	678761	5024820
6	29-Jul-09	21	16	12:55	14:54	678250	5025039
7	29-Jul-09	8	6	13:34	15:34	679100	5025951
8	29-Jul-09	23	28	13:54	15:33	678566	5025540
9	29-Jul-09	36	36	14:09	16:09	678783	5025252
10	30-Jul-09	8	18	10:12	12:18	678630	5026479
11	30-Jul-09	11	18	10:32	12:45	679097	5025661
12	30-Jul-09	25	32	11:00	13:03	678445	5025031
13	30-Jul-09	7	15	11:28	13:38	679150	5025153
14	30-Jul-09	11	18	11:55	14:00	678450	5025493
15	30-Jul-09	31	35	12:14	14:17	678827	5025456
16	30-Jul-09	11	19	12:45	14:45	678775	5025813
17	30-Jul-09	12	20	13:00	15:00	678811	5024885
18	30-Jul-09	21	23	13:38	15:40	679105	5025333
19	30-Jul-09	9	8	13:55	15:56	678642	5024605

Table 4 Catch summary, Livingstone Lake SPIN, 2009.

Net Set	brook trout	lake trout	white sucker
1		1	
2		1	1
3			
4			
5			
6			
7			
8			
9			
10	1		
11			
12		2	
13			1
14			
15			
16			
17			
18			
19			1
Total	1	4	3

APPENDIX 6: Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

Table 5 Biological characteristics of fish caught in Livingstone Lake SPIN, 2009.

Species	Fish	Fork Length (mm)	Total Length (mm)	Round Weight (g)	Sex	Maturity	Age
brook trout	4	310	320	360	F	unk	
lake trout	1	482	529				6
lake trout	3	508	552	1100	F	mat	11
lake trout	5	520	574	1450			7
lake trout	6	374	415	500			5
white sucker	2	450					
white sucker	7	473					
white sucker	8	425					

Table 6 Biological characteristics of fish caught in Livingstone Lake SLIN, 1997.

Fish	Fork Length (mm)	Total Length (mm)	Round Weight (g)	Clip	Age
20	315	346	340	RV	6
18	335	370	480	LP	8
8	347	379	560	RV	6
19	353	386	590	RV	6
10	364	400	720	RV	6
11	383	424	660	RV	6
12	390	430	730	RV	6
17	392	432	780	RV	6
21	400	439	840	RV	6
15	411	454	980	RV	6
9	420	462	1030	RV	6
5	429	470	1050	RV	6
13	435	475	1000	RV	6
14	441	488	1140	RV	6
1	445	486	1125	RV	6
6	456	502	1390	RV	6
7	458	499	1300	RV	6
16	500	554	1610	none	9
4	510	565	1810	none	9
2	515	570	1460	none	8
3	595	650	2450	LV	9

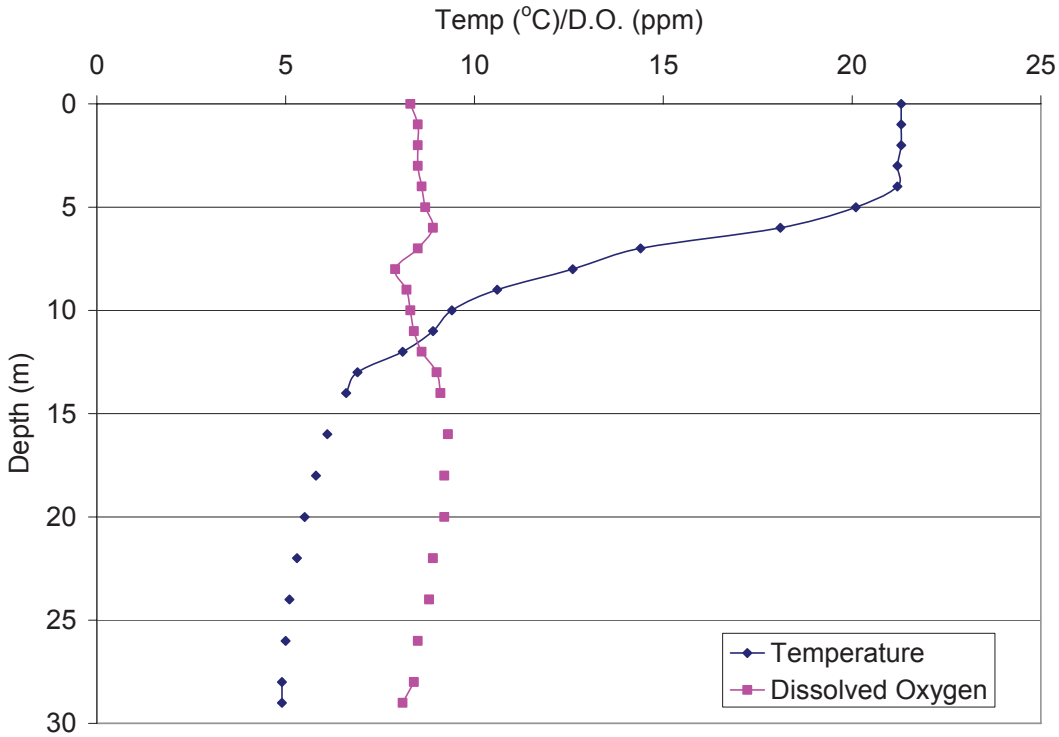


Figure 1 Temperature and dissolved oxygen profile, Livingstone Lake, July 29, 2009.

APPENDIX 6: Summer Profundal Index Netting Survey Conducted on Livingstone Lake in 2009

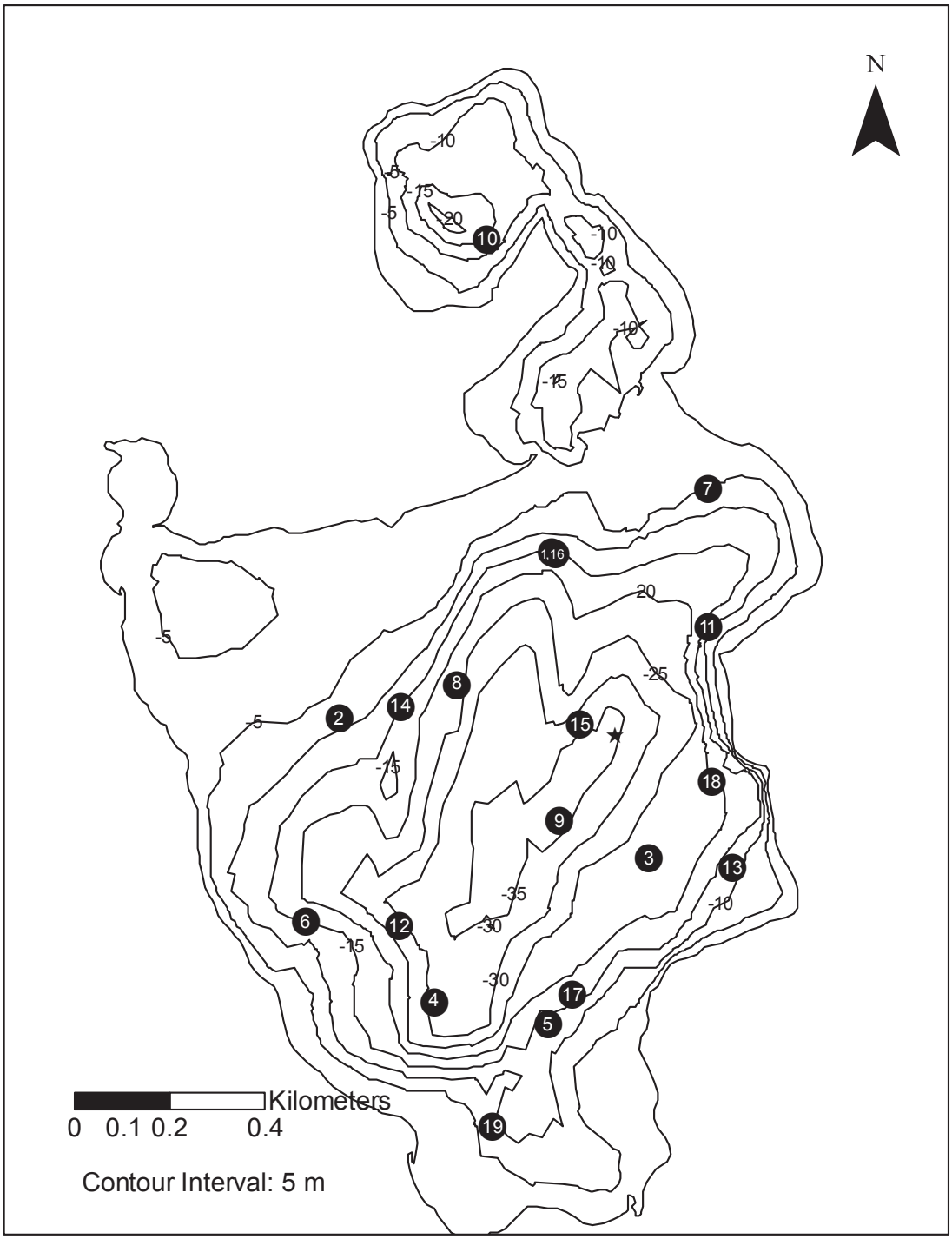


Figure 2 Map of Livingstone Lake showing SPIN net set (circles) and water chemistry station (star), 2009. Contour interval: 5 m.

SUMMER PROFUNDAL INDEX NETTING REPORT

Lake: Livingstone | Office: Bracebridge | Target Sp: Lake Trout | SPIN

Date: 2009 (Year) 7 (Month) | Total Area: | Sampled Area: 113 | TDS:

Area Wt. Selectivity Adj Values	Total Catch	Arith CUE	Arith Stdev	Arth RSE
Lake Trout >=300 and <=1500mm	4	0.25	0.53	0.49

Using Large Body Conversion

Density (ha)	Pop Est	Low Est	Upper Est	Pred. Level
1.4	156	0	383	68%

Sel. Corr. Length Summary (mm)

	Mean	Std
Total Catch	452	64
For LT >300	452	64

Stratum Info	Sites #	Total # Nets	% Sites	% Samp Area	Tot Catch #	Tot Catch %	Mean CUE	Std	RSE
Stratum 1 (8-10m)	3	3	16%	12%	1	24%	0.34	0.59	1.00
Stratum 2 (10-20m)	9	9	47%	40%	1	24%	0.11	0.34	1.00
Stratum 3 (20-30m)	4	4	21%	29%	2	52%	0.55	1.11	1.00
Stratum 4 (30-40m)	3	3	16%	19%	0		0.00	0.00	
Stratum 5 (40-60m)	0	0			0				
Stratum 6 (60-80m)	0	0			0				
Stratum 7 (80+m)	0	0			0				
Total	19	19	100%	100%	4	100%			
				actual	4				

No. of Sets Next Day	
Stratum 1	1
Stratum 2	2
Stratum 3	6
Stratum 4	1
Stratum 5	
Stratum 6	
Stratum 7	

Total Biomass >300mm: 1.4 kg/ha opt

Target Annual Harvest Rate: 0.28 kg/ha opt

Acceptable Harvest No.: < 0 LT >300mm

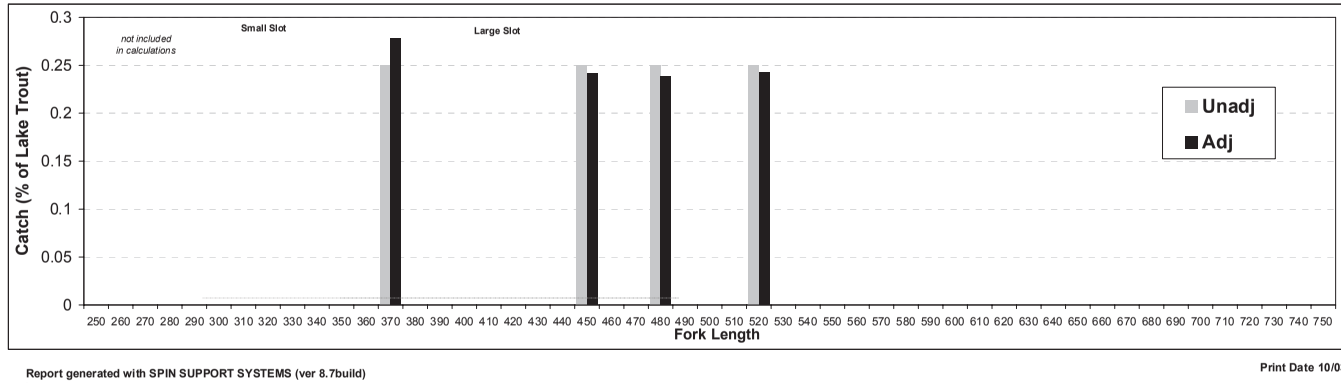
Previous Arith Mean:
Previous Arith Stdev:
Previous n=:

p-Value:
Previous Mean,Stdev, n= not specified

Power Observed:

Power Desired: 80%
Change Detectable: 20%
Sets Required (n=): 515

Thermocline(top): n/a m
Thermocline(bottom): 0 m



% zero S1	67%
% zero S2	89%
% zero S3	75%
% zero S4	100%
% zero S5	
% zero S6	
% zero S7	
Area Wt % zero	84%

Report generated with SPIN SUPPORT SYSTEMS (ver 8.7build)

Print Date 10/03/2010

Figure 3 Summer Profundal Index Netting report (S. Sandstrom, Muskoka Lakes FAU).

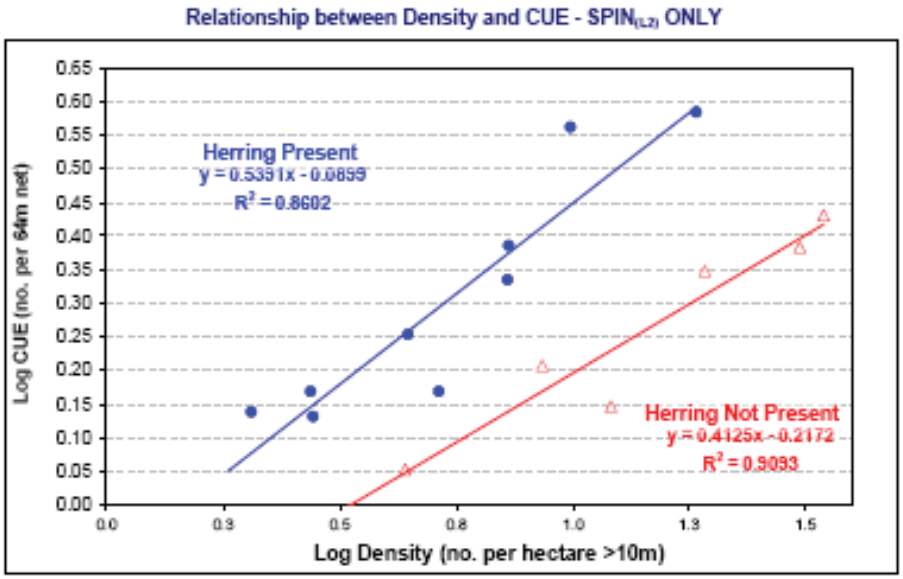


Figure 4 Relationship between SPIN catch rate and estimated lake trout density (Sandstrom and Lester 2007).

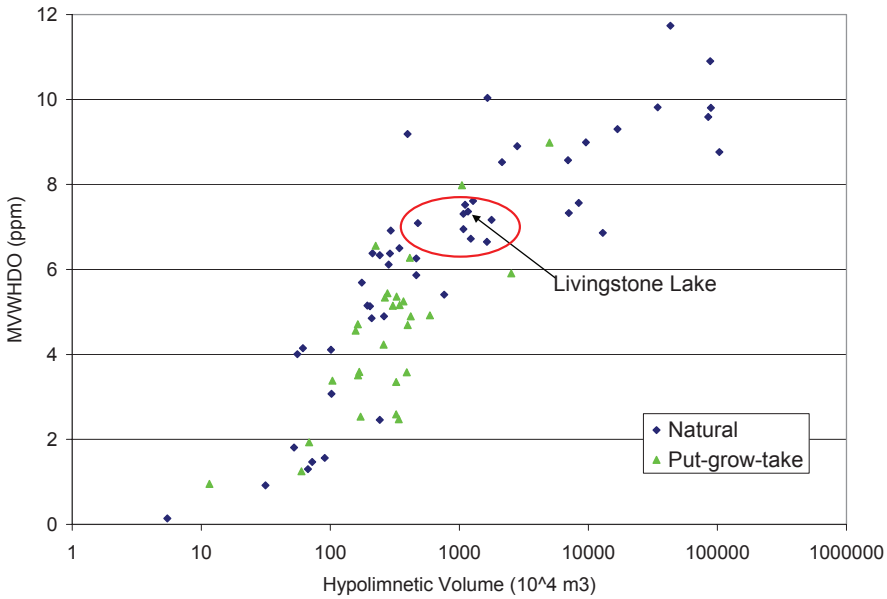


Figure 5 Relationship between hypolimnetic volume and mean volume-weighted hyplimnetic dissolved oxygen (MVWHDO) levels in lake trout lakes in Parry Sound District. 'Natural' lakes are managed for natural reproduction. "Put-grow-take' lakes are stocked with no expectation of natural reproduction.

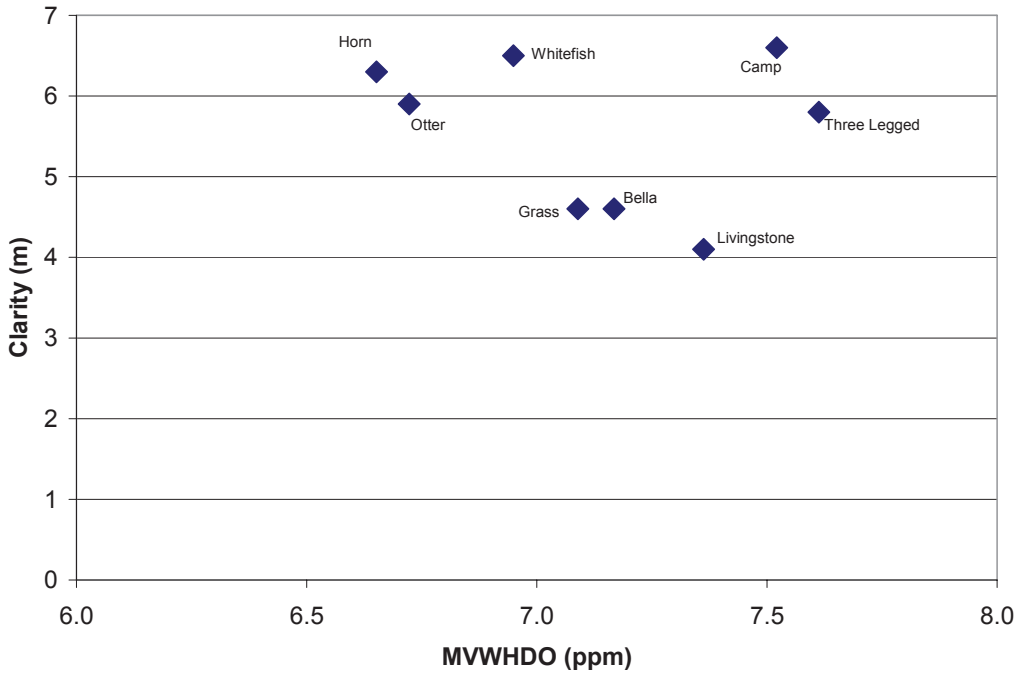
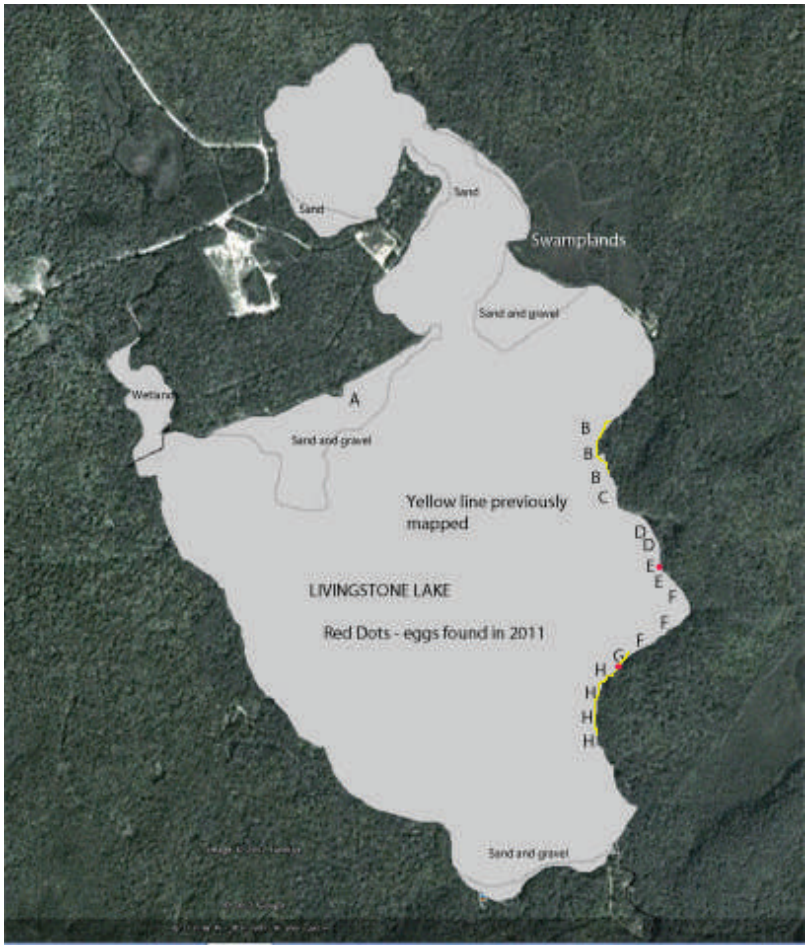


Figure 6 Comparison of hypolimnetic dissolved oxygen and water clarity for lakes circled in Figure 5. Source of water clarity data is District Municipality of Muskoka and MOE Lake Partner Program.

APPENDIX 7: Livingstone Lake Trout Spawning Areas, November 2011



Livingstone Lake Trout Spawning Areas (November 2, 2011 Survey)

A Wismer Point: minimal habitat – no eggs
B Narrow band of patchy substrate – very shallow
C Good habitat
D Boulder/talus - poor habitat
E Boulder/talus with patches of cobble - good habitat
F No suitable habitat
G Good habitat
H Patchy - fair to poor habitat

Survey conducted by Stephen Scholten, Ministry of Natural Resources and Forestry, Bracebridge

APPENDIX 8: Government of Ontario Regulations

Ontario's Living Legacy Land Use Strategy
The OLL strategy sets a framework for future land and resource management on Crown lands and provides guidance and direction on permitted and restricted land uses and activities. Any new or revised management plan or decision to dispose of Crown lands must be consistent with the intent of the OLL strategy. The OLL strategy is intended to complement the land use direction provided in existing planning documents such as the Bracebridge, Bancroft and Minden District Land Use Guideline (1983) and the Integrated Plan for Land and Resource Development prepared for the Leslie M. Frost Natural Resources Centre in 1980.

When interpreting the policy for the area, it is important to consider:

- the Ontario Living Legacy Land Use Strategy
- the nearby Enhanced Management Area
- the Bracebridge/ Parry Sound Forest Management Plan
- Areas of Concern guidelines

Public Lands Act
Pursuant to Ontario Regulation 453/96, work permits are required for the:

- Construction of a building on public land
- Construction of a permanent trail, road and water crossings on public lands.
- Dredging of shorelands (includes both Crown and private lands)
- Filling of shorelands and disturbance or addition of aggregates
- Removal of aquatic vegetation from specific shorelands
- Construction on shorelines that occupies more than 15 square metres

Lakes and Rivers Improvement Act (LRIA)
Ontario Regulation 454/96 requires approval of the following:

- Construction or improvements of dams
- Private water crossings draining an area greater than 5 sq. km
- Enclosing or covering a length of river or stream greater than 20 m, or
- Installation of a cable or pipeline if it results in damming, forwarding or diverting water

APPENDIX 9: Changes to MNRF Permit Requirements for Shoreline Work. FOCA, 2014

With some changes as recommended by FOCA, and others, the MNR changed the work permit requirements for the following activities, effective January 1, 2014:

- Maintenance dredging;
- Relocation of rocks and/or boulders for boating and swimming access;
- Mechanical removal of native aquatic vegetation for swimming or boating access;
- Mechanically removing invasive aquatic vegetation.
- Construction of buildings for mineral exploration and development;
- Maintenance, repair or replacement of existing erosion control structures.

These changes are related to O. Reg. 239/13 and permits made under the Public Lands Act – Activities on Public Lands and Shore Lands – Work Permits and Exemptions.

Details about when you need (or don't need) a permit:
(from the MNRF website)

In 2013 MNR released a policy paper describing how they plan to "modernize" their approvals process and remove a number of regulatory controls, including eliminating the need for approvals from MNR where an activity will have "little impact". The approach will instead rely on establishing rules that must be complied with.

Work permits are a regulatory tool used by the MNR to control specific activities occurring on public lands, including the beds of most navigable waters, and shore lands. This includes constructing or placing a building; constructing a road, trail or water crossing; dredging or filling shore lands; and the removal of aquatic vegetation.

The proposal considered means that proponents would no longer be required to obtain work permits for these activities but instead will be required to voluntarily comply with rules set out in regulations under the Public Lands Act. Projects that do not comply with the proposed rules still require a work permit.

FOCA and our members are committed to the sustainable use and responsible oversight of our waterfronts, and our aquatic resources. FOCA is concerned that this "permit by rule" approach may reduce the protections afforded these important resources.

See official FOCA comments submitted to MNRF: MNR_public_land_proposals_Jan_comments_FOCA_final draft

Note that MNR also issues land use permits and leases under the Public Lands Act. No changes are proposed to these authorizations at this time.

Source: Federation of Ontario Cottagers' Associations

APPENDIX 10: Municipal Government Structure and Responsibilities

Haliburton County

- Two levels of government administer the affairs of the Haliburton County: the county and its four area municipalities or townships - the Municipalities of Dysart et al, and Highlands East, and the Townships of Minden Hills and Algonquin Highlands.
- The current County Council is comprised of eight members: the Reeve and Deputy Reeve of the four municipalities. The Warden of the County is elected or appointed by his or her peers annually.
- Council operates under a standing committee system and members are appointed to various boards, agencies, and committees, some of which include non-elected members from the community. The County consults with the public on a number of issues and projects.
- The County has responsibilities for planning, roads, emergency services, civic addressing, economic development and tourism, geographic information system (GIS), environmental protection and source water protection. The County also implements and enforces tree cutting and preservation by-laws.
- The Planning and GIS Department maintains the Official Plan for the County of Haliburton and oversees the approval process for land development (creation of lots) applications, approvals for Municipal Official Plans and Official Plan Amendments and Decisions on development made by County Council or the Land Division Committee depending on the type of application.
- The County of Haliburton Official Plan establishes a land use and planning framework for local official plans. As such, it has a broad, rather general focus intended to guide local municipalities and enhance their local Official Plan policies. The local municipal Official Plans are more prescriptive and geographically significant in their intent.

Township of Algonquin Highlands

- The Township of Algonquin Highlands includes half the village of Dorset, part of Carnarvon, and the hamlets of Boshkung, Buttermilk Falls, Halls Lake, Little Hawk Lake, Maple Lake, Ox Narrows, and Oxtongue Lake.
- The Township Council operates under a standing committee system and members are appointed to committees, some of which include non-elected members from the

community. The Township consults with the public on a number of issues and projects.

- Municipal offices are located on North Shore Road, 5 km north of Carnarvon with a satellite municipal office located in Dorset.
- Algonquin Township has responsibility for building permits, planning, development control, fire, waste management, municipal law enforcement, parks and recreation, and cemeteries.
- Algonquin Highlands Trails Department manages over 38 km of hiking trails, hundreds of campsites, portages, area lakes and canoe routes. Since 2002 the Trails Department has been successfully working to preserve, protect and promote outdoor and natural recreation opportunities through a proactive, sustainable management approach. The Trails Department works in partnership with all stakeholders including the Townships of Lake of Bays, Minden Hills, the County of Haliburton and the Ontario Ministry of Natural Resources and Forestry.

Land Use Planning and Management in Algonquin Highlands

- In Ontario, the land use planning process is regulated by the Ontario Planning Act. Decisions occur within a hierarchy established by the Act. Broad policies are made at the upper levels of government and refined or further developed with more detail at lower levels of government as shown below.

Province
▼
County
▼
Local Municipality

- This decision making process is formalized with the following documents:

The Ontario Planning Act
▼
Provincial Policy Statements (Regulations of the Planning Act)
▼
County Official Plan
▼
Local Official Plan
▼
Local Zoning By-Law

- Each of these documents must, by law, conform to the document above it in the hierarchy. The Planning Act now requires every planning authority/municipality to have an Official Plan. It also requires that this plan be reviewed and updated at five-year intervals. The Official Plan is not a static document but a document that evolves over time. The Planning Act requires that Official Plans and Zoning By-laws be prepared with public input and review so that they represent the views of the local residents. Of course, these documents must be consistent with the direction coming from senior levels of government.
- Algonquin Highlands' by-laws and its land use planning process guide development within the waterfront and along the shoreline of Livingstone Lake. Understanding the land use planning process allows us to participate in and influence the formulation of revisions to policies and by-laws. The uses, development, and policies that allow for the degradation of the lake's natural and social environment over time need to be addressed.

Official Plan

- The Official Plan is the key policy document of a municipality. It is like a contract between the elected representatives and the residents of the municipality. It guides all municipal decisions on land use and provides a consistent approach to land use development. Residents of the municipality know that there are policies or "rules" that guide the land use decisions made by politicians and know that these decisions are not made in an ad hoc manner.
- The Township strives to develop clear and thoughtful policies that will protect our natural environment, support and encourage a sound and healthy economy, and guide sustainable resource use and development.
- At first glance, these broader objectives may seem contradictory. It is the function of the Official Plan, through a planning process that includes public input and discussion to identify community goals and objectives, prioritize these objectives and develop strategies or policies to achieve them.

Zoning By-Laws

- Municipal zoning by-laws are the legal documents that implement the policies of an Official Plan. They are law. A municipality can prosecute under a zoning by-law but not under an Official Plan. A zoning by-law is specific. It defines terms. It specifies what land uses are permitted on a property; the size of the lots; the location and size of all buildings and structures (e.g. water setbacks, setbacks from lot lines); and the requirements for facilities such as parking.

Minor Variance

- A minor variance is a variation from the requirements of the zoning by-law. For example, a property owner who is building an addition may want to build closer than the setbacks defined in the by-law. A minor variance establishes site-specific criteria for the property based upon a review of the unique circumstances. The Planning Act requires any variance that is granted to a zoning by-law meets all of the following four tests:
  - Is the application minor? There is no exact definition of what is "minor." Past decisions of the Ontario Municipal Board have provided direction that the concept of "minor" is not necessarily a numerical evaluation. Rather "minor" is a matter of impact and must be assessed on a case by case basis.
  - Is the application desirable for the appropriate development of the lands in question?
  - Does the application conform to the general intent of the zoning by-law?
  - Does the application conform to the general intent of the Official Plan?
- When the municipality receives an application for a minor variance request, it should circulate the application to the neighbours and to the Lake Association and Lake Steward for comment. There is usually a two-week window to submit comments before the Committee of Adjustment meets to make a decision. In some cases, the Committee decides to conduct a site visit.
- It is now widely recognized by scientists and planners that maintaining the water setback is important to protect the lake

environment. Although minor variations are by themselves perhaps insignificant, their approval should be viewed in the context of the cumulative impact that applications will be make on the lake over time. The sensitive and critical ecological function of the near shore areas need to be protected to minimize impact to the ribbon of life.

Application to subdivide

- A lot owner may apply to the County of Haliburton if they wish to divide their property into additional lots. If the development proposal is for a small number of lots (generally less than five) then the owner can apply for consent to sever (a severance application).
- If the proposal is for five or more lots, then development must proceed by a plan of subdivision. The applicable municipal Official Plan and zoning by-law regulate lot frontage and area requirements for new lots. Most local jurisdictions now require a site evaluation report to be prepared in support of an application to create a new waterfront lot. To protect these values, the County requires a professional evaluation of the impacts of the proposed additional lot development on the lake as part of a complete application. Approvals have conditions imposed to implement the recommendations of the evaluation. Both the County and local Official Plans also have policies to limit the developed area along the shoreline.
- However, subdivision to create new lots cannot take place on Livingstone Lake because the lake is deemed, in Algonquin Highlands' Official Plan, to be at capacity. (See *Livingstone Lake Description*, page 4.)

APPENDIX 11: Fire Dos and Don’ts, Livingstone Lake Association, 2014

Indoors: Dos

- Designate someone to call the Dorset Fire Department (705-789-6466) and LLA volunteers. The 705-789-6466 number is direct to the local Fire Department and is faster than calling 911.
- Have appropriate fire extinguishers at or near every cooking and every wood stove and make sure everyone in the household knows how to use them. Use these as soon as possible and direct the spray at the base of the fire. Check the gauges on the extinguishers to ensure that they are charged.
- Designate an assembly area in the case of fire and ensure that family and guests are aware of the need to go and stay there as quickly as possible. Check your assembly area for family, friends and pets.
- Practise a fire drill and evacuation so that all family members and guests know what to do. If you purchased a backtank, practice and learn how to use it.
- Ensure that every room in the cottage has at least one exit that is not blocked in any way.
- Ensure that all vents and chimneys are in good condition and maintained (cleaned) regularly.
- Install and maintain both smoke and carbon monoxide detectors; test regularly.
- Install the newer (more expensive) arc fault detector breakers for all sleeping areas. These breakers detect arcing from any electrical unit attached to the circuit and will shut down the circuit immediately. The new building code stipulates the use of these breakers for all new construction. Arc faults often occur in older buildings where an insufficient number of electrical outlets were installed to service today’s many appliances. As a consequence, a few outlets serve many extension cords, power bars etc. With time and vibration some of these extensions can deteriorate and may spark (arc) and potentially start a fire. The arc fault detector breakers reduce and/or eliminate this problem.
- Use only candles within non-combustible containers such as glass or metal.

Indoors: Don’ts

- Do not store fuel or other highly combustible materials inside the cottage. It would be safer to store these away from the cottage in a non-combustible compartment or shed. Always use CSA approved containers for fuel storage.
- Do not leave candles, lanterns or any open flame

APPENDIX 11: Fire Dos and Don’ts, Livingstone Lake Association, 2014

appliance unattended.

- Never re-enter a burning building. The toxic smoke can render you unconscious within a few minutes.

Outdoors: Dos

- For campfires, always use a designated fire pit that has a steel or rock lining preventing roots or other underground organic matter from igniting. Follow posted MNRF guidelines regarding fires and burning.
- Always have a few water buckets and/or a garden hose near the campfire.
- Always douse the fire and stir the ashes to ensure that the fire is completely out before leaving it unattended. The residual heat in the ground can easily re-ignite a fire that has not been properly doused.
- Use extreme caution if you must light a fire under windy conditions. The wind can easily carry sparks and other burning material to another location and cause a fire that can quickly get out of control.
- Use fireproof material around and under your BBQ. Burning grease from the BBQ can fall and ignite combustible material below.
- Always use CSA approved containers for fuel storage.

Outdoors: Don’ts

- Never leave an open fire unattended!
- Do not abandon a dying fire: douse it thoroughly with water before leaving.
- Do not allow forest litter to accumulate near or under your cottage as it can help fire to spread.
- Do not re-fuel equipment while it is in operation; gas is extremely flammable and can ignite on the hot engine or exhaust parts of the equipment.
- Ensure that the exhaust system on your equipment is in good order and incorporates a spark arrestor.

APPENDIX 12: Cottage Rental Posters. Coalition of Haliburton Property Owners' Associations

Bathroom

☒ DON'T

X Use automatic toilet bowl cleaners.
X Use anti-bacterial hand soap.
X Put paper towel, tissue, hair, baby wipes (even ones marked 'flushable'), or feminine products (no tampons) down the toilet.
X Put anything down the toilet other than natural waste and toilet paper.

√ DO

√ Use non- antibacterial soap.

√ Use biodegradable cleaners (phosphate and chlorine free).

√ Use peroxide cleaners.

√ Limit the amount of toilet paper used.

√ Conserve water to avoid overload to septic system.

*Septic systems need bacteria for it to properly function, thus anti-bacterial products are not good for the system.

*The toilet, sink and shower are connected to the septic tank, a system of tanks that allows waste to filter 'slowly' into the ground.

Protect Our Environment.
We're enjoying it now,
Let's make sure our future enjoys it too!

Garbage Disposal

☒ DON'T

X Burn garbage.

X Feed wildlife.

X Leave garbage outside, unless in an animal-proof container.

X Leave any scented products outdoors.

X Leave pet food outside.

√ DO

√ Reduce, reuse, recycle!

√ Rinse out bottles, jars and containers before putting them in the recycling box.

√ Check local dump hours to dispose of waste.

√ Pick up pet waste using a biodegradable bag.

*Wild animals cannot depend on you for their food source.
Please do not feed the animals or leave your garbage outside.

*Recycling is mandatory in Haliburton County.

Protect Our Environment.
We're enjoying it now,
Let's make sure our future enjoys it too!

Kitchen

☒ DON'T

X Use anti-bacterial products as the septic system needs bacteria.

X Pour fats, oils and grease down the drain.

X Use chlorine bleach.

All of these are harmful to the septic system.

√ DO

√ Use phosphate free cleaning products.

√ Wash dishes with phosphate free detergents.

√ Run the dishwasher only when completely full.

*Any product that has any warning symbols or hazardous ingredient warnings should generally be avoided.

*Use 1 cup baking soda followed by 3 cups boiling water (plus 1 cup vinegar if needed) for unclogging drains, instead of commercial products.

Protect Our Environment.
We're enjoying it now,
Let's make sure our future enjoys it too!

Laundry

☒ DON'T

X Do more than 1 laundry load per day.

X Use chlorine bleach.

X Take a shower or bath the same time as doing laundry.

√ DO

√ Use washing soda or oxygen bleach instead of chlorine bleach.

√ Use phosphate free detergents.

√Use peroxide stain removers.

√ Wait for laundry load to finish before draining a bath or taking a shower.

*Be aware of how much water is going into the septic system as it cannot handle large volumes of water at one time.

*Using washing soda or oxygen bleach in your laundry will not only whiten and brighten your clothes, but also help to keep the septic system healthy.

Protect Our Environment.
We're enjoying it now,
Let's make sure our future enjoys it too!

APPENDIX 13: Septic Health Resources. Coalition of Haliburton Property Owners' Associations

Septic Health Resources

Keep our lakes clean with these simple SEPTIC TIPS

FACT: The more efficiently your Septic System operates, the less pollution goes into the environment.

The 2 secrets to septic health and minimizing lake pollution are: **Time** and **Bacteria**

Bacteria –Never let anything go down the drain that kills the good bacteria in your system, like:

a. Bleach - non-chlorine bleach is ok
b. Anti-Bacterial Products – ban them from your house and cottage!
c. Dishwasher Detergent containing bleach (most brands do!)
   i. Only ONE load of dishes using a regular detergent can kill ALL the good bacteria in your system for up to 70 hours – Use Septic Friendly Products available at The Organic Times in Minden & other local retailers (look for a statement on the front of the package stating **no bleach & no phosphates**)
d. Dishwasher Rinse Aids – use lemon juice instead
e. Cream Cleansers – most have bleach (see a.)
f. Drain Cleaners – use **Eco Ethic Septic Treatment** instead (*more detail on reverse side)*
g. Automatic Toilet Bowl Cleaners – blue is not green

- If soap, toilet paper or grease (bacon & eggs anyone?) get down your drain or anyone in the house is on antibiotics – use **Eco Ethic Septic Treatment** once a month to provide your system with the correct bacteria and enzymes to digest these items
- If your system is sometimes not used for months at a time –when you arrive back the 1st thing you should do is flush 2 cups of **Eco Ethic Septic Treatment** down your drain to kick start your system
- Never use a garburator

Time - Your system needs as much time as you can give it to digest the waste you put in before the next load of water arrives. Remember – **one drop in = one drop out** of your system
Give your system time by Minimizing Water Use and Spreading It Out Over Time

a. Cut your household water use by 27% by installing a **Water Matrix – Proficiency, 3 litre flush** toilet. These toilets are **tested and recommended by the C.H.A.** and are available at **local Timber Marts.**
b. Try not to do any more than 1 load of laundry per day
c. Keep showers short and use a low flow shower head
d. Use every opportunity to use less water when doing regular activities
e. Get a licensed septic pumper to pump out and inspect both sides of your tank every 3-5 years.

For great entertainment and more info watch the "Poop Talk" **Lake Protectors** Video at **http://www.cohpoa.org** Click on the Documents/Videos Tab

More Septic Tips on Reverse Side

Keep our lakes clean with these simple SEPTIC TIPS

Who we are: - **The C.H.A.** - is a Haliburton based non-profit, volunteer organization dedicated to protecting and enhancing the lakes in Haliburton County.

Did you know? - Septic Systems Are The Single Largest Polluter Of Our Lakes. All systems pollute, but those not working well pollute much more. Use **Eco Ethic Septic Treatment & The Septic Tips** on the reverse side to keep your system performing well and protect your lake!

Q. – Is it true our Septics don't need added bacteria - our guts give them what they need?

A. - As long as you only put human waste - no soap, grease or toilet paper- down your toilet and drains that is correct. But - if like most of us, you do dishes having *any* grease on them, use soap & toilet paper- your system and your lake will benefit from monthly use of **Eco Ethic Septic Treatment**

Regular use of **Eco Ethic Septic Treatment** will help keep your septic system performing well

Price - $5 a month ($60 plus HST for a year's supply) to protect your lake and one of your largest investments - your septic system and tile bed.

Available at **Organic Times,** 134 Bobcaygeon Rd., Minden and **Northern Expressions,** 13588 Hwy #118, Haliburton

Benefit-These retailers are CHA **Lake Protectors** Partners. Our **Lake Protectors** Partners contribute 100% of the net proceeds of this product's sales to environmental projects to protect our lakes in Haliburton County

Certification - this product is certified by Environment Canada's Eco Logo Program

More info or to **Contact the CHA** visit www.cohpoa.org Click contact link - bottom of the home page

Septic Tips on Reverse Side

The Details - A septic system functions on the principal of digestion of organic materials by bacteria. In the septic tank enzymes break the bonds of compounds, resulting in a simple food that bacteria then metabolize, converting waste into mostly water, carbon dioxide, mineral ash and more bacteria. Clean, clear effluent then flows out of the tank and into the tile bed (leaching field) where the effluent percolates into the soil. The more efficient the system operates the less pollution goes into the environment. The more bacteriological activity in the septic tank the better the effluent.

GLOSSARY

ATV	all-terrain vehicle
cm	centimetre(s)
CHA	Coalition of Haliburton Property Owners' Associations
COHPOA	Coalition of Haliburton Property Owners' Associations
CSA	Canadian Standards Association (now called CSA Group)
DIY	Do It Yourself
EMA	Enhanced Management Area
FOCA	Federation of Ontario Cottagers' Associations
GIS	geographic information system
GUA	General Use Area
in	inch(es)
km	kilometre(s)
km/h	kilometres per hour
LLA	Livingstone Lake Association
LRIA	Lakes and Rivers Improvement Act
m	metre(s)
mg/l	milligram(s) per litre
ml	millilitre(s)
MNRF	Ontario Ministry of Natural Resources and Forestry
MOECC	Ontario Ministry of the Environment and Climate Change
N	north
OLL	Ontario's Living Legacy (Land Use Strategy)
PCOC	Pleasure Craft Operator Card
PFD	Personal Flotation Device
ppm	parts per million
SFL	Sustainable Forest License
SPIN	Summer Profundal Index Netting
W	West
ug/l	microgram(s) per litre

Prepared by the Livingstone Lake Association
Contact:
Karen Hammond, khammond9295@gmail.com
John Wismer, jswismer@sentex.net
July 2015