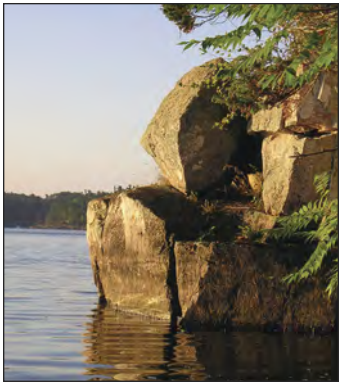
Introduction

For generations, picturesque lakes have lured families from across Ontario to fish, boat and swim. At the lake, people discover the enchanting call of the loon, the sight of painted turtles basking on logs and the magnificent sight of osprey soaring above crisp blue waters.

The popularity of retreating to Ontario's lakes for rest and recreation is growing. As a result, development on the shorelines of our lakes is taking place at an unprecedented rate. In addition to this increased development, more and more people are extending their time at the cottage to live there year round. To preserve the lake environment that brought us there in the first place, it is imperative for us to understand our impacts and to know how to reduce them.



This guide offers you background information and advice on ways to make the most of your shoreline property while living in balance with your lake's fragile ecosystem.

What is a Watershed?

Your lake is more than just what you see out of your windows: it is connected to and affected by a larger system called a watershed. A watershed is defined as all of the land area drained by a river and its tributaries. You could look at it as the path of a raindrop once it hits the ground. That path is shaped by the contours of the land and by climate and vegetation. These factors moderate the flow of water from land to streams and lakes.

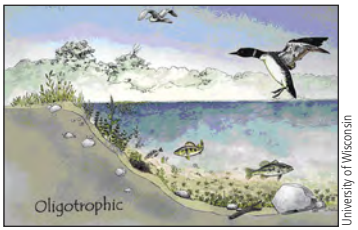
James Wilkes

Land use has an important impact on the water that moves through a watershed. As human activity reduces forest cover, fills wetlands and paves over open land, less water gets filtered back into the watershed. Unfiltered surface runoff increases, and nutrient and contaminant concentrations in water may reach levels that threaten the health of aquatic ecosystems. It is important to recognize that our lifestyle choices may contribute to the declining health of our lakes. A lake benefits – or suffers – from the cumulative actions of all the lake users within the watershed.

What Type of Lake Do You Live By?

There are three basic types of lakes found in Ontario. You can learn more about your lake's unique characteristics by contacting your local Conservation Authority, Ontario Ministry of Natural Resources (MNR) or cottage association.

Oligotrophic Lakes



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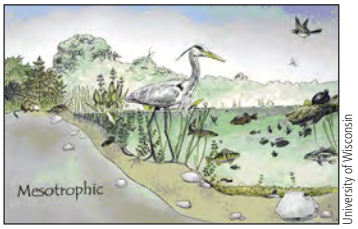
- Generally deep
- Minimal aquatic plant growth
- Low nutrient levels
- Support cold-water fish such as trout and whitefish
- Low levels of phosphorus and chlorophyll
- Most lakes on the Canadian shield are oligotrophic with some exceptions

Mesotrophic Lakes



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- Medium depth
- Usually good for fishing; support a wide variety of fish such as walleye and bass
- More nutrients than oligotrophic lakes, but not nearly as much as eutrophic lakes
- Occasional algae bloom at the surface

Eutrophic Lakes

University of Wisconsin

- Generally shallow with abundant vegetation
- Support warm-water fish such as perch, bass and pan fish
- Frequent algae blooms
- Susceptible to oxygen depletion
- High phosphorus or chlorophyll readings

Eutrophication is a lake's aging process. Sediments, erosion and the growth and decomposition of aquatic plants eventually fill up the lake bottom. Over time, the lake is converted to a wetland (e.g., a bog or marsh) and later, dry land. This process normally takes tens of thousands of years, but human activity can accelerate lake eutrophication by contributing excesssive nutrients.

Limiting Nutrients in Your Lake

Excessive amounts of nutrients, particularly phosphorus, are carried into a water body with runoff from fertilized lawns, golf courses, urban or agricultural areas and from poorly maintained septic systems. Water quality impacts associated with excessive nutrients in a lake include:

- Frequent blooms of undesirable algae* (potentially toxic, giving water poor taste and odour)
- Excessive growth of aquatic plants leading to a loss of open water
- Decrease in water clarity
- Lower levels of dissolved oxygen, which may lead to fish kills and affect fish diversity
- Increased levels of coliform and E. coli bacteria present
- Possible increase in the presence of carcinogens, such as chloroform, resulting from increased organic matter reacting with disinfectants such as chlorine

*Note that nutrients are only one of the variables that influence algal blooms. Blooms are also impacted by increased temperatures and water column stability.

Dorset Environmental Science Centre

Simple Steps to Reduce Excess Nutrients

Reduce or Eliminate Fertilizer Use

Remember that what goes on your property goes into the lake! That includes fertilizers applied near the water. Rain and irrigation carry these fertilizers into the water and encourage the rapid growth of aquatic plants and algae. For every pound of phosphorus in the water, 500 pounds of aquatic vegetation are produced!

Maintain Your Septic System

Pumping out your septic tank on a regular basis is critical to reducing nutrient flows into lakes. The frequency of your pump-outs will vary based on the size of your tank, your family size, and the number of appliances your use. As a general rule, pumping your septic tank every 2 to 3 years is a good practice.

Be Careful With Soap

At the lake, soaps should always be phosphate-free. Soapy wastewater from dishwashing and bathing should be disposed of in soil at least 60 meters from the water's edge to prevent harming wildlife and creating nutrient-induced algae blooms.

To find out more about the water quality of your particular lake, or to play a hands-on role in water quality sampling on your lake, contact the Ministry of the Environment's Lake Partner Program at 1-800-470-8322, www.ene.gov.on.ca/en/water

Shorelines

Kawartha Conservation

Shorelines

The shoreline of your waterfront property is called a 'ribbon of life' because it is where 90 percent of all lake and river life is born, raised and fed. Natural shorelines support cattail, pickerelweed and reeds that provide habitat for fish, nesting birds, mammals and insects. Plants at the water's edge help filter nutrients and prevent erosion, while underwater logs and rock piles allow fish to rest, feed and spawn while providing protection from predators. In these ways, healthy shorelines help to protect valuable recreational resources and are part of a healthy lake ecosystem. Unfortunately, not every shoreline demonstrates these features.

Erosion

Shorelines erode due to various forces: natural wave and wind action, ice movement from freezing and thawing, and human activities such as altering the waterfront with lawns, docks and breakwalls. When soil is exposed and vegetation is mowed to the water's edge, the stabilizing effect of root systems is lost, exposing the soil to the power of waves, ice and surface runoff. Sediment carried away by wind or waves reduces the size of waterfront properties and damages shoreline habitat by burying spawning beds and reducing water clarity.

Hardened Shorelines

Despite their popularity in some areas, natural erosion can't be prevented by concrete shore walls or sloped rock. Both of these measures are expensive and temporary fixes. Major storms, ice damage and the effects of time eventually cause them to fail. Hardened shores in one place may also deflect wave and wind energy and cause more erosion problems at neighbouring shorelines.

Naturalized Shorelines

A naturalized shoreline is generally considered the best multi-purpose approach to protecting the lake's edge. Maintaining or planting a buffer zone of native vegetation along your shoreline will slow erosion, provide food and shelter for fish and wildlife species and protect your property and investment. Best of all, naturalized shorelines mean less work and more time to enjoy the lake!

- Roots from shrubs and trees absorb wave and ice energy, stabilize soils and prevent erosion
- Plants along the shoreline slow surface runoff and filter contaminants before they reach the lake
- Shrubs and trees discourage Canada Geese, preventing goose poop and nuisance interactions with these birds
- Naturalized shorelines provide food and shelter for fish and wildlife species

Buffer Zones Protect Shorelines and Reduce Erosion

- Protect the natural shoreline by replanting areas that lack trees and shrubs, and maintain those areas that already exist.
- Leave a buffer zone of native vegetation around all shoreline areas. The buffer zone can be as little as three meters wide or as large as you would like.
- Don't mow right to the waterfront. A pathway can be maintained for access down to the water, but keep any development at least 30 meters away from the shoreline.

Restoring Developed or Damaged Shorelines

Shorelines that have been stabilized with rock 'rip rap', armour stone or gabion baskets can be modified to incorporate natural vegetation and extend the life of retaining structures. Noted below are some options to protect your shoreline from erosion while improving habitat.

Restoring Developed or Damaged Shorelines

Vegetated Buffer Zone
Plant native species of trees and shrubs with a variety of other aquatic and upland plants. Biodegradable erosion-control fabric can be effective when used with native plants; it holds the soil while allowing plants to grow through it.

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 rocks and will provide natural protection to absorb and dissipate wave action.

Bioengineering Techniques
Bundles of branches, or "wattles," staked into the bank will protect the shoreline from eroding. (See photo at right) 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.

Consult with your local authorities whenever you plan to restore or alter a shoreline. For more information and advice, check with your local Conservation Authority, Ministry of Natural Resources, Trent-Severn Waterway or Rideau Canal office regarding permits for changes to your shoreline.

Other agencies that may be able to provide advice include the Department of Fisheries and Oceans Canada, Federation of Ontario Cottagers' Associations, or your local stewardship council.


Kawartha Conservation


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Kawartha Conservation

Shoreline Construction Projects

Building a dock or boathouse along your waterfront can impact important shoreline habitat by covering fish spawning areas, removing rocks and logs that provide shelter, causing erosion from bank disturbance, removing vegetation, and even introducing toxic substances if improper building materials are used.

There are ways to limit disturbances to shoreline areas when construction projects are taking place. Fisheries and Oceans Canada (DFO) has a series of "Operational Statements" which provide advice on activities including dock and boathouse construction, aquatic weed removal and beach creation. There is often no need for DFO to issue permits and review in-water projects provided the measures in the Operational Statements are followed.

Fish Friendly Dock Structures

One of the most common in-water construction projects that waterfront property owners undertake is dock building. The information and drawings below outline some of the most popular dock designs and their impacts on fish and aquatic habitat. Floating docks are among the most "fish friendly".

Floating Dock

- Simply designed and easy to build
- Causes minimal disruption of lake bed
- Minimal shading of aquatic plants
- Free flow of water underneath
- Least environmental impact

Pipe Dock

- Little contact with lake bed
- Minimal shading of aquatic plants
- Adjustable to water fluctuations
- Free flow of water underneath
- Minimal environmental impact

Crib Dock

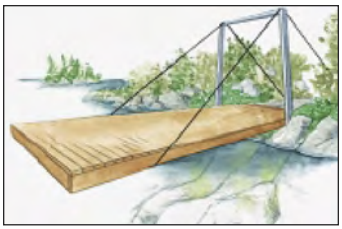
- Imported rubble and rock in crib bed
- Covers large area of submerged ground, smothering everything beneath
- May provide structure in otherwise sterile lake bed environments

Permanent Pile Dock

- Requires professional installation
- Minimal contact with lake bed
- Free flow of water underneath

Cantilever and suspension or lift dock

- Not suitable for areas with extreme water fluctuations
- Minimal impact of lake bed
- Sunlight to aquatic plants is restricted
- Installed properly can cause minimal shoreline damage



Work done in or around the water must not result in the harmful alteration, disruption or destruction of fish habitat. To ensure the protection of fish habitat, contact your local Conservation Authority, MNR office or Fisheries and Oceans Canada if you are planning a construction project along your waterfront.

If your lot fronts onto the Trent-Severn Waterway or the Rideau Canal, please contact Parks Canada.

Low Impact Lake Recreation

The ecological impacts of human activity on the water include wake effects, wildlife disturbance, noise and pollution. Here are a few tips to reduce the impacts of your actions while you enjoy the benefits of living by water.

Watch Your Wake!

Many animals respond to human disruptions by altering their behaviour and location. Breeding water birds nest at the water's edge where high wakes can drown nests and destroy eggs. Disturbances such as noise and frequent visits to nesting areas may mean that waterfowl abandon their nests or young chicks.

- Operate your boat below 10km/h whenever you are within 30 meters of the shore – it's the law!
- Always avoid waterfowl nests and other sensitive wildlife habitat.
- Always follow safe refueling guidelines to avoid polluting water.
- Consider using non-lead fishing tackle.
- Obey posted speed limits and "No Wake" zones and know your boat's wake-free speed.
- Remember that operating your boat on plane creates a smaller wake than when 'plowing' through the water at lower speeds

Following these tips will help ensure that your recreational activities aren't negatively impacting your human and wildlife neighbours!

Clean Marine

It is equally important to prevent avoidable pollution, such as oil and gas spills and chemical contamination, from entering our lakes. It is vital that boat operators take appropriate precautions and use the appropriate facilities when refilling tanks or discharging used water. Remember to use absorbent pads to soak up oil, fuel or anti-freeze spills before discharging your bilge water. Also consider installing a bilge filter. For more information regarding Ontario's Clean Marine program, visit the Ontario Marine Operators Association at www.omoa.com and look for the Eco-Rated Clean Marina nearest you.

Leave No Trace

After camping and shoreline meals, be sure to pack out whatever garbage you have packed in. Leave No Trace principles also include:

- Plan ahead and prepare
- Travel and camp on durable surfaces
- Dispose of waste properly
- Leave what you find
- Minimize campfire impacts
- Respect wildlife
- Be considerate of other visitors

"If you pack it in, pack it out."

Biodiversity

The haunting cry of the loon or the sight of a deer leaping in your woodlot is a feature that no doubt brought you to your lake. As our natural lake landscapes are altered through increased development, pollution and the spread of invasive species, many native species - including loons - are finding it difficult to cope. In many cases, habitat loss can result in population declines for sensitive species. With careful consideration to the needs of the plant and animal species with which we share our lakefront properties, we can make a difference and help conserve Ontario's biodiversity. You can enhance the variety of natural life that your property supports by taking a few simple steps such as those outlined below.

Parks Canada

Maintain Natural Habitat

Consider leaving specific areas around your property "untouched". Keep large rocks, fallen tree limbs and brush piles where they are to provide habitat for a variety of wildlife. Hawks and owls will keep your rodent populations to a minimum if you leave standing dead trees (where safety permits) for them to use for cavity nests and hunting perches. Rock piles are perfect habitats for reptiles, mammals and amphibians, all of which play an important role in Ontario's biodiversity.

Keep Aquatic Plant Populations Intact

Aquatic plants support the insects that fish eat, and are a primary food and habitat source for birds. In addition, aquatic plants help stabilize loose sediment and are an effective natural breakwater keeping waves from eroding the shoreline. Wherever possible, keep your shoreline vegetation intact and enhance it with shrubs and plants to create a natural buffer zone.

To find out more about biodiversity in Ontario, visit the Government of Ontario website at www.gov.on.ca and search for 'Biodiversity'

Native Plant Gardening

When gardening, think about enhancing the habitat value of your property by planting native vegetation. Native plants thrive on minimal care and maintenance: they are a natural choice for cottage properties since they don't require the watering or chemical support that many of their exotic counterparts depend on.

By providing shelter to local wildlife species native plants contribute to biodiversity and the preservation of local gene pools. Native plants also give your property a sense of place. Indigenous wildlife species such as birds, bees and butterflies will help to bring a native plant garden to life. With a variety of beautiful native plants such as the black-eyed susan and butterfly milkweed (left), your landscape can be a splendour of colours through the seasons. Ask for native plants at your local garden centre and make sure the plants are native to the immediate area. Never dig plants from the wild.

Bird Feeding

Nannyberry, serviceberry, pin cherry and birch are all native shrubs and trees that are excellent choices for feeding birds throughout the fall and winter. Flowering plants such as sunflowers that have gone to seed in the garden become natural birdfeeders for species to enjoy in the fall and winter. When using a built birdfeeder in winter, be sure to wash it to avoid transmitting disease and bacteria and maintain a consistent amount of food in the feeder for your feathered friends.

For more information about the benefits of native plants and a list of suppliers, visit the North American Native Plant Society www.nanps.org.

Animal-proof Your Home or Cottage

Attracting wildlife and planting native plant species on your property can result in positive effects ranging from pest control provided by bats and dragonflies to hawks hunting rodents around your buildings. Sometimes, wildlife creates a challenge when some species occur where you might not want them, or are too numerous.

Squirrels, raccoons, chipmunks and other rodents can invade your home or cottage by way of tree limbs and cracks in the ceiling, walls and floors. To discourage these animals, simply remove tree limbs that give access to your home and seal up all openings with wire mesh, metal flashing or caulking. Don't forget to check for any young (or any other adults) that might be still inside before you seal the access point. The parents will try everything to get back inside! Small mammals such as skunks and mice make their homes in and around woodpiles, so be sure to store your wood a good distance away from your home.

Voracious Visitors

In Ontario, numbers of Canada geese are increasing exponentially due to suitable habitat and low predator numbers. Geese prefer to eat short tender lawn grasses, and they feed where they have an open view of the water. To discourage geese from visiting your property, allow naturally occurring vegetation along the shoreline to grow. To be effective, a vegetative barrier needs to be 60cm (24 inches) or more in height and dense enough to keep geese from seeing through.

Be Bear Aware

To discourage bear visits, store your garbage and recycling in bear-proof dumpsters, and avoid storing garbage outside. Burn barbeques clean after cooking, wash and store them covered and out of the wind to minimize attracting bears. Don’t leave pet food outside and keep meat, fish and sweet foods (including fruit) out of your household composter. If you feed birds in the winter, be aware that seeds, suet or hummingbird nectar can attract bears as well as birds. From March to November, birds have access to plenty of natural foods. Consider a birdbath as an alternative of attracting birds without attracting bears during the summer season.

Aquatic Plants Out of Control

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Aquatic plant growth is something that many lakefront owners feel they have too much of. Aquatic plants play a key role in maintaining your lake's biodiversity, preventing erosion and providing oxygen in the water. As a lake gets older, an accumulation of nutrients in the sediment can cause an increased growth in aquatic plants. This natural process can be sped up by pollution and erosion. When a lake receives an overload of nutrients from fertilizer runoff, leaky septic systems, or erosion, aquatic plants and algae can grow out of control. Eliminating sources of pollution and reducing erosion can help to avoid the over-fertilization of plants in the lake.

Water temperature also has a profound effect on aquatic plant growth. Increases in water temperature can be caused by the removal of shoreline vegetation, which shades shallow waters from the heat of the sun. If the streams and rivers that feed a lake have unprotected banks, pre-warmed water entering the lake adds to the increase in temperature.

What Can You Do to Control Aquatic Plant Growth?

Cutting is an expensive and labour intensive method of controlling aquatic vegetation; it may not even be productive, as cutting can sometimes stimulate growth. Fragments left in the water can re-root and create a denser patch of vegetation than was originally there. In smaller areas, plants might be pulled out, rather than cut. Be sure to remove pulled plants from the water.

For detailed information about aquatic plant control, contact Fisheries and Oceans Canada, or visit their website at www.dfo-mpo.gc.ca and look for the "Working Around Water Fact Sheet I-2: Fish Habitat and Controlling Aquatic Plants".

Toxic herbicides should be avoided! They may, or may not, control aquatic plants quickly in the short term, but can be expensive, may have to be used often to be effective, and have negative side effects. Herbicides are especially discouraged within a wide area where anyone will be swimming, or where water intakes are nearby. Using these chemicals has health and environmental risks, and always requires a Ministry of the Environment and/or Parks Canada permit.

Maintain a lakeside buffer zone by using trees to shade the shores and tributaries. This can reduce erosion as well as stop any excess nutrients from entering the lake.

Invasive Species

Non-native, exotic or invasive species are all terms used to describe organisms that have been introduced into habitats where they haven't historically existed and do not belong. Invasive species can negatively affect the habitats they invade, displacing native species and causing a serious threat to biodiversity. Invasive species can cause widespread and unpredictable changes to the habitats they invade which results not only in damage to the ecosystem, but also to the native fish and wildlife populations. Aquatic ecosystems are especially vulnerable to invasive species. Once established in an aquatic ecosystem, an invasive species is almost impossible to eliminate and control measures can be costly.

Common Aquatic Invaders of Ontario

Zebra Mussels

Tolerant of a wide range of environmental conditions, these mussels have managed to spread throughout all of the Great Lakes as well as into many inland lakes. They filter the water and because of their high numbers can encourage nuisance levels of aquatic plants. This can destroy the habitat of some native species. In addition, mussel introductions can also cause considerable damage to property and significant changes to the recreational quality of the waterfront.

Spiny Water Flea

The spiny water flea is an invasive crustacean with a range in Ontario that includes over 65 inland lakes and waterways. This hungry zooplankton competes directly with our native zooplankton species and juvenile fish, eating up to three times as much food. Spiny water fleas have a sharp tail spine that can become entangled in fishing lines and downrigger cables. When the cable is pulled from the water, the spiny water fleas attached to the cable look like straight pins.

Round Goby

Accidentally introduced into the Great Lakes by way of ballast water from ships, the round goby is an aggressive bottom-dwelling fish that competes with native species. The round goby can accumulate high contaminant levels in their tissues. When other animals eat the goby, the toxins perpetuate within the food chain.

Photos courtesy of Dave Brenner (Michigan Sea Grant Archives–www.miseagrant.umich.edu

You Can Prevent the Spread of Aquatic Invasive Species

With over 180 non-native species already established in the Great Lakes and a new one arriving every 8 months, preventing their spread can seem like an overwhelming task. Yet, there are simple things that you can do to stop their spread.

Call the Ontario Federation of Anglers and Hunters' Invading Species Hotline at 1-800-563-7711 to report a sighting or to obtain more information on how to protect your lake and surrounding area from invasive species.

For information on non-aquatic invasive species including forest pests and plant species, visit the Invading Species Awareness Program website at www.invadingspecies.com

Boaters

- When removing your boat from a lake, inspect the boat, trailer and all accessory equipment that has been in the water. Remove all plant and animal material before leaving the launch.
- Drain water from motor, live wells, bilge and transom wells immediately, before leaving water access area.
- Before transporting your boat to another water body, wash your boat, tackle, downrigger cables, trailer, and other equipment with hot water, or spray with high-pressure water; or, let your boat dry out in the sun for five days.

Anglers

- Empty bait buckets on land. Never dump a bait bucket into a lake if it has water from another water body in it, and never dump live fish from one water body into another. Not only can this result in the introduction of a new species into a lake, it is also **illegal**.
- Learn to identify the different species of baitfish and distinguish them from invasive fish such as the round goby. Buy your bait where you fish and dispose of unused bait and water on land away from the lake, or in the trash.

Gardeners

- Exotic plants can add beauty and variety to your garden. But take care – some species can become invasive if they escape to our natural waters or woodlands.
- Learn how to identify exotic/invasive species. Remember that they thrive in disturbed areas; so wherever possible, keep it natural.
- Choose contained areas for your exotic plants; or, better yet, use native plants.

Protecting and Testing Drinking Water Sources

Untreated surface water should never be ingested! Even healthy lakes can harbour harmful bacteria and parasites that can affect human health. Drinking contaminated water can make you sick and may even be fatal. Bacterial contamination, such as E. coli, causes stomach cramps and diarrhea, along with other problems. Harmful bacteria such as Giardia (which causes the illness known as "beaver fever") and cryptosporidium can cause gastro-intestinal problems.

Test treated drinking water for bacteria at least three times a year and after any major plumbing work. You can pick up bottles to test treated lake and well water at the public health laboratory or your local public health unit. Be sure to follow the directions explicitly to ensure accurate testing. To locate your local public health unit or laboratory, call the Ministry of Health's INFOline: 1-866-532-3161.

James Wilkes

Chemicals in your drinking water can also threaten your health. If you live near an agricultural area, you may want to test for pesticides, excess nitrates and phosphorus in addition to bacteria. Well owners may also want to test for gasoline, pesticides and solvents. These chemical tests are performed for a fee at private laboratories accredited by the Ministry of the Environment (MOE). To locate your local lab, contact MOE at 1-800-565-4923.

Unusual tastes in your drinking water may indicate excess amounts of iron, chlorine, bacteria and other substances. Strange smells may indicate naturally occuring sulfur, or possibly sewage overflow (after excessive rainfall or flooding), or other pollutants. Water contamination isn't always noticeable. The only way to make sure your drinking water is safe is to have it tested regularly.

Simple Steps to Protect Drinking Water Quality

- Use less water. The amount of water that goes through your septic system affects the amount of nutrients or pollutants being washed into the lake and into the groundwater.
- Conserve water by installing water-saving fixtures like low flow aerators
- Only run laundry machines and dishwashers with full loads
- Take short showers rather than full baths
- Fix leaky faucets
- Clean debris from your well and make sure the lid is vermin proof and fits tightly
- Properly decommission unused wells so they don't contaminate the aquifer
- Ensure that your well is at least 100 feet away from your (and your neighbours') septic bed
- Install and maintain vegetated areas for storm water runoff from parking lots and driveways

Well Aware

To learn more about well maintenance, water testing and rural property issues visit www.wellwise.ca

Be Smart About Septic Systems

Wastewater treatment is closely related to your drinking water quality. Maintaining your septic system is critical to ensuring that your wastewater does not add excess nutrients to your lake or contaminate groundwater.

- Have your septic tank inspected and pumped out on a regular basis. The frequency of your pump-outs will vary based on the size of your tank, your family size, and the number of appliances your use. As a general rule, pump your septic tank every 2 to 3 years.
- Avoid constructing patios, decks or parking areas over your septic tile bed. Extra weight can crush pipes and compact the soil limiting its permeability.
- Do not use snowmobiles over the leaching bed area in winter; this will reduce the snow cover's insulating effect. In addition, ATVs and snowmobiles can also compact filtration material.
- Have an effluent filter installed in your septic tank, to reduce the amount of solids entering the leaching bed, which prevents clogging.
- Ensure access to the septic tank for proper maintenance and servicing.
- Avoid planting certain species of trees around the leaching bed area. Willow roots can clog pipes and shade the septic area, slowing evaporation.
- Do not water your lawn around leaching bed area; extra water can reduce the bed's ability to absorb and treat waste water from the house.
- Direct rainwater from roofs, patios and driveways away from the leaching bed to avoid system overload.
- Do not dump toxic waste down your drain or toilet. Paints, oil, gasoline, antifreeze and chlorine can be disposed at your local hazardous waste centre
- Use environmentally friendly cleaning products and avoid putting fats, oils or antibacterial products into your septic system.
- Avoid using in-sink garbage disposal units
- Consider installing a composting toilet to reduce wastewater

Contact your local building inspector for more information, and visit the Ontario On-Site Wastewater Association at www.oowa.org for wastewater resources.

"There is an amazing amount of knowledge and experience around every lake."

– Don and Ruth Benson, Mountain Lake, Haliburton

Lake Management Planning

If there isn't already a lake management plan in place for your lake, you may want to consider getting one started. Lake management plans give you the big picture, helping you to recognize and protect the unique character of a lake while you consider land use and larger watershed matters. A well-developed plan engages and empowers the community and brings the public together to support the sustainable future use of our lakes.

The first step in lake management planning is to establish a committee that:

- Encourages partnerships between concerned citizens, lake users, resource managers, municipalities and other stakeholders
- Identifies concerns that people feel need to be addressed
- Sets realistic goals, objectives and action plans.

A comprehensive management plan includes information about the watershed. It could also address key issues including:

Water quality
Land use and zoning
Public water access
Natural and cultural heritage
Aquatic vegetation
Exotic species
Surface water use conflicts
Fisheries management
Wildlife

The Federation of Ontario Cottagers' Associations can provide advice and resources to help you get started on a lake management plan. Contact them at www.foca.on.ca

Securing The Future of Your Shoreline Property

More and more waterfront owners want to leave a legacy for the health of their lake or river. There are several options for doing so, each with potential for significant benefits. These options include:

- donating all or a part of the land to a conservation organization
- leaving it to such a group in your will, or now, with rights to still use it
- transferring it to a good steward or with conservation conditions, or
- entering into a conservation agreement that allows your continued enjoyment of the property but puts conditions on use to ensure your stewardship efforts will be maintained long into the future, regardless of who may come to own it.

New tax rules allow a donation of ecological land, conservation agreement or securities to a conservation charity to be exempt from capital gains tax and qualify for enhanced claim limits. In some cases, such arrangements can benefit you by reducing property or other taxes, or make it easier for a conservation charity to acquire land. U.S. residents may also be able to benefit from U.S. tax incentives. These options can allow creative arrangements to meet owners' specific needs. With the right solution, your shoreline stewardship can become a long-term legacy for your lake or river, and your community.

To explore your conservation options, contact your local land trust. Visit the Ontario Land Trust Association's website for contact information www.olta.ca

Climate Change and Your Lake

It is uncertain how climate change will impact Ontario's lakes. An increase in extreme weather events is anticipated due to climate change, including drought, high winds, heavy rainfall, and high temperatures. These weather variables control lake dynamics such as water temperature, water levels (through evaporation), the number of ice-free days, nutrient runoff, and erosion. Physical and biological aspects of lakes such as temperature stratification, water temperatures, the numbers and types of bacteria and algae, and the timing of seasonal events like fish spawning may all be affected by climate change.

Another major issue that we will certainly all face as property owners will be the increase in extreme weather events. These intense storms bring high winds and heavy rainfall. Large amounts of water running off the land into lakes will increase the affects of erosion and may affect shoreline infrastructure. As has been pointed out, the best defense against these forces of nature is a well-established and well-rooted naturalized shoreline along with thoughtfully designed dock systems. Accompanying the rain can be high winds that will damage trees, buildings and power lines. It is always important to be prepared for emergency situations like power outages at the cottage. Be sure to have adequate supplies of drinking water, extra food and alternative light sources to get you through.

To learn about how climate change is affecting Ontario's environment, visit www.gogreenontario.ca

Characteristics of a Healthy Lake Ecosystem

At this point in this guide, the role that you play in maintaining the health of your lake ecosystem should be clear. As a summary, some key features of lake ecosystems are noted below.

Characteristics of a Healthy Lake:

James Wilkes

- Natural shorelines providing a buffer that filters runoff and pollutants
- Well vegetated to provide shade (trees, shrubs, etc.)
- Good water quality that has low levels of pollutants or excess nutrients
- Water clarity remains constant or normal
- Relative absence of invasive species around or within the lake
- Abundant and healthy fish and wildlife
- Lake conditions changing gradually and naturally over time, not rapidly

Characteristics of an Unhealthy Lake:

Dorset Environmental Science Centre

- Lack of natural shoreline (advanced shoreline development, erosion and hardened shorelines)
- Poor water quality, with high levels of E. coli, phosphorus and other pollutants
- Frequent changes in water clarity
- Rapidly changing aquatic plant and algae growth, possibly due to high levels of phosphorus
- Invasive species affecting lake health, native species and human use
- Loss of fish and wildlife habitat with declining populations

FOCA's Docktalk kit is full of useful tips on keeping your lake healthy. Visit www.foca.on.ca for more information.

How to be a Good Lake Steward

There are many things that you can do to take care of your lake so that future generations can enjoy it too! Here is a summary of some of the key points in this guide.

- Remember that what goes on your property and into your drain eventually finds its way into the lake, so avoid the use of harsh cleaners, pesticides, herbicides and fertilizers.
- When undertaking construction projects along the shoreline, consult the DFO's Operational Statements to reduce disturbance to aquatic habitat, and contact your local Conservation Authority, Ministry of Natural Resources, Trent-Severn Waterway or Rideau Canal office.
- Keep your speed under 10km/h whenever you are within 30 meters of the shore, and be careful with oil and gas when filling boat tanks and emptying bilge water.
- Clean and inspect your boat before moving it to other lakes to control the spread of invasive species.
- Protect your shoreline from erosion, Canada geese and runoff by maintaining or planting a buffer zone of native vegetation – don't mow to the water's edge!
- Enhance biodiversity on your property by leaving rock piles, fallen tree limbs and brush piles untouched so they can function as wildlife habitat.
- Encourage native species of flowers, shrubs and trees to limit your maintenance work and provide shelter to local wildlife species.
- The water that you drink is precious! Practice water conservation inside and outside your cottage, and have your drinking water tested regularly.
- Maintain your septic system by booking regular pump outs and inspections
- Consider the future of your lake property – initiate a lake management plan or leave a legacy by protecting your land with the help of a local land trust.

Before

Kawartha Conservation

After

Kawartha Conservation

Joe Fowler Park, Port Perry, Ontario. Restoration undertaken by Scugog Lake Stewards.

"When one tugs at a single thing in nature, he finds it attached to the rest of the world."

- John Muir

Glossary

Aquifer: an underground layer yielding groundwater for wells and springs

Ballast water: water taken up or released by boats to keep steady when lightly loaded

Buffer zone: a strip of vegetation, including native vegetation, located between developed land and a lake, stream or wetland. A buffer zone protects the water, adds beauty and provides habitat for wildlife.

Dissolved oxygen: the amount of free oxygen dissolved in the water. This is used by aquatic organisms to "breathe."

Exotic species: plants or animals that are not native to an area

Gabion: a cylindrical wire basket filled with earth and stones

Invasive species: exotic plants or animals that compete with (and overtake) native species

Littoral: the area of shallow water along the lake edge

Permeable: porous; allows water to pass through

Rip rap: small pieces of blast rock, usually limestone, placed to prevent erosion

Sediment: material that has settled at the bottom of a body of water

Vegetated geogrid: natural or synthetic material wrapped around soil with live branch cuttings placed in it

In addition to using this valuable resource, we encourage you to learn more. The back page of this guide lists contact information for agencies that publish fact sheets, host events, and run programs to help you get involved in lake stewardship.

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The Lakeland Alliance is a collaboration of the following organizations and government agencies that are working together for natural shorelines and healthy waters throughout the Kawartha, Haliburton and Bancroft region.

- Bancroft Area Stewardship Council
- Federation of Ontario Cottagers' Associations
- Fisheries and Oceans Canada
- Haliburton Highlands Stewardship Council
- Kawartha Conservation
- Ministry of the Environment – Lake Partner Program
- Otonabee Region Conservation Authority
- Peterborough County Stewardship Council
- Peterborough Green-Up
- Victoria Stewardship Council

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