

A Shoreline Owner's Guide to
Healthy Waterfronts

3rd Edition



Introduction

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

The popularity of retreating to Ontario's lakes for rest and recreation continues to grow. As a result, development on the shorelines of our lakes continues.

In addition to this, more and more people are extending their time at the cottage to live there year-round. To preserve the lake environment that brought us here in the first place, it is imperative for us to understand our impacts and to know how to reduce them.

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

Read onward to find out what you can do to take care of your lake so that future generations can enjoy it, too!



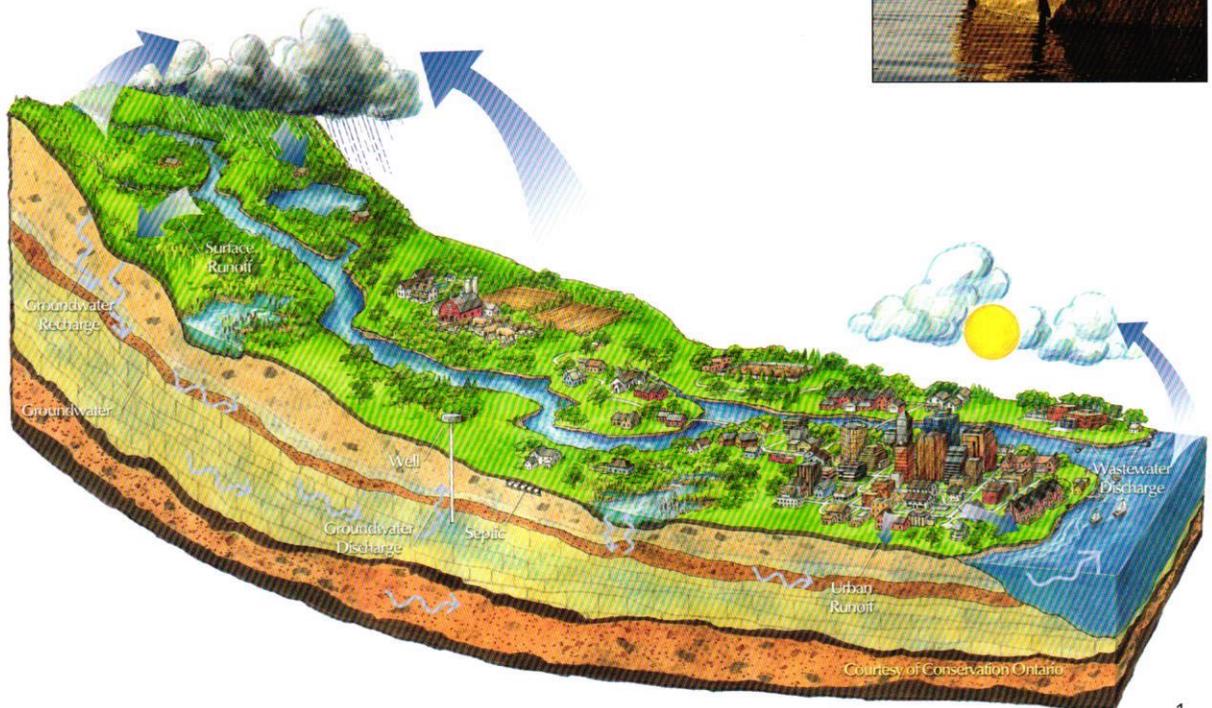
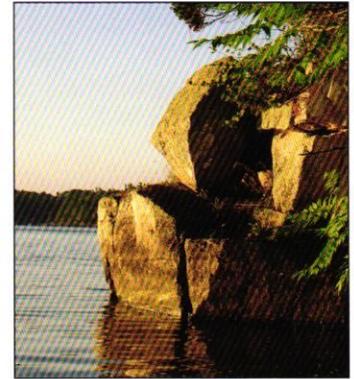
Randy French



What is a Watershed?

Your lake is more than just what you see out 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. Think of 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.

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 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.

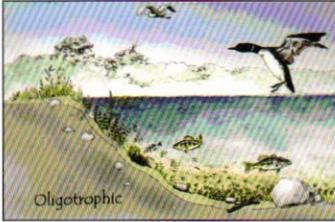


What Type of Lake Do You Live By?

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 and Forestry (MNR) or cottage association.

Oligotrophic Lakes

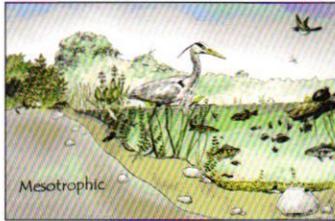
- Generally deep
- Minimal aquatic plant growth
- Low nutrient levels
- Support cold-water fish such as trout and whitefish
- Low levels of phosphorus and chlorophyll
- Most lakes on the Canadian shield are oligotrophic with some exceptions



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Mesotrophic Lakes

- 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



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Eutrophic Lakes

- 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



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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 excessive 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, 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 you 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. Avoid antibacterial soaps. 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 Lake Partner Program at 1-800-470-8322, or visit <http://foca.on.ca/lake-partner-program-overview>

Climate Change and Cottage Country

Our climate is changing, in large part from human causes. An increase in extreme weather events is anticipated due to climate change including drought, heavy rainfall and extremes (and shifts) in temperature. In cottage country, we need to be prepared for emergency situations such as power outages from downed trees and power lines. Be sure to have adequate supplies of drinking water, extra food and alternative light sources at the cottage, in case of emergency.

Aquatic ecosystems are very vulnerable to climate change. Even small changes can cause big impacts. Weather variables affect lake dynamics such as water temperature, water levels, 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 be affected.

For more, see: <http://foca.on.ca/climate-change-and-waterfront-Ontario>

Climate change will affect our land and water resources, our economy, our communities and all of us as individuals. Some likely developments for Ontario include:

- Extreme heat events will be more common.
- The frequency of intense rainfalls will increase, leading to more flooding events.
- Precipitation distribution will likely change, with more in the winter and less in the summer, reducing surface and groundwater levels.
- Declines in the duration of winter ice may reduce the likelihood for winter fish kills in shallow lakes.
- Fish growth rate should increase, but not at the same rate for each species. The food chain will likely be altered.

Extreme weather events are also likely to increase the effects of erosion, and may affect shoreline infrastructure. The best defence against these forces of nature is a well-established and well-rooted naturalized shoreline, along with thoughtfully designed dock systems.

You have a role to play in maintaining the health of your lake ecosystem, and to mitigate the effects of climate change. Learn more on the following pages.





Shorelines

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. 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.



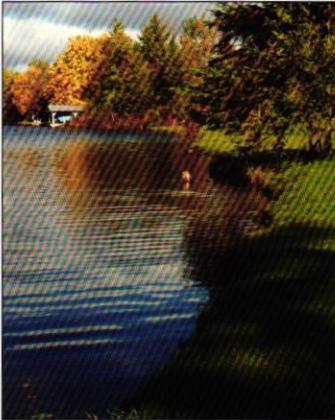
Kawartha Conservation

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 metres 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.

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.



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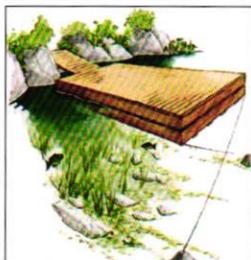
Shoreline Construction Projects

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. Avoid work during fish spawning times. Check whether you need a permit for shoreline work, including dock and boathouse construction, aquatic weed removal and beach creation. If your property fronts onto the Trent Severn Waterway or the Rideau Canal, you will need to contact Parks Canada about any shoreline projects.

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

- Covers larger area of submerged ground, smothering everything beneath
- May provide structure in otherwise sterile lake bed environments
- Make sure to avoid imported rubble and rock in crib bed

Permanent Pile Dock

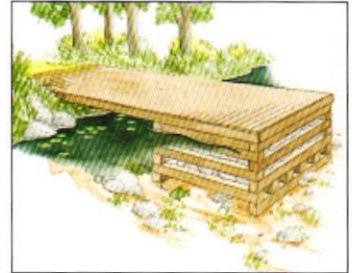
- Requires professional installation
- Minimal contact with lake bed
- Free flow of water underneath

Cantilever and suspension or lift dock

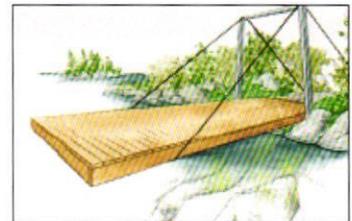
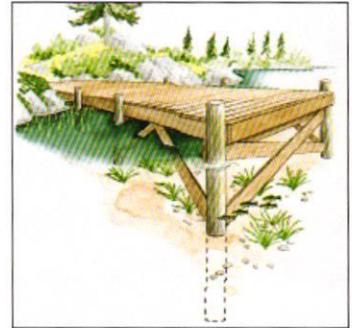
- Minimal impact of lake bed
- Minimal shading of aquatic plants
- Installed properly, can cause minimal shoreline damage

Get links from FOCA here:

<http://foca.on.ca/permits-for-shoreline-work-crown-land>



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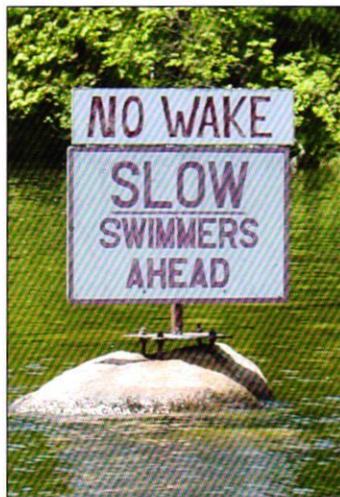


Low Impact Lake Recreation

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.

Clean Marine

It is 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 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. One litre of spilled gasoline can contaminate thousands of litres of water. Oily water from a messy bilge leaves a choking rainbow-hued slick. Garbage thrown overboard may take tens to hundreds of years to decompose.



Clean Boating

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!
- 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
- Always avoid waterfowl nests and other sensitive wildlife habitat.
- Always follow safe refueling guidelines to avoid polluting water.
- Only use non-lead fishing tackle.

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

Get tips from FOCA at <http://foca.on.ca/safe-boating>

Biodiversity

The haunting cry of the loon or the sight of a deer leaping in your woodlot is an experience that can make you love your lake. As our natural lake landscapes are altered through increased development, pollution and the spread of invasive species, many native species are finding it difficult to cope. Habitat loss can result in population declines for sensitive species. With careful consideration to the needs of the plant and animal communities 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, outlined below.

Maintain Natural Habitat

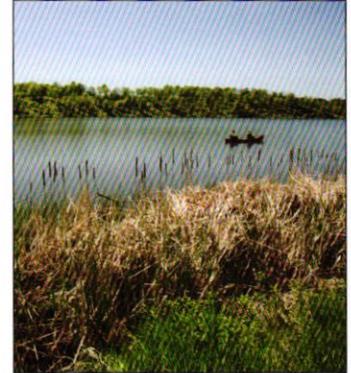
Consider leaving specific areas around your property "untouched". Keep large rocks, fallen tree limbs and brush piles where they are to provide habitat for a variety of wildlife. Hawks and owls will keep your rodent populations to a minimum if you leave standing dead trees (where safety permits) for 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.

Dark Skies

Light pollution can negatively affect foraging, hunting and reproductive behaviours of birds and animals. Keep light impacts to a minimum at night, using illumination where and when you really need it. Consider motion detectors instead of dusk-to-dawn fixtures. Light shields help to direct light along pathways or steps without flooding large areas. Now you can really star-gaze!

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.



Find out more at <http://foca.on.ca/ontario-biodiversity>

Native Plant Gardening

When gardening, think about enhancing the habitat value of your property by planting native vegetation. Native plants thrive with 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. Finches and other seed-eating birds feast on the seed heads of thistle and goldenrod 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 the Ontario Invasive Plants Council's "Grow Me Instead" guides, visit <http://foca.on.ca/fact-sheets-videos> and find links in the "Additional Resources" section.

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, 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 continue to increase 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 to attract birds without encouraging bears during the summer season.

