





# Lake Protection Workbook

## A Self-Assessment Tool for Shoreline Property Owners

LAKE LINKS

## Disclaimer

This workbook is not a replacement for technical evaluation or in-person assessment by a professional.

It is an educational tool drawing attention to important aspects of lake protection.

## Acknowledgments

This Lake Protection Workbook was produced by the Lake Links Planning Committee with collaboration and review from:

- Cataraqui Region Conservation Authority
- Friends of the Tay Watershed Association
- Lake Networking Group
- Lanark County Stewardship Council
- Mississippi Valley Conservation Authority
- Ontario Ministry of Natural Resources and Forestry
- Rideau Valley Conservation Authority
- Watersheds Canada

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## Introduction

There are compelling reasons why people are drawn to lakeside cottages, homes, camp sites and retreats. Among these are the solitude, the peace and quiet, the beauty of the water and surrounding forests, and the enjoyment that comes from spending time with family and friends. Our lakes are also a source of income for some, a source of significant tourism revenue for local communities, and provide clean drinking water for surrounding villages, towns and cities.

Our lake environments support countless species of plants and animals, with the 'ribbon of life' (near-shore habitat) especially critical to their survival and well-being. Lakes are complex ecosystems, of which humans are a part, and no two are exactly alike. Each depends upon good stewardship (i.e. responsible care and use) to remain healthy. Your individual property is important to the overall health of your lake. As with all conservation measures – whether reusing or learning to turn off the lights when leaving a room – you can make a difference. If every property owner on every lake was to take ownership of the health of that lake, imagine how we could, collectively, improve the quality of life for all.

**This Lake Protection Workbook is a tool designed for you to self-assess whether activities and uses on your property are protecting your lake. Practical information, recommendations and space for recording improvements are offered to assist you in your lake protection efforts. Your completed workbook is for you to keep and is completely confidential.**

Lake protection is everyone's responsibility, and every action matters. Being a patient, persistent and active steward of our lakes is essential to their good health – and ours as well. We hope that you'll share this workbook with others on your lake.

*Photo: Cataraqui Region Conservation Authority*

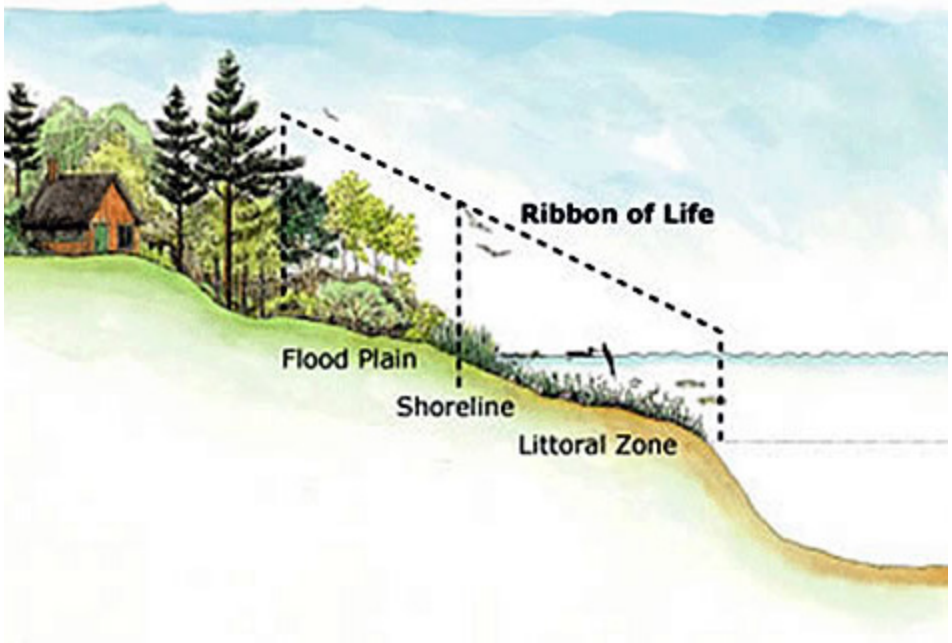



*Illustration: Rideau Valley Conservation Authority*

## How Lakes Function

Canada's lakes provide recreational opportunities, sources of drinking water, habitat for wildlife and are a cornerstone of many local businesses. Accordingly, our lakes are essential elements of the landscape:

1. **They provide important habitat for wildlife including fish and other aquatic species, birds, and various mammals.**
2. **People treasure lakes for their beautiful scenery and take advantage of them for recreational activities such as fishing, boating, swimming and hunting.**
3. **Lakes also provide important ecosystem services. They trap sediments and nutrients from rivers and streams that flow into them and help to regulate flows through the watershed. Plants that grow along the water's edge provide complex habitats for terrestrial animals and help to prevent sediment erosion.**

The natural function of a lake is driven by many factors including:

- light energy,
- nutrients from inflowing streams, rivers, runoff and the lakebed itself,
- evaporation,
- plant growth, and
- groundwater recharge.

**Physical lake features**, or lake shape, such as basin depth, surface area, and volume directly influence how energy and nutrients are cycled and will determine the ecology of the lake environment. Processes within the lake such as mixing, heat absorption, and plant growth together determine which communities are found within the lake.

Other influences on lakes include the introduction of invasive species, changes in weather patterns, and shoreline development.

## How to Complete This Work

The following pages provide a series of questions that help you to assess how well you are protecting your property and your lakefront through everyday actions. The questions relate to such factors as lawns and gardens, the shoreline, your sewage system, and other considerations. Once these questions are answered, you will be able to calculate your scores and learn about ways in which you might be able to improve your lakeshore practices – thus helping to protect your lake.

**Part 1** is intended to capture general property information, such as shoreline frontage, number of buildings on the property, etc. so that you have a record of your property at the time your workbook was completed.

**Part 2** challenges you to think about various aspects of lake protection, and how you are doing in relation to these on your own property. There are nine topic areas in the workbook requiring observations and careful reflection. Depending on your property, reading and filling in your workbook could take a few hours – take your time for maximum benefit.

Follow these steps for Part 2:

- Complete each section of multiple-choice questions;
- Record scores and calculate the total score for each section;
- Complete the summary score sheet on pages 32 and 33 to compare your scoring for each section: a higher score indicates a property with better lake protection;
- Determine how much your property and related activities contribute to lake health; and,
- Make note of recommended actions to improve shoreline protection on your property.

**Part 3** is space for recording planned improvements and achievements for your shoreline property.

**Part 4** is a summary of contacts and resources**.**

**Keep this workbook with your property records.** It is recommended that you review the information in this workbook every year. Keeping an up-to-date record will help to keep property-specific lake protection a priority.

Should you have any questions or require additional information, please contact your local Conservation Authority or watershed organization.

## Part 1: Background Property Information

Name(s): _____

Number of Regular Residents / Cottagers: _____

Date Self-Assessment Completed: _____

Property Address: _____

Length of Shoreline Frontage: _____

| | | | | |
|---|---|---|---|---|
| Shoreline is mostly: | ☐ Natural (see pg. 9) | ☐ Developed | | |
| Water Source (bathing, etc.): | ☐ Well | ☐ Surface Water Intake | | |
| Water Source (drinking): | ☐ Well | ☐ Surface Water Intake | ☐ Other | _____ |
| Property Type: | ☐ Permanent | ☐ Seasonal (cottage) | | |

Number of Buildings on the Property:

Additional Notes:

## Part 2: Lake Protection Self-Assessment

## Lawns & Gardens

Maintaining a lawn on a waterfront property can be challenging. In addition, lawns have low habitat value and short root systems that don't strongly bind to the soil; this can lead to shoreline erosion. Studies also show that 55% of precipitation runs off hardened surfaces, including short waterfront lawns.

When waterfront lawns are treated with herbicides and chemical fertilizers, the chemicals will run directly into the nearby lake or stream and adversely affect the aquatic ecosystem.

A healthy alternative to herbicides and fertilizers is to use natural methods of lawn care, as outlined below. Also, naturalizing sections of lawn, especially along the shoreline, will not only lessen the amount of effort required for maintenance, but will reduce erosion and provide important nearshore habitat.

- **Naturalize your lakeside property** by replacing short cut grass with native grasses, wildflowers and other native plants;
- **Move your lawn further back** from the shoreline;
- **Increase shrub borders or expand field and forest habitat**; and
- **Leave any sections of lawn approximately 10 centimetres high** to encourage the growth of stronger and deeper roots

*Photo: Shoreline Planting, Watersheds Canada, 2018*

*Photo: Lemoine Point Native Plant Nursery, Cataraqui Region Conservation Authority*

## Group 1 Questions: Lawn & Gardens

1. **We don't have a waterfront lawn.**
   True = 1 False = 0 Answer: _____

2. **Approximately, what percentage of our property (excluding buildings) is lawn?**
   Less than 25% = 3 Between 25 - 49% = 2 Between 50 - 75% = 1 More than 75% = 0 Answer: _____

3. **We don't use chemical fertilizers or uncomposted manure on our waterfront property.**
   True = 1 False = 0 Answer: _____

4. **We use natural lawn care methods, including leaving the grass longer to encourage the growth of stronger and deeper roots.**
   True = 1 False = 0 Not applicable, we have no lawn = 1 Answer: _____

5. **We only plant native plants on our property or simply let nature do the planting.**
   *Native plants are preferred because they are well adapted to our climate and wildlife, usually have deeper roots, and do not pose a threat of becoming invasive.*

   True = 1 False = 0 Answer: _____

6. **We check whether any of the plants we select could be an invasive species.**
   *Check out the Ontario Invasive Plant Council's 'Grow Me Instead' resources.*
   *https://www.ontarioinvasiveplants.ca/resources/grow-me-instead/*

   True = 1 False = 0 Not applicable, we don't plant = 1 Answer: _____

7. **We keep brush and compost piles well away (i.e. 30 meters) from our shoreline.**
   *Excessive decomposing plants near the shoreline can contribute to nutrient loading in lakes and rivers. The extra nutrients can lead to poor water quality, excessive weed growth and algae blooms.*

   True = 1 False = 0 Answer: _____

8. **We try to limit the direct runoff to our lake from our property.**
   *Runoff from your property can contain pollutants like nutrients and bacteria. You can direct runoff away from the lake by installing rain barrels, rain gardens, soak away pits and reducing lawn area or hardened/ paved surfaces. Vegetation, including shoreline buffers, provides good runoff reduction.*

   True = 1 False = 0 Answer: _____

**Record your total Group 1 score here** ☐

## Recreation

Boating, fishing and celebrations with friends and family are a key part of the lake experience.

Your lake is precious to you and boating is a great way to enjoy and explore your lake. Keep in mind that there are others boating, as well as wildlife on the lake. Being a respectful, courteous and safe boater is appreciated by wildlife and fellow boaters alike.

Fishing is a popular pastime enjoyed by lakefront property owners and lake visitors. To ensure the sustainability of fish populations, follow all provincial regulations for your fisheries management zone. This includes respecting size limits, catch limits and seasons set out for different fish species. Fishing zone maps and rules can be found online and in the Fishing Ontario Recreational Fishing Regulations Summary.

In addition, take precautions to prevent the transportation of invasive species. Always clean, drain and dry your boat before launching at another lake. Be careful with your bait choices and don't release unused bait into any waterbody. It is illegal to release any live bait or dump the contents of your bait bucket directly into or within 30 metres of any waters!  Another best practice is to try to use tackle that is lead-free, as it protects against wildlife poisoning.

*Photo: Ontario Federation of Cottagers Associations, 2019*


*Photo: Eaton & Putnam Count*

Although fireworks create a spectacular visual show, enjoyable to many as the colourful explosions reflect on the lake surface, there are risks to this activity.

Fires and injuries are possible. The particulate left in the sky after a firework explodes contains heavy metals, including lead, which can land directly on the lake or be washed into the lake following a rain storm, with harmful effects on the aquatic food chain. Noise and light from fireworks can have a negative impact on wildlife including nest desertion.

## Group 2 Questions: Recreation

1. **We slow down to reduce wake for small watercraft, nesting waterfowl and shorelines.**

   True = 1 False = 0 Not applicable; we don't have a motorized boat = 1 Answer: _____

2. **We power wash or leave our watercraft to dry for 24 hours before launching at another lake / returning to our home lake.**

   True = 1 False = 0 Not applicable; no watercraft / stay on one lake = 1 Answer: _____

3. **We know and follow fishing regulations pertaining to size limits, catch limits and seasons.**

   True = 1 False = 0 Not applicable, we don't fish = 1 Answer: _____

4. **We practice catch and release of highly targeted (preferred) fish species (e.g. walleye, lake trout).**

   True = 1 False = 0 Not applicable, we don't fish = 1 Answer: _____

5. **We have tried to eliminate lead weights and lures from our tackle box.**

   True = 1 False = 0 Not applicable, we don't fish = 1 Answer: _____

6. **We refrain from fishing in/near spawning locations during spawning season.**

   True = 1 False = 0 Not applicable, we don't fish = 1 Answer: _____

7. **We know and obey the burn regulations and/or bans in our region, including campfires.**

   True = 1 False = 0 Answer: _____

8. **We plan celebrations without fireworks.**

   True = 1 False = 0 Answer: _____

**Record your total Group 2 score here** ☐

# Shorelines

Natural shorelines rich in native trees, shrubs, grasses and wildflowers are critical to lake health. Some of their many benefits are described below.

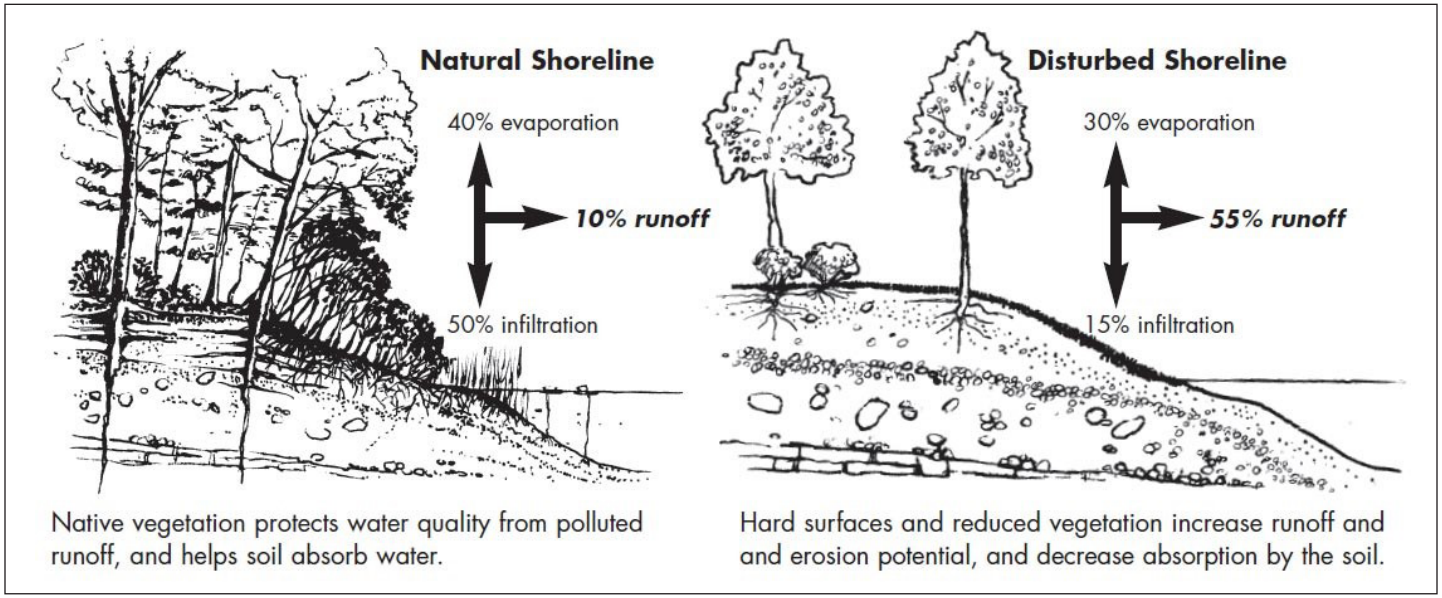



*Illustration: Kipp, S & Callaway, 2003*

**Water Quality Protection**
Surface water runoff can contain pollutants like fertilizers, soil particles, excess nutrients, bacteria and chemicals. Planted shoreline buffers help to absorb and trap these pollutants before they enter lakes and rivers where they can cause poor water quality, excessive plant growth and algae blooms.

**Erosion Protection**
Shorelines are a dynamic, ever-changing environment where some amount of erosion will always be occurring. Wind, waves, fluctuating water levels and other disturbances can accelerate this erosion leading to unstable slopes, loss of land and excessive sedimentation into lakes and rivers. Shoreline plants reduce this erosion by helping to keep soil in place, stabilize banks and absorb wave energy. Deep rooted native trees and shrubs often provide the best protection.

**Wildlife Habitat**
Shorelines provide critical habitat for both aquatic and terrestrial wildlife. Natural shorelines provide food, shelter, and safe travel corridors for animals. Fallen trees provide basking logs for turtles and refuge for fish. Tree canopy and overhanging branches provide shade and help keep water cool creating a more favourable environment for many fish species.

**How to Get Started on Naturalizing Your Shoreline**

Naturalizing your shoreline can be as easy as establishing a “no-mow” area and allowing the natural grasses and wildflowers to establish. Over time, you can consider planting additional trees, shrubs, wildflowers, grasses, and ferns. Native plants will provide the greatest benefits like deeper root systems and supporting wildlife. They also generally require less maintenance and don’t attract Canada Geese.

*Photo: Watersheds Canada*

## Group 3 Questions: Shorelines

1. **The average width of our buffer (un-mown grasses, shrubs and trees) is.**
   *Optimal buffer width is 30 metres for maximum benefit. As this is not often practical for lakefront properties, a minimum of at least 3 metres is recommended.*

   More than 10 metres wide = 2 Between 1 - 10 metres wide = 1 No buffer = 0 Answer: _____

2. **The area we keep open for shoreline is no bigger than necessary to access the water.**
   True = 1 False = 0 Answer: _____

3. **The current state of our shoreline is:**
   *Hardening a shoreline can have unforeseen impacts on the lakebed and adjacent areas.*

   Natural = 2 Lawn or imported rock = 1 Hardened/retaining wall/gabion baskets = 0 Answer: _____

4. **We never bring in extra fill (sand, soil, rock, etc.) to our shoreline property.**
   *Excess fill along a shoreline can alter floodplains and is easily washed into the lake. Any alteration to a shoreline may require a permit.*

   True = 1 False = 0 Answer: _____

5. **We do not maintain an artificial beach on our shoreline.**
   *Artificially placed sand easily erodes over time filling in the lake and smothering habitat.*

   True = 1 False = 0 Answer: _____

6. **We monitor our shoreline for invasive species and remove them when found.**
   *Invasive plants can quickly take over an area reducing the variety and quality of wildlife habitat. When removing invasive plants, proper disposal (including moving aquatic plants away from the shoreline) is required to prevent them from spreading.*

   True = 1 False = 0 Answer: _____

7. **We always call and check with our local conservation authority or watershed organization and municipality before making any major changes to our shoreline or undertaking in-water work.**
   *It is always a good idea to call before undertaking any construction on your shoreline property to ensure it does not require permits or violate rules and regulations in your area.*

   True = 1 False = 0 Answer: _____

**Record your total Group 3 score here** [ ]

## Wetlands

A wetland is low-lying land covered by enough water for all or part of the year to sufficiently support unique aquatic plants and wildlife. In technical terms, it is a highly productive and diverse ecosystem that may consist of marshes, swamps, bogs and fens.

Wetlands add much value to a waterfront property and waterbody by:

- **Helping to filter and clean the water** that we drink and in which we swim;
- **Moderating high and low water levels** by storing water during floods and releasing it during droughts
- **Reducing the risk of flood damage** to property and buildings;
- **Replenishing groundwater** supplies used for drinking water;
- **Buffering** wave action to reduce shoreline erosion;
- **Providing habitat for wildlife and plants** which makes it an interesting place to live near and explore

Wetlands are under increasing threat due to competing land uses (industry, development, agriculture, pollution, climate change and invasive species). In Ontario, over 72% of wetlands are estimated to have been lost since 1800. In eastern Ontario, an estimated 65% to 85% of wetlands have been lost and in Canada, up to 80 acres (30 hectares) of wetlands are lost every day.

To help protect wetlands, the province uses an assessment and scoring tool to identify Provincially Significant Wetlands (PSWs) based on the type and size of the wetland, the diversity and rarity of the plants and animals it supports, and its connection to the watershed. Social and economic considerations are also taken into account. If your property borders a PSW, you cannot fill it or otherwise change its character.

Development within 120 metres of a PSW is also restricted and requires assessment and special permission from your local municipality or Conservation Authority in order to protect these critical areas. Depending on where your property is located, there could also be restrictions on development in and within 30 metres of a wetland that is not classified as a PSW.

**To help to preserve and protect wetlands:**

- Contact your municipality and Conservation Authority before working in or next to a wetland to find out if restrictions apply.

- Make sure to watch for invasive species that inhabit wetlands including Phragmites (Figure 1) and Water Soldier (Figure 2). If you find these species talk to your Conservation Authority or watershed organization about the best ways to deal with it.

- Properties that have Provincially Significant Wetlands (PSWs) are eligible for the Conservation Land Tax Incentive program. Municipal tax reduction could also be available.

**There are four main categories of wetlands:**

**Swamp** – The most common wetland in southern Ontario, it is characterized by slow-moving or standing water. Surfaces are normally water-logged and dominated by flooded shrubs, and trees, such as black ash and red maple.

**Marsh** – A wetland that is periodically or permanently flooded with water. Vegetation typically consists of non-woody plants such as rushes, reeds, grasses, and sedges. Floating and submerged plants such as water lilies and pondweeds can be found in open water marshes.

**Bog** – An area that has almost no water flow, depending on precipitation, and consists of ancient peat covered with some trees and shrubs. They function as a carbon sink, because of accumulated plant material.

**Fen** – Rare in southern Ontario, it is characterized by a high-water table, very slow drainage and consists of peat covered with grass, sedges, shrubs or trees.

*Photo: Cataraqui Region Conservation Authority*

Figure 1: Phragmites

*Photo: Michigan Invasive Species*

Figure 2: Water Soldier

## Group 4 Questions: Wetlands

1. **We do not throw yard waste into or along the edge of any wetland.**

   True = 1 False = 0 Answer: _____

2. **We've learned about the wetlands and enjoy wildlife and bird watching.**

   True = 1 False = 0 Answer: _____

3. **We do not cut standing dead trees from wetlands, burn brush or otherwise interfere with wetland vegetation.**

   True = 1 False = 0 Answer: _____

4. **We consult with our municipality and/or Conservation Authority before planning any work near a wetland.**

   True = 1 False = 0 Answer: _____

**Record your total Group 4 score here** ☐

## Wildlife

The first 10 - 15 metres of shoreline around lakes and rivers – dubbed the 'ribbon of life' – provides food and habitat essential to the survival of many wildlife species. In fact, 90% of all lake life is born, raised and fed in the transition zone between land and water. Many micro-organisms, insects, amphibians, reptiles, birds, mammals and fish depend on the shoreline throughout their development and life cycle.

Many of the actions throughout this workbook benefit wildlife. This includes:

- **Leaving downed, woody debris (e.g. fallen logs and branches)**
- **Retaining cavity trees and creating brush piles,**
- **Planting native trees and shrubs,**
- **Leaving seasonally wet depressions**

Aquatic vegetation and emergent plants also serve an important wildlife habitat function. While it may be tempting to remove them to create beach-like swimming areas, doing so destroys primary habitat for fish and other aquatic species. The best way to access your lake is to clear a small area through the existing vegetation to get to deeper water and leave the rest untouched.

Trees and branches that have fallen into the water or along the shoreline should be left alone. These woody structures, provide important fish and wildlife habitat. They act as cover for small fish and other aquatic life so that they can hide from predators and find shade and cooler water. In addition, any insects that were living on the woody material before it fell are now a source of food for others in the food chain. Fallen logs also create an easy transition from land to water for many frogs and turtles. Turtles can often be seen basking on downed trees to warm themselves up in the sun.

*Photos: Cataraqui Region Conservation Authority*

**Natural Habitat on Your Property**

**Cavity trees** – large trees with hollow cavities. In Ontario, more than 50 species of birds and mammals (including pileated woodpeckers and barred owls) depend on cavity trees for nesting, rearing young, roosting, feeding, storing food, escaping predators, and hibernating.

**Fallen logs** – essential for small mammals, such as moles, certain woodpeckers, toads, and many insects. As logs rot, reptiles and amphibians lay their eggs in the moist wood. Beetles and ants burrow under the bark and lay eggs, which then become a food source for other species.

**Brush piles** – provide habitat for snowshoe hares, cottontail rabbits, grouse and other species. They can be constructed with the cut materials from trail clearing or woodlot management. Pile the brush waist-high on a stump, log or boulder, or along fence rows. For added benefit, train climbing vines, such as Virginia creeper, onto the brush pile.

## Other Wildlife-Related Considerations

**Species at Risk**
At-risk wildlife species can especially benefit from habitat enhancements that you make on your property. Bat populations have undergone substantial declines due to white nose syndrome, a fungal disease that causes them to emerge earlier than normal from their winter hibernation. You can help in their recovery by installing a bat box on your property. Bat boxes provide maternal roosting habitat and will aid in bat recruitment.

**Light Pollution**
Recently, researchers have been drawing awareness to the effects of light pollution. The International Dark Sky Association (IDSA) defines light pollution as the "inappropriate or excessive use of artificial light" (IDSA, 2019). Light pollution can have negative effects on wildlife by disrupting the organisms' natural day and night rhythms.

To learn what you can do to minimize light pollution on your waterfront property please go to the section on Light Pollution starting on page 26.

**Human-Wildlife Interactions**
The spirit and intent of this workbook section is to encourage actions to protect and enhance wildlife habitat. At the same time, it is important to acknowledge certain undesirable human-wildlife interactions and the steps that you can take to avoid them. When animals become habituated or conditioned to our presence, they can become a nuisance, potentially destructive, or, in some circumstances, even aggressive or dangerous. Bears, for instance, can become problematic if you leave attractants on your property. Here's what you can do:

- **Put garbage in a lidded container, store it indoors (e.g. shed, garage, freezer), and only put it out on garbage day;**
- **Only feed birds during the winter months as seed, suet and nectar can attract bears;**
- **Pick all ripe fruit and berries from trees and bushes;**
- **Keep meat and fish out of your compost;**
- **Feed pets indoors and avoid leaving pet food outside (e.g. on your porch); and,**
- **Clean your BBQ thoroughly after each use.**

By adopting practices such as these you can enjoy wildlife at the lake while avoiding unwelcome encounters!

## Group 5 Questions: Wildlife

1. **We leave fallen, downed trees and woody debris along our shoreline.**
   True = 1 False = 0 Answer: _____

2. **We leave native aquatic vegetation and emergent plants along our shoreline (e.g. water lilies, cattails, pickerelweed).**
   True = 1 False = 0 Answer: _____

3. **We have a bat box on our property.**
   *Bat populations are declining because of habitat loss. They forage at night on dry, warm evenings, catching and eating flying insects. Female bats only produce one pup per year, making it hard for bat populations to recover from large losses. By installing a bat box on your property you are providing a safe place for females to raise their young.*

   True = 1 False = 0 Answer: _____

4. **We leave seasonally wet areas (i.e. depressions that fill up with water during spring melt and after heavy rains) on our property.**
   True = 1 False = 0 Answer: _____

5. **We store our garbage in a lidded container indoors (e.g. shed, garage, freezer), only putting it out on the morning of pick up or taking it directly to the waste disposal site.**
   True = 1 False = 0 Answer: _____

6. **We feed birds only in the winter months.**
   True = 1 False = 0 Answer: _____

7. **We do not put meat, including fish in our compost.**
   True = 1 False = 0 Answer: _____

8. **We clean our BBQ, including the grease cup underneath, thoroughly after each use.**
   True = 1 False = 0 Answer: _____

**Record your total Group 5 score here** ☐

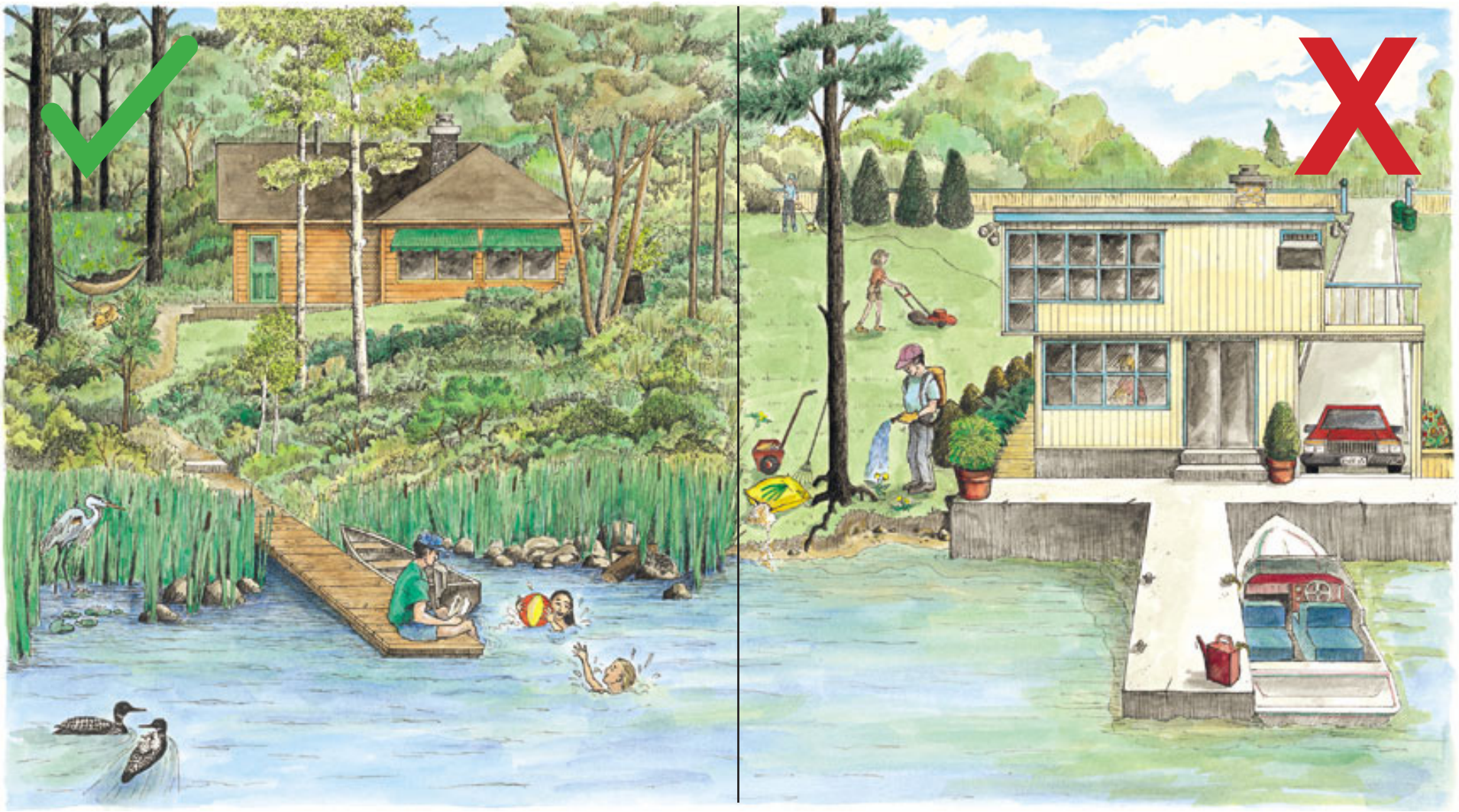


*Photo: Rideau Valley Conservation Authority*

A more natural property supports a healthy ecosystem and the wildlife that depends on it.

## Docks and Boathouses

Docks or boathouses can provide many benefits to the enjoyment of your waterfront property. However, if not designed correctly, they can negatively affect shoreline habitat by:

- **Covering fish spawning areas,**
- **Removing rocks and logs that provide shelter,**
- **Causing erosion from bank disturbance,**
- **Removing vegetation,** and
- **Introducing toxic substances** if improper building materials are used

Note that permanent structures can be susceptible to flood and/or ice damage.

There are ways to minimize these impacts by limiting the number and size of such structures on your property, as well as taking special consideration for the location, design, and materials used in their construction.

**Materials:** Untreated wood such as hemlock or cedar are good choices for docks because they have natural preservatives that protect them from rotting. Treated wood and wood preservatives can contain chemicals that are harmful to fungi and insects and should be used with care. Styrofoam should also be avoided because as it deteriorates, the broken off bits create pollution and an unhealthy snack for fish and other wildlife.

**Location:** The structure should be placed where it will have the least impact on important aquatic habitat, such as fish spawning areas. To minimize loss of natural shoreline area and riparian vegetation, orient the dock away from the shore (Figure 3), rather than extending the dock along the shore (Figure 4). Structures should also be placed well inside of your property lines to avoid impact on your neighbour's enjoyment of their property (check municipal zoning requirements).

For the storage of boats and related accessories, instead of a boathouse right at and/or over the water, consider placing a storage structure away from the shoreline.

Figure 3: Dock oriented away from shore

Figure 4: Dock oriented along the shore

*Illustrations: Fisheries and Oceans Canada, 2005, The Dock Primer*

**Design:** The structure should be designed to limit contact with the lake bottom, allow for the free movement of water, and be only as large as needed for water access. Removable structures are preferred because they are versatile in terms of location as well as eliminating the complication of ice and flooding damage that can come with having a permanent dock.

*Illustrations: Federation of Ontario Cottagers' Associations*

Figure 5: Removable Floating Dock

Figure 6: Removable Pipe Dock

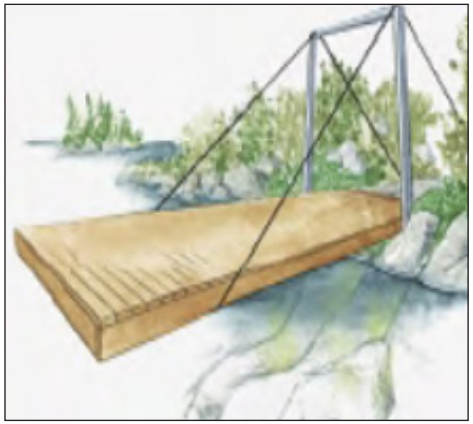


Figure 7: Cantilever Dock

Figure 8: Permanent Post Dock

Figure 9: Open Crib Dock

Floating (Figure 5), pipe (Figure 6) and cantilevered docks (Figure 7) have the lowest overall impact while the level of impact increases for permanent post (Figure 8) and crib docks (Figure 9). For crib structures (Figure 9), minimizing the size of the cribbing, using an open rock-filled design and leaving space of at least 2 metres between the cribs and the shore reduces the impacts to near shore habitats. Solid designs made of concrete piers or abutments, vertical planking, or metal sheeting should be avoided as they cut off the movement of wildlife and increase erosion to the shore and lake bed by altering natural water currents and refracting waves.

*Development projects including decks, boathouses, docks and alterations to watercourses, may require planning approval or a permit. Before starting your project contact your local Conservation Authority or municipality to learn what permits apply to your waterfront property. If your property fronts onto the Rideau Canal or the Trent Severn Waterway please contact Parks Canada.*

## Group 6 Questions: Docks & Boathouses

**1. We have a dock that is:**

Removable = 1 Permanent = 0 Not applicable, we don`t have a dock = 1 Answer: _____

**2. Our dock design is:**

Floating, pipe / post or cantilevered = 2 Open cribs = 1 Solid cribs / piers / walls etc. = 0
Not applicable, we don't have a dock = 1 Answer: _____

**3. Our dock is oriented:**

Away from the shoreline (Figure 3) = 1 Along the shore (Figure 4) = 0
Not applicable, we don't have a dock = 1 Answer: _____

**4. We avoid the use of chemically treated wood products and Styrofoam in and near the water.**

True = 1 False = 0 Answer: _____

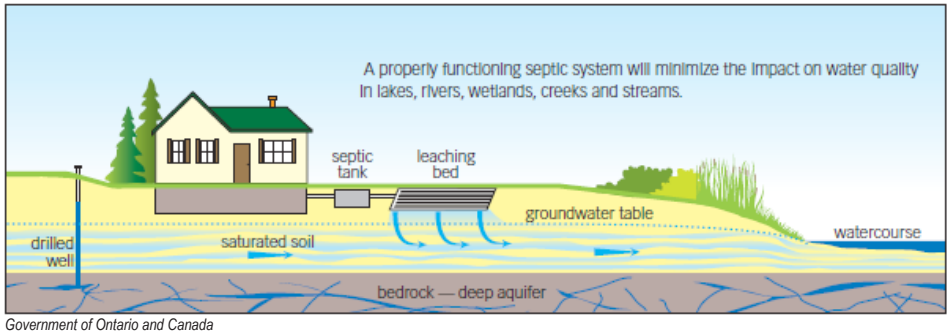
**5. We have a boathouse / boat storage structure:**

On dry land away from the shore = 3 Floating, pipe or post = 2
On open cribs or at the edge of the shoreline = 1 On solid cribs / piers / walls, etc. = 0
Not applicable, we don't have a boathouse or storage structure = 3 Answer: _____

**Record your total Group 6 score here** ☐

## Sewage System Part 1

Properties without municipal sewage treatment rely on private sewage systems to dispose and treat sewage. Properly used and maintained systems pose a lower risk to drinking water supplies (Figure 10). Sewage system components must be located a minimum distance from wells, property lines and other features to reduce the risk of affecting water quality and/or septic system function (Government of Canada and Government of Ontario) (Figure 11). Note that these are only minimum distances; additional separation is better.




*Government of Ontario and Canada*

Figure 10: Septic systems recharge the groundwater

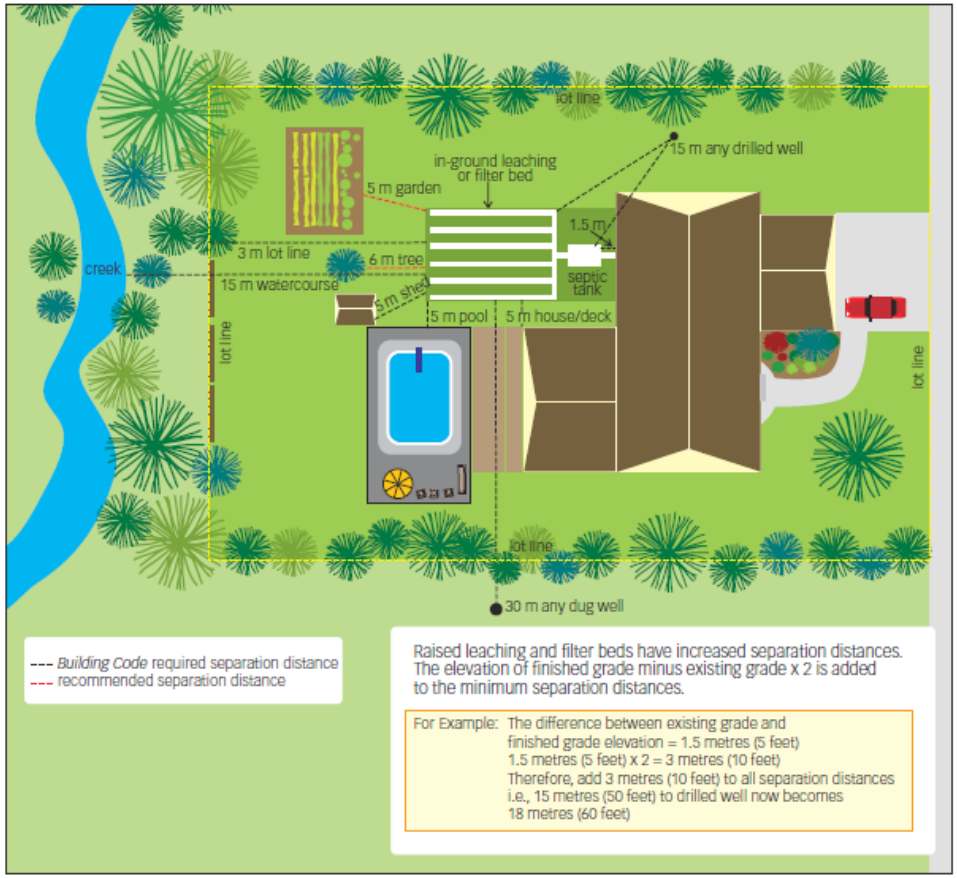
## Main Types of Sewage Systems

**Leaching bed** – a septic tank with a series of trenches and perforated pipes with geotextile, gravel and sand

**Filter media bed** – a septic tank with a bed of special filter media and perforated drain pipes over a common stone layer

**Holding Tank** – no sewage treatment, only storage

**Advanced Treatment** – uses a pre-treatment tank, treatment unit and a smaller distribution field




*Government of Ontario and Canada*

Figure 11: Minimum setbacks for conventional septic system

## Group 7 Questions: Sewage System Part 1

1. **We have an on-site sewage system on our waterfront property:**
   *Most rural homes and businesses have sewage systems to treat both grey (sink and shower) and black (toilet) water.*

   Yes = 1 No, our sewage is treated by a municipal system = 1 Unknown = 0 Answer: _____

2. **We know what type of system we have.**
   *Maintenance requirements are not the same for all types of sewage systems. To reduce the risk of pollution, you must perform specific maintenance requirements and only dispose of suitable waste.*

   True = 1 False = 0 Answer: _____

3. **We have a copy of our sewage system permit.**
   *Your permit will show you the location of the system components and will detail the design capacity. Contact your sewage system authority if you would like a copy or more information.*

   True = 1 False = 0 Answer: _____

4. **The age of our sewage system is:**
   *Most systems are expected to last for at least 15 years. Good maintenance will help to extend the lifespan of your system.*

   Less than 15 years old = 2 16 - 45 years old = 1 More than 45 years old = 0 Answer: _____

5. **Our sewage system on our waterfront property is being used within its design capacity.**
   *Sewage systems have a design capacity. If more people are using it than intended, it can become overwhelmed and fail. Compare the number of bedrooms, sings and showers approved on your permit to what is present now.*

   True = 1 False = 0 Answer: _____

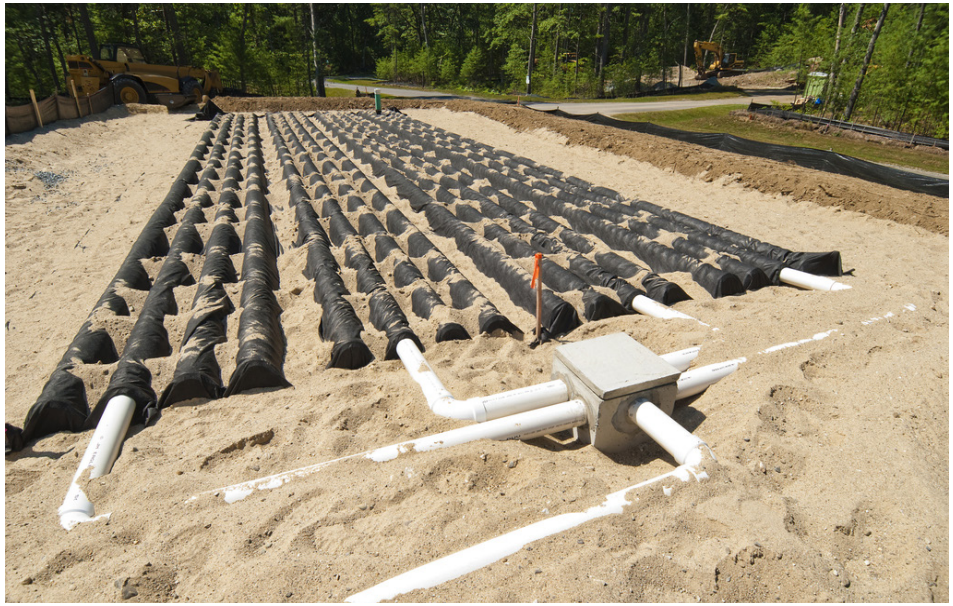
6. **Our sewage system meets the minimum setback from the closest well and/or surface water (i.e. lake, river, stream, wetland).**
   *The setback distance is more than 15 m for drilled wells and surface water (lakes and streams) and more than 30 m for any other wells. It is also important to remember that you cannot control what happens on neighbouring properties. It is good practice to maintain good separation distance to property lines.*

   True = 1 False = 0 Answer: _____

**7. Our sewage system was last inspected:**
*An inspection will identify any problems, so they can be addressed to optimize sewage treatment and reduce pollution.*

Within the last 5 years = 2 More than 5 years ago = 1 Never = 0 Answer: _____

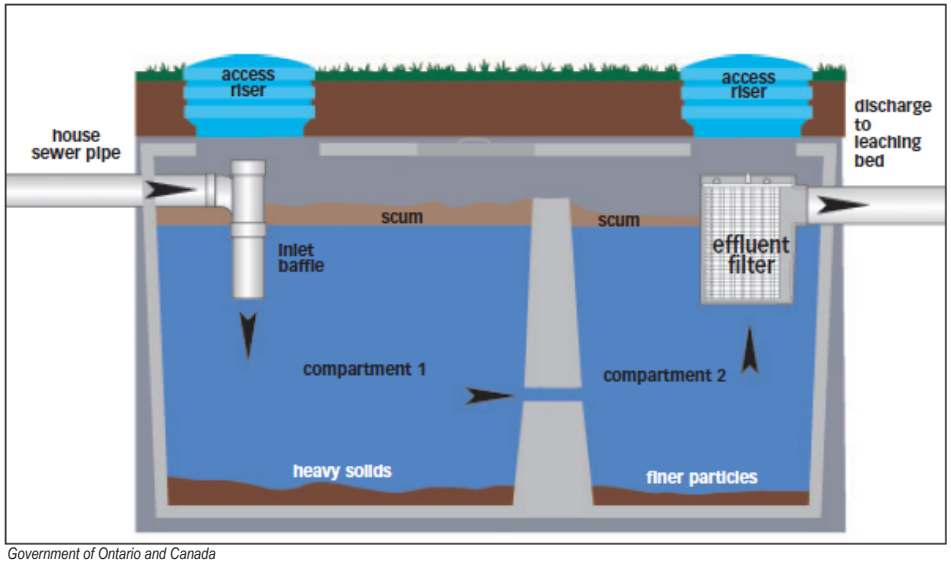
**Record your total Group 7, Part 1 score here** ☐



*Photos: Cataraqui Region Conservation Authority*

*A sewage system under construction*

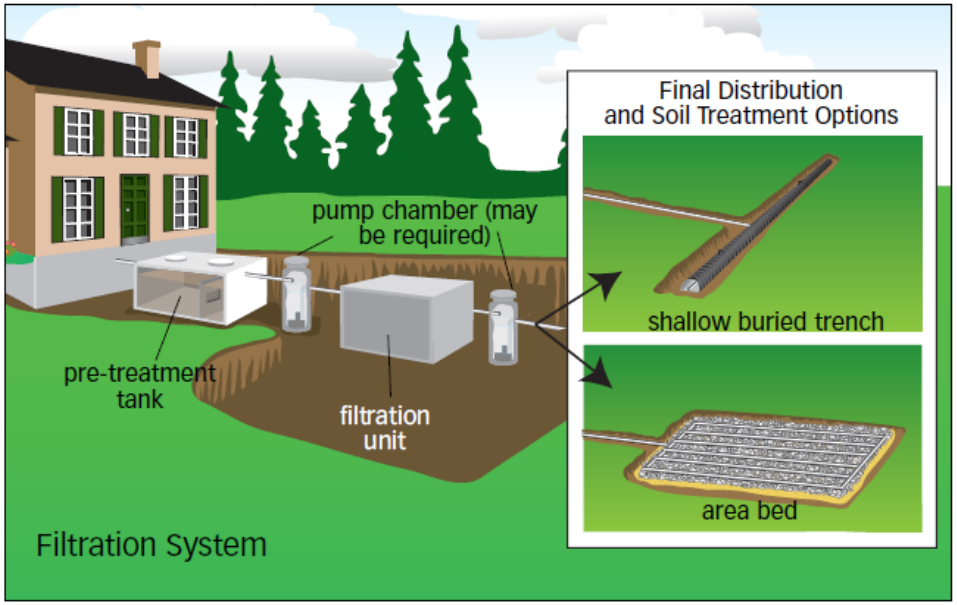
## Sewage Systems Part 2




Government of Ontario and Canada

*Figure 12: Parts of a septic system*

Conventional leaching bed or filter bed systems have two main parts: the septic tank and the leaching bed. Sewage flows to a two-compartment septic tank (Figure 12) where heavier solid materials sink to the bottom and lighter scum (fats, oils and grease) rise to the top. This allows the clearer middle portion of the wastewater to flow through the partition wall into the second compartment of the tank for further settling of particles and separation of scum. Bacteria in the tank breaks down the waste and, if present, an effluent filter catches any larger items that could clog the leaching bed. The now partially treated wastewater flows to the leaching bed where it filters through gravel and sand and soil. Sewage is further treated by physical, chemical and biological properties of the soil (Government of Canada and Government of Ontario).




Government of Ontario and Canada

*Figure 13: Effluent from an advanced treatment unit flows to a shallow buried trench or an area bed.*

Advanced treatment systems (Figure 13) are like conventional treatment systems, but more treatment occurs in a per-treatment tank than in the leaching bed. These systems also require more maintenance and a signed agreement with an authorized service provider for yearly maintenance inspections (Government of Canada and Government of Ontario).

## Group 7 Questions: Sewage System Part 2

1. **The last pump-out of our septic tank or repair of our sewage system was:**
   *Proper sewage system maintenance can reduce the risk of groundwater pollution. This includes having the septic tank pumped out every three to five years.*

   Between 0 and 5 years ago = 2 More than 5 years ago = 1 Never / unknown = 0 Answer: _____

2. **Our sewage system does not have unresolved problems (i.e. back ups, system freezing, slow drains or toilets) nor is there a noticeable "bad" smell in our home or near our leaching bed:**
   *These occurrences are clues that your sewage system many not be functioning properly. A noticeable smell could signal that the sewage system is no longer treating the sewage. There could be a problem with a clogged septic tank or effluent filter or the tank may be damaged. Contact a licensed septic inspector for more information.*

   True = 1 False = 0 Answer: _____

3. **The ground near our sewage system is:**
   *Spongy areas near the leaching bed may be a sign of a clogged septic tank or a failed leaching bed. Contact a licensed sewage system installer to further investigate these issues.* ***Odours and spongy ground could mean a system failure which poses a risk to human health and the environment.***

   Firm with no odours = 2 Seldom wet or spongy with some odours = 1
   Frequently wet or spongy with odours = 0 Answer: _____

4. **Water drainage near our sewage system is:**
   *Water drainage away from your sewage system ensures that decomposition (bacterial breakdown) of sewage is not disrupted and your system is working effectively. Sewage treatment systems are designed to operate in dry locations. Wet areas impede sewage treatment and can wash sewage-related pollution towards drinking water sources.*

   Away from the sewage system = 1 Toward the sewage system = 0 Answer: _____

5. **There is only grass and/or native wildflowers or woodchip cover on or near our sewage system.**
   *Planting grass around your septic system increases evaporation and prevents erosion. Larger trees and shrubs may disrupt the bed with their roots.*

   True = 1 False = 0 Answer: _____

6. **We do not drive or park over our sewage system area.**
   *Excess weight on the leaching bed may cause pipes and other parts to break.*

   True = 1 False = 0 Answer: _____

7. **We do not dispose of cigarette butts, coffee grounds, disposable diapers, facial tissue, or non-biodegradable materials into our sewage system.**
   *Dumping unwanted materials into toilets, sinks, and ultimately the septic bed can clog your system, promoting contaminant transport into the ground and chemicals entering your groundwater source.*

   True = 1 False = 0 Answer: _____

**Record your total Group 7 Part 2 score here** [ ]

# Light Pollution

Making better outdoor lighting choices will protect the natural rhythms of wildlife and plants and prevent light pollution (i.e. the inappropriate or excessive use of artificial light).

### How light pollution impacts the waterfront environment

*Photo: Mississippi Valley Conservation Authority*

Light pollution has a negative impact on lake property owners and visitors. Glare and light trespass can reach great distances to unintended destinations. Many of you have likely sat out at night and noticed the lights at properties across the way. Take a moment to reflect on how that made you feel and consider if light from your property is also trespassing.

All plants and animals have spent thousands of years adapting to the light and dark cycles that are part of a natural day and night rhythm. However, modern artificial lighting has been changing the number of hours in the night that darkness is present in our environment. Scientific studies are showing measurable negative effects on birds, mammals, amphibians, insects, and even plants. The International Dark Sky Association, for example, describes how artificial lights can negatively impact the nocturnal calling and breeding habits of amphibians. Light pollution has also been shown to cause shifts in predator-prey relationships and to disrupt the navigational abilities of migrating birds.

### Four Types of Light Pollution

**Glare** – Excessive brightness that causes visual discomfort. Glare increases difficulty in spotting nighttime hazards. Older eyes are more sensitive to glare.

**Skyglow** – Brightness of the night sky over inhabited areas. Skyglow reduces human and wildlife ability to see the stars.

**Light trespass** – Light falling where it is not intended or needed (such as into bedroom windows, onto neighbouring properties, or into natural environment areas).

**Clutter** – Bright, confusing and excessive groupings of light sources.

### How does light pollution impact safety?

Outdoor lighting is often used to enhance security and the safe use of our properties at night. However, depending on the type of lighting, it can have the opposite effect. For example, when glare shines in our eyes, our pupils constrict, which reduces our night vision abilities and decreases our safety (International Dark Sky Association). The glare can also create harsh shadows that, when combined with our compromised night vision, can make it harder to spot hazards. A property owner may be tempted to make it easier to see these hazards by adding more powerful lights or more light fixtures, but this will increase the amount of light pollution occurring at the property.

**Light colour has an influence**

Blue spectrum light helps humans, animals and plants know it is day-time. Exposure to blue light at night can confuse and negatively impact circadian rhythms in animals and photosynthesis in plants. Warmer orange/red toned lights have a lesser influence and are a better choice for outdoor lighting.

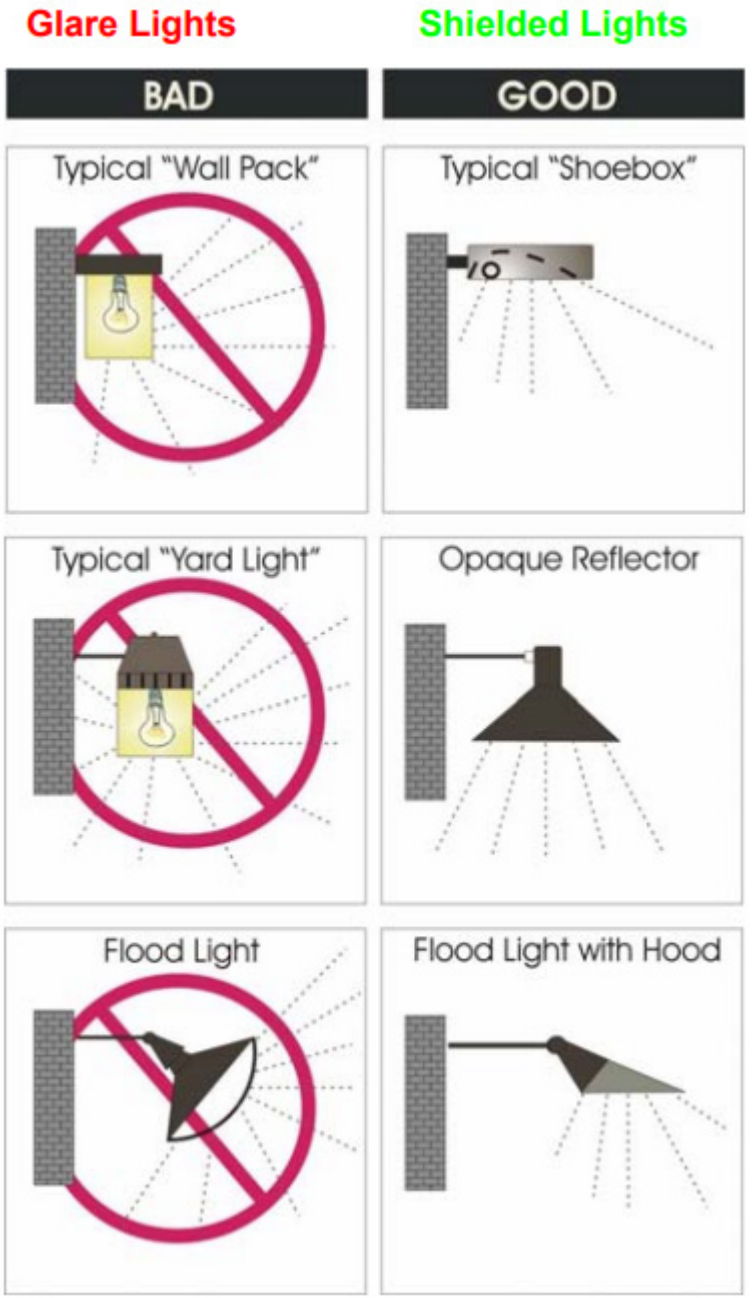
**Some good outdoor lighting alternatives**

It is possible to manage your outdoor lighting to provide darkness for wildlife while also providing useful lighting for navigating your property safely.

- **Use lower wattage bulbs.**
- **Choose shielded lights that are purposely directed at doorways, stairs or other features while minimizing glare and light trespass.**
- **Limit the use of your outdoor lights to when they are needed.**
- **Choose light bulbs that produce a warmer orange colour, rather than the cooler blue white options.**
- **Consider retrofitting existing lights with a nightsaver shield.**

If you would like to experience a night sky with as little light pollution as possible, consider visiting a dark sky preserve.


*Photo: Good Neighbour Lighting, 2017*




*Examples of lights that are unshielded and can produce glare vs lights that are shielded and provide functional light to a dark space. (Good Neighbour Lighting, 2007).*

## Group 8 Questions: Light Pollution

1. **Our exterior lights are used:**
   *Modern artificial lighting has been changing the number of hours in the night that darkness is present in our environment.*

   Only when someone is there = 1 Every night, **even if no one is there** = 0 Answer: _____

2. **We use dark sky friendly lights on our property.**
   *Unshielded lights can produce glare while shielded lights reduce glare and provide functional light to a dark space. Glare and/or harsh shadows from the exterior light(s) make it hard to see your way around the property.*

   True = 1 False = 0 Answer: _____

3. **Our exterior lights are warmer colours (i.e. not blue spectrum lights).**
   *Warmer white / orange bulbs produce less light pollution than the cool white / blue tones.*

   True = 1 False = 0 Answer: _____

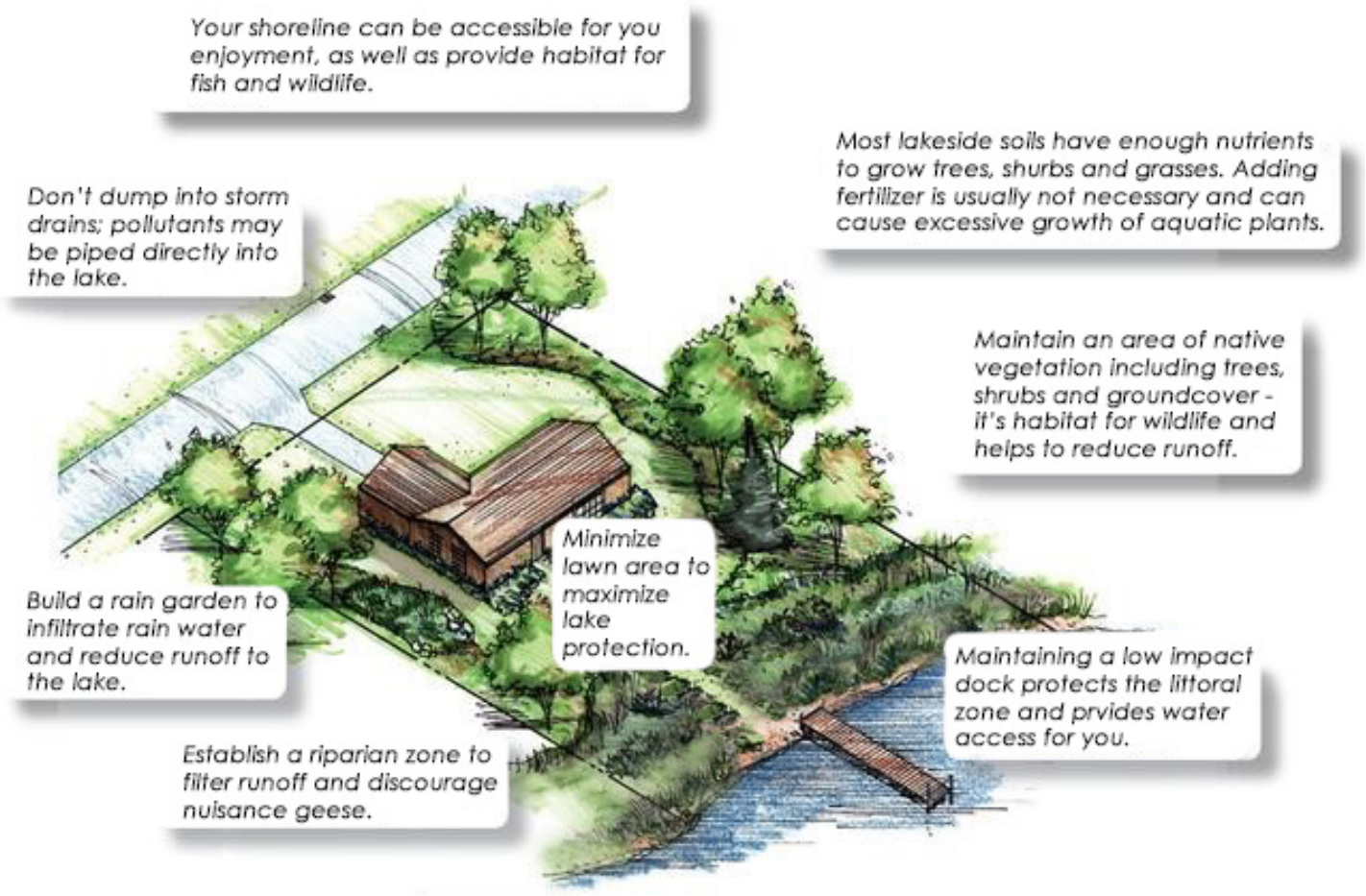
**Record your total Group 8 score here** ☐

## Runoff

After rain or snowmelt, surface water runoff is the remaining water that hasn't soaked into soils. This runoff travels overland into nearby streams and lakes, frequently carrying pollutants such as nutrients and sediments into our freshwater ecosystems. Lakeshore properties that are steeper, with less porous soil or a lot of hard surfaces like roofs, decks and driveways have more runoff.

**What do we do about it?**

To prevent runoff from entering your lake, plant and retain native vegetation in upland areas to allow for rainwater runoff infiltration. Minimize paved and hard surfaces on your property such as driveways and decks. Use public boat launches rather than building your own. Direct the runoff from driveways to areas of infiltration such as lawns or grassed swales. Runoff from roofs can flow into rain barrels, rain gardens or infiltration pits.




*Burnett County Land and Water Conservation Department, 2008*

## Group 9 Questions: Runoff

1. **We use gravel or another porous material instead of pavement on our property for parking and pathways**.

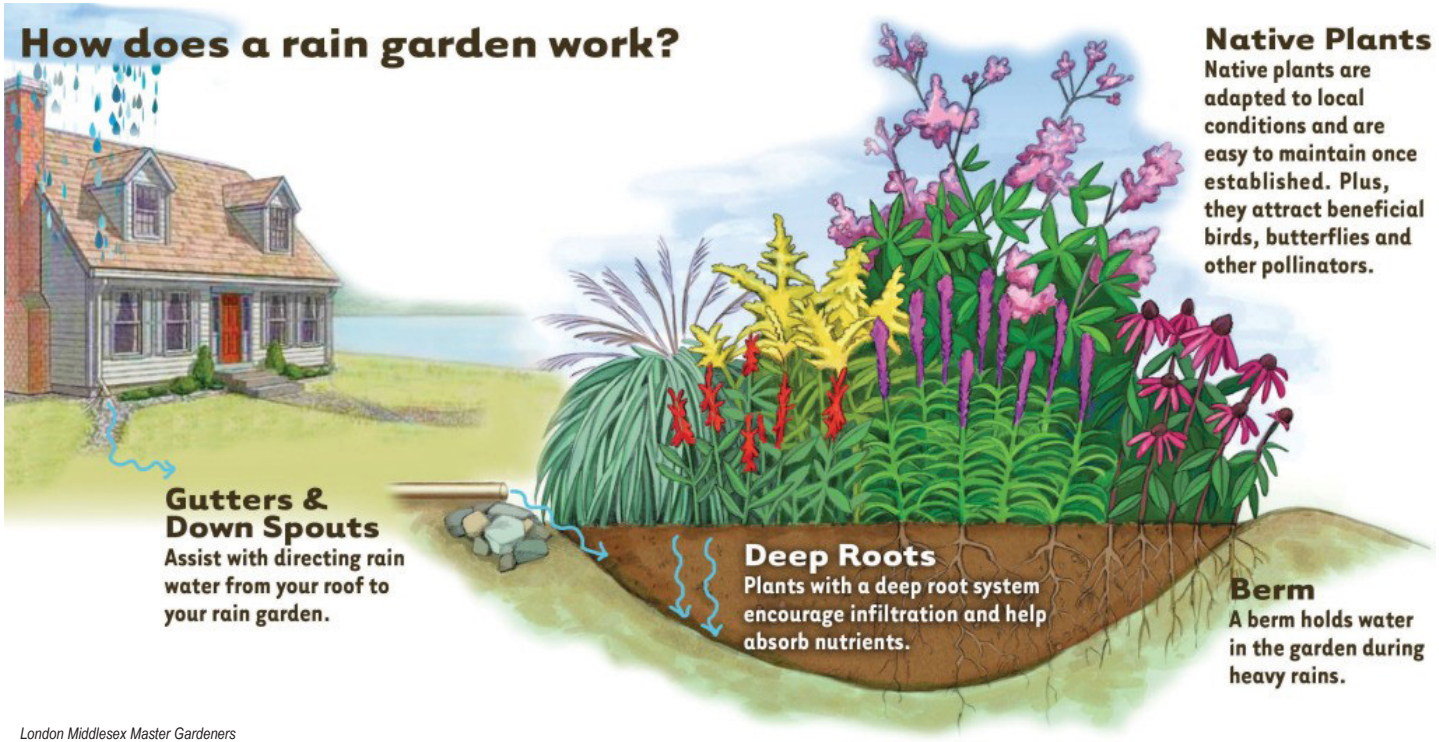
   True = 1 False = 0 Answer: _____

2. **We use a rain barrel, rain garden or direct downspouts into vegetated areas to control runoff from our roof.**

   True = 1 False = 0 Answer: _____

3. **Where possible, we try to direct our runoff into natural areas where it can infiltrate into the soil rather than directly into the lake.**

   True = 1 False = 0 Answer: _____




*London Middlesex Master Gardeners*

4. **Where needed, we have grassed swales (i.e. broad, shallow ditches), infiltration trenches or french drains in place to direct runoff into the ground and away from our buildings.**

   True = 1 False = 0 Answer: _____

5. **We limit hardened surfaces on our property such as decks, pathways and buildings.**

   True = 1 False = 0 Answer: _____

6. **When landscaping our property, we used curved pathways and natural terraces on slopes and incorporated natural areas into upland areas to allow for surface water to infiltrate into the soils.**

   True = 1 False = 0 Not applicable, no pathways / breaks in natural vegetation = 1 Answer: _____

**Record your total Group 9 score here** ☐

## Score Summary

Enter each of the sub-totals from the numbered question groups to see how well your lakeshore property practices are helping to protect your lake.

| Question Group | Total | Score | Ranking | Interpretation |
|---|---|---|---|---|
| 1: Lawns & Gardens | | **7 - 10** | Excellent | Your practices are being managed well and are protective of your lake. Be proud of your dedication and showcase your efforts to visitors. |
| | | **4 - 6** | Moderate | There is some room for improvement and some practices are negatively affecting your lake. |
| | | **0 - 3** | Needs Improvement | Prioritize some changes to protect you lake. |
| 2: Recreation | | **5 - 8** | Excellent | You are doing an excellent job protecting your lake while enjoying recreational opportunities. |
| | | **3 - 4** | Moderate | While you are generally mindful of the impact of your fun on the environment, there are some areas for improvement. See what you can do to maximize lake protection. |
| | | **0 - 2** | Needs Improvement | Wildlife, water quality and fellow lake users would benefit from changes to your recreational practices. |
| 3: Shorelines | | **6 - 9** | Excellent | Good work, you recognize that a natural shoreline is vitally important to your lake and have taken steps to ensure your impact is minimized. |
| | | **3 - 5** | Moderate | While your shoreline area is somewhat naturalized, there is room for improvement. Prioritize actions toward enhancing natural features (e.g. removing invasive plants, mowing less) and stopping practices that are harmful. |
| | | **0 - 2** | Needs Improvement | Your shoreline area should be in a more natural state. Identify some things you can do both in the short-term and the long-term to reestablish the natural ecosystem. |
| 4: Wetlands | | **5** | Excellent | You protect wetlands. Enjoy and promote these critical natural features. |
| | | **3 - 4** | Moderate | Look for ways to reduce human influence on the wetlands on or near your property. |
| | | **0 - 2** | Needs Improvement | Wetlands on your property are being impaired. Make changes to your practices to better care for the wetlands that are needed for good lake health. |

| Question Group | Total | Score | Ranking | Interpretation |
|---|---|---|---|---|
| 5: Wildlife | | 7 - 10 | Excellent | You are actively helping wildlife by protecting and enhancing habitat while minimizing negative interactions. |
| | | 4 - 6 | Moderate | See what else you can do to improve habitat and reduce the risk of fostering nuisance animals. |
| | | 0 - 3 | Needs Improvement | Wildlife on your property is at risk from loss of habitat and/or developing a negative relationship with humans (i.e. feeding on human food). |
| 6: Docks & Boathouses | | 5 - 8 | Excellent | You dock and/or boathouse is lake-friendly. Consider talking with your neighbours about the choices you've made. |
| | | 3 - 4 | Moderate | The shoreline and littoral zone are still providing important lake protection functions. Some changes such as reorienting the dock to minimize direct contact with the shoreline would be an improvement. |
| | | 0 - 2 | Needs Improvement | The 'ribbon of life' at your property has been disrupted, reducing habitat and presenting other problems like erosion and increasing runoff. Make one change and go from there. |
| 7: Sewage System (total from Part 1 & 2) | | 6 - 9 | Excellent | Your sewage system is in good condition. Continue proper use and maintenance. |
| | | 3 - 5 | Moderate | Your sewage system could be improved and may pose a risk to the health of your lake. Prioritize actions to make improvements. |
| | | 0 - 2 | Needs Improvement | Your sewage system poses a risk to your lake. |
| 8: Light Pollution | | 5 | Excellent | The choices you've made are benefiting wildlife, you and your neighbours. |
| | | 3 - 4 | Moderate | Your lighting could be improved and priority actions should be identified. |
| | | 0 - 2 | Needs Improvement | Lighting on your lakeshore property is disrupting natural rhythms and infringing on your neighbours' enjoyment of the night. |
| 9: Runoff | | 4 - 6 | Excellent | Your property is designed well to support infiltration and reduce erosion. |
| | | 2 - 3 | Moderate | See if there is anything else you can do to encourage infiltration and interrupt direct flow paths to the lake. |
| | | 0 - 1 | Needs Improvement | Making changes will better protect the lake and your property. |

**Thank you for dedication to lake protection and taking the time to complete this workbook.**

## Part 3: Record of Achievements and Planned Improvements

Use this space to track goals and successes in protecting you lake through improvements mare to your shoreline property.

## Part 4: List of References and Sources of Information


**Lawn and Garden:**
Fisheries and Oceans Canada, 2008, The Shore Primer - http://www.dfo-mpo.gc.ca/Library/337927.pdf
Otty Lake Association, 2010, Otty Lake Shoreline Handbook - https://www.ottylakeassociation.ca/documents/otty_lake_shoreline_handbook.pdf
Ontario Invasive Plant Council, 2016, Species Grow Me Instead - https://www.ontarioinvasiveplants.ca/resources/grow-me-instead/

**Wildlife:**
Watersheds Canada, 2019, Love Your Lake - http://loveyourlake.ca/
Government of Ontario, 2019, Bear Wise - https://www.ontario.ca/page/prevent-bear-encounters-bear-wise

**Wetlands:**
Government of Ontario, 2019, Conservation Land Tax Incentive Program - https://www.ontario.ca/page/conservation-land-tax-incentive-program
Government of Ontario, 2019, Wetland Conservation - https://www.ontario.ca/page/wetland-conservation

**Docks and Boathouses:**
Federation of Ontario Cottagers Associations, 2015, A Shoreline Owners Guide to Healthy Waterfronts, revised edition.
https://foca.on.ca/shoreline-owners-guide-to-healthy-waterfronts/
Fisheries and Oceans Canada, 2005, The Dock Primer - http://www.dfo-mpo.gc.ca/Library/337921.pdf
Government of Ontario, Crown Land Work Permits - https://www.ontario.ca/page/crown-land-work-permits

**Recreation:**
Government of Ontario, Ontario Fishing Regulations Summary, 2019 - https://www.ontario.ca/document/ontario-fishing-regulations-summary
Fisheries Management Zone Regulations - https://www.ontario.ca/page/fisheries-management-zone-regulations
Information on fishing limits, size restrictions and catch and release, 2019
https://www.ontario.ca/page/fishing-limits-size-restrictions-and-catch-and-release

**Septic Systems:**
Ontario Ministry of Agriculture, Food and Rural Affairs, (nd), Septic Smart - http://www.omafra.gov.on.ca/english/environment/facts/sep_smart.htm
Kipp, S. & Callaway. 2003. On the Living Edge: Your Handbook for Waterfront Living.

**Light Pollution**
International Dark Sky Association - https://www.darksky.org/
Neighbour lighting in Mississippi Mills - https://www.mississippimills.ca/en/townhall/resources/GoodNeighbourLighting.pdf
Dark Sky preserve near Ardoch, Ontario - http://www.northfrontenac.ca/dark-sky-preserve.html

**Other Sources of Information:**

Cataraqui Region Conservation Authority: *https://crca.ca/*
Mississippi Valley Conservation Authority: *http://mvc.on.ca/*
Rideau Valley Conservation Authority: *https://www.rvca.ca/*
Ducks Unlimited Canada: *http://www.ducks.ca/*
Lanark County: *http://www.lanarkcounty.ca/*
United Counties of Leeds Grenville: *https://www.leedsgrenville.com*
Ministry of Natural Resources & Forestry: *https://www.ontario.ca/page/invasive-species-ontario*
Ontario Federation of Anglers & Hunters (Invasive Species): *https://www.ofah.org/*
Watersheds Canada: *https://watersheds.ca/*
Your Local Municipality