



Landowner Guide to Protecting Water Quality in the Kawarthas

The tips provided in this handbook are intended to help you identify sources of nutrients, such as phosphorus and nitrogen, while providing information on best management practices for your property. At the same time, we believe that these practices have the potential to improve your property value, enhance personal enjoyment of our urban, shoreline, and rural environments, and contribute to healthier lifestyles.



**KAWARTHA
CONSERVATION**

Discover • Protect • Restore



How to use this guide

This guide uses a seasonal approach to the implementation of best management practices (BMPs). You will find information throughout the booklet to help you reduce your impact on local lakes and rivers. Good water quality and a healthy, sustainable environment are a result of responsible home and property management choices. Evaluate the current activities on your property as you read through the guide. You will find easy ways to make a positive change to your land use practices. Other options are presented that may be more challenging, but your actions will have multiple benefits, including saving you additional effort, time, and money, and protecting the long-term quality of water.

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The Value of our environment

The natural world is too often taken for granted and undervalued. A healthy, resilient natural environment is the basis of sustained economic growth, flourishing urban and rural communities, and the personal well-being of its residents and visitors.

When properly managed, ecosystems provide us with vital goods, such as agricultural products and fisheries, life sustaining services, such as pollination and water purification, and life-enriching contributions that include beautiful surroundings and healthy people. Often, the important ecosystem services are only appreciated after they stop being productive or impact our ability to use our lakes and waterways!



Clean water and a healthy environment are critical for our own health, and the sustainability of our local economy. It is the foundation of tourism, agriculture, recreational opportunities and the quality of life in the Kawartha region.

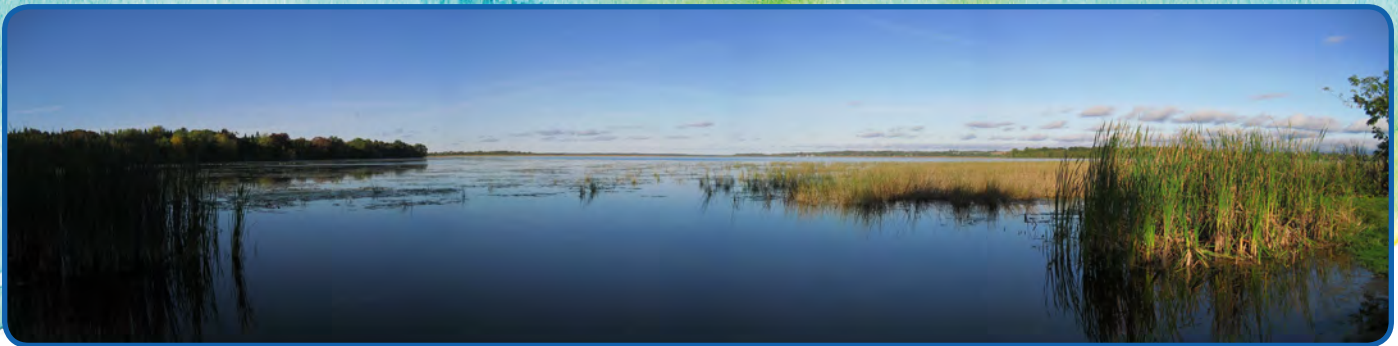


Waterfront properties in the Kawartha region represent hundreds of millions of dollars in real estate, with tourists as well as seasonal and permanent residents stimulating significant economic activity. A healthy Kawartha watershed supports:

- One of the most significant fishing destinations in Ontario
- Marinas and many other businesses that depend on healthy lakes
- A strong and vital agricultural sector
- Waterfront land values on hundreds of kilometres of shoreline
- Four-season recreational opportunities
- Wildlife and their habitats
- A major source of drinking water.



This handbook is supported by research undertaken by Kawartha Conservation lake management planning. Our studies are showing that relatively small urban areas and lakeside communities are responsible for a large percentage of the nutrients impacting our lakes, rivers, and streams.



McLarens Creek Wetland in Ken Reid Conservation Area, Sturgeon Lake. Wetlands filter and clean water, prevent flooding, and provide vital wildlife habitat.

Nutrients

Nutrients, such as phosphorus and nitrogen, contribute to eutrophication in water bodies. Eutrophication is a process of increased productivity of a lake as it ages. This process can be greatly accelerated by human influence and is then termed 'cultural eutrophication.' In effect, our actions can cause lakes to get old quickly. It's important that we reduce our impact, so that we can extend the life of our lakes.

What happens in human-influenced eutrophic lakes?

- Increased amounts of algae
- Increased growth of aquatic plants and weeds
- More fish kills (due to less oxygen in the water)
- Bad colour, smell, and appearance of water.



Excess aquatic plants can take most of the oxygen from the water through respiration and decomposition. This creates a low-oxygen environment which can lead to the death of fish and other aquatic wildlife.

Where do the nutrients in our lakes come from?

Residential and urban runoff	Fertilizers, pet waste, and organic material picked up by rain and snow melt that enters ditches and storm drains, or flows directly into the lake
Soil erosion	Soils contain nutrients and cover up important fish spawning sites
Agricultural runoff	Livestock waste, fertilizers and soil picked up by rainwater runoff, and outdated ploughing methods instead of recommended tillage practices
Rural road runoff	Road, ditch, and bridge maintenance and erosion during construction
Feces from birds	Canada geese, ducks (especially large groups which gather to be fed by people), and other wildlife
Atmospheric deposition	Nutrients in rain and dust that fall from the sky
Septic systems	Effluent that seeps through the ground
Sewage treatment plants	Treated effluent released into lakes and rivers

Spring

We can protect water quality, and reduce our impact on the environment by how we care for our home and property. Trees, shrubs, and other plants help clean the air we breathe and filter the water we drink. Maintaining your yard and property with water quality in mind can contribute to a healthier and more livable community for you and your family.

Your lawn

While grass-free landscaping is becoming more popular, people may still maintain grassy areas for various activities, while others just want that perfect, green lawn. The basic requirement for a healthy lawn is good soil. There are excellent natural solutions you can use to improve your soil.

Let it grow. Longer grass (6 cm to 8 cm in length) will contribute to a healthier lawn by absorbing more water and nutrients, leading to improved root and soil structure.

Let your lawn breathe! Aeration creates small holes, loosens the soil, and removes thatch (dead grass) to allow water, nutrients, and oxygen reach the root system. Try wearing spiked golf shoes while pushing your mower. This will help ensure a lush, thick, green lawn that can out-compete most weeds.

Over-seeding. The thicker the grass, the less chance the weeds will have to survive. Use grass species that are suitable to your growing area. Species such as rye and fescue grass are native and drought tolerant. They are also more pest-resistant, hardy, and develop strong root systems that help reduce erosion.



Apply compost to your lawn. A thin layer of compost (or soil containing compost) applied each spring will contribute to a healthy lawn by nourishing the grass and increasing the organic matter in the soil.

Reduce foot traffic during wet periods. Compacted soils decrease the ability of roots to grow. Consider foot paths or stepping stones in high traffic areas.

The thicker the grass, the less chance weeds will have to survive.

If you fertilize...fertilize responsibly

Nitrogen is the only nutrient which may need to be applied each year. Phosphorus and potassium can remain in the soil for years. Over-applying fertilizer translates to a waste of personal effort, loss of money, minimal effect on your grass, potential damage to lake and river ecosystems, and an overall negative effect on the watershed.

If you feel that fertilizing is necessary, please minimize the amount you use:

- Determine what nutrients are needed and how much by getting a soil test.
- Be accurate with your applications – fertilizer particles that end up on the sidewalk or other hardened surfaces will find their way to the storm drain, and then into our lakes and rivers.

The Ontario Ministry of Agriculture, Food and Rural Affairs offer a list of Accredited Soil Testing Laboratories in Ontario. See <http://www.omafra.gov.on.ca/english/crops/resource/soillabs.htm> or call 1.877.424.1300.



*Choose Zero
Phosphorus
Fertilizer*

The 3 main nutrients required by lawns

Nitrogen (N)	Phosphorus (P)	Potassium (K)
Promotes green colour	Supports root development	Fights drought
Encourages growth	Improves longevity	Ensures thickness

Using natural pest solutions

If you have a pest problem, avoid releasing harmful chemicals by using these alternatives.

Diatomaceous earth is a dust that contains microscopic, razor-like edges that create an obstacle for insects. This type of pest control works well on insects such as aphids, earwigs, and worms.

Deter snails by surrounding your plants with coffee grounds, crushed egg shells, sawdust, or rocks. The rough edges of these materials make it uncomfortable for them to get by.

Round up slugs with beer. Bury a glass jar at the same level as the ground. Fill the jar with dark beer almost to the top to trap the slugs. Slugs are attracted to the yeast contained in the beer.

Research! Determine which pest you are dealing with and find the appropriate natural treatment.

What about compost?

Compost is considered a soil amendment, not a fertilizer. It contains limited nutrients. Organic matter will improve the drainage and aeration of clay soil, and help sandy soil hold water and nutrients. Applying compost will improve the condition of your soil, and ideally eliminate the need for any fertilizer product. For more on composting, see page 16.

Your garden

Mulching

Mulch can play an important part in establishing a water-efficient garden. It is best done in the late spring, shortly after the soil warms. It will give your plants enough time to sprout and allow you to easily work around them.

Tips

- Apply the mulch evenly. Avoid direct contact with the stems of plants and the trunks of trees to allow air flow to the base of the plant.
- Organic mulches include any material of natural origin that decomposes naturally, such as bark chips, grass clippings, straw, leaves, compost, rice hulls, or saw dust.



Hardwood mulch

Why mulching?

- Organic mulches decompose over time and increase the health of your soil, saving you time and money.
- Mulch reduces water loss due to evaporation by up to 70 percent.
- Mulch blocks out the sunlight that certain weed seeds need to germinate. If a weed does sprout, it is much easier to remove from the mulch than the soil.
- Mulch works to moderate the temperature in the soil, and reduces the extremes to which plants are exposed. Plants prefer a steady temperature in order to maintain vigour and maximize growth.



Mulch can inhibit weed germination and growth.



A soaker hose slowly releases water into the soil.

Watering your garden

Soaker Hose - Made from recycled car and truck tires, a soaker hose is round, like a garden hose, but very porous. When it is filled with water, it seeps from small holes, allowing water to soak slowly into the soil around plants. Consider attaching this hose to your rain barrel for effortless and effective watering.

Drip Irrigation - Provides water at exact intervals. Plants next to the nozzles get water, while nearby weeds that might compete for the water do not.

Attracting pollinators

Birds, bees, butterflies, and other native species play a vital role in both our food chain and in nature. By constantly feeding and moving, they are transferring pollen between plants. This is essential to the survival of many plants, including our food sources. Of the foods we consume, one in three requires pollination.

Bees and other pollinator populations face many threats that are contributing to their decline. These threats include parasitic mites, bacteria, pesticides, and a loss of wild space (habitat). It is important to provide a variety of shapes, colours, and flowering periods within the urban garden to offer food and shelter for this important group of species.



Native willows are an important food source for pollinators.

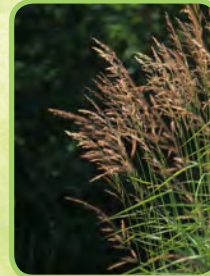
Native grasses, perennials, shrubs, and trees are attractive, low maintenance, and effective natural filters.

Grasses

- Big Bluestem (*Andropogon gerardii*)
- Bottlebrush Grass (*Elymus hystrix*)
- Canada Bluejoint (*Calamagrostis canadensis*)
- Canada Wild Rye (*Elymus canadensis*)
- Prairie Cord Grass (*Spartina pectinata*)
- Indian Grass (*Sorghastrum nutans*)
- Switch Grass (*Panicum virgatum*)



Indiangrass



Bluejoint



Big Bluestem

Native Perennials for Sunny Areas

- Wild Bergamot (*Monarda fistulosa*)
- Black-eyed Susan (*Rudbeckia hirta*)
- Butterfly Milkweed (*Asclepias tuberosa*)
- Cardinal Flower (*Lobelia cardinalis*)
- Gray-headed Coneflower (*Ratibida pinnata*)
- Joe Pye Weed (*Eupatorium maculatum*)
- New England Aster (*Aster novae-angliae*)
- Spiked Blazing Star (*Liatris spicata*)

Why choose native grasses, shrubs, and flowers?

Most lawns in the Kawartha region are planted with non-native turf grasses like Kentucky blue grass. The short roots of turf grasses do not absorb and filter water effectively. This contributes to increased levels of polluted storm water runoff that enters rivers, lakes, and streams.

Native Perennials for Shady Areas

- Great Lobelia (*Lobelia siphilitica* L.)
- Large-leaved Aster (*Eurybia macrophylla*)
- Ostrich Fern (*Matteuccia struthiopteris*)
- Trout Lily (*Erythronium americanum*)
- Wild Columbine (*Aquilegia canadensis*)
- Woodland Sunflower (*Helianthus divaricatus*)

Flowering Shrubs and Trees

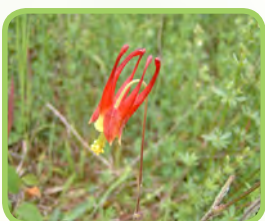
- Bebb's Willow (*Salix bebbiana*)
- Nannyberry (*Viburnum lentago*)
- New Jersey tea (*Ceanothus americanus*)
- Red Maple (*Acer rubrum*)
- Red osier Dogwood (*Cornus sericea*)
- Sage-leaved willow (*Salix candida*)
- Silver Maple (*Acer saccharinum*)
- Smooth Serviceberry (*Amelanchier laevis*)



Black-eyed Susan



Nannyberry



Wild columbine



Joe Pye Weed



Trout Lily



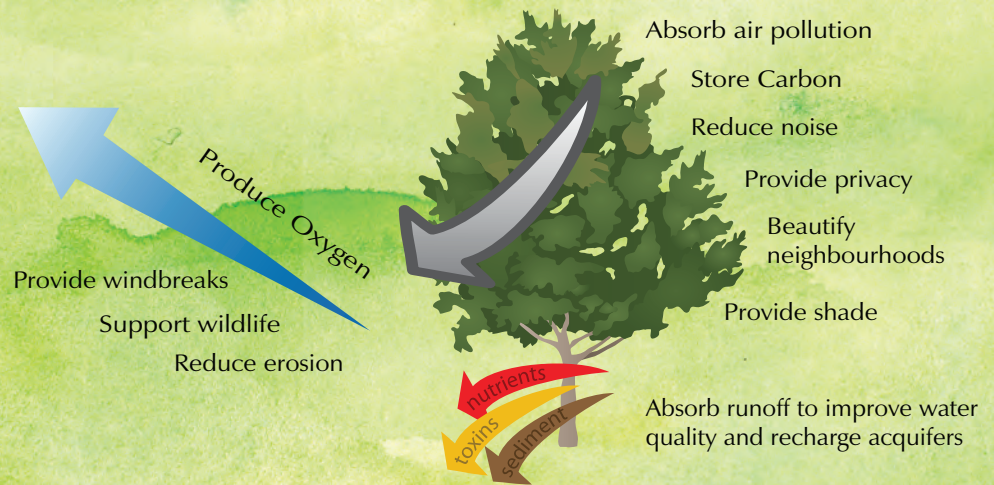
Red-osier Dogwood

The urban forest

The cool, wet weather of spring combined with moist soils are the ideal conditions for planting native trees and shrubs.

The trees you own and care for provide important ecological services for you and your community. You can help increase the health and livability of your neighbourhood by planting native trees on your property.

Why are Trees Valuable?



Did you know?

- A 10 metre tall tree, properly spaced, reduces annual heating and cooling costs of a typical home from 8 to 12 percent.
- A mature tree canopy reduces air temperatures by about 2 to 4 percent, moderating the internal temperatures of nearby buildings and cooling the surrounding air.
- The canopy of a street tree absorbs rain, reducing the amount of water that will fall on paved or hard surfaces. This helps minimize the amount of runoff entering our lakes and rivers.
- Shrubs and trees also provide habitat, shade, and promote rainwater absorption.
- Planting trees on your property is a simple but effective way to contribute to the health of our watershed. The type of tree is important, too. Native trees are the best choice because they are adapted to our local climate and perform well with minimal care, while providing essential life-giving services.



Valued for its syrup, wood, and beautiful fall colours, Sugar maple is one of the most important trees in Canada.



Mature urban trees help regulate temperatures and reduce the impact of rainfall events.

Staghorn Sumac seeds and fruits are eaten by many species of game birds, songbirds, and mammals.



Native Trees in the Kawartha Region

- | | | |
|-------------------------|---------------------------------|-----------------|
| • American mountain-ash | (<i>Sorbus Americana</i>) | 8 to 12 metres |
| • Bur oak | (<i>Quercus macrocarpa</i>) | Up to 10 metres |
| • Cockspur hawthorn | (<i>Crataegus crus-galli</i>) | Up to 8 metres |
| • Hop-hornbeam | (<i>Ostrya virginiana</i>) | 5 to 2 metres |
| • Sugar maple | (<i>Acer saccharum</i>) | 20 to 35 metres |
| • White spruce | (<i>Picea glauca</i>) | Up to 30 metres |
| • White birch | (<i>Betula papyrifera</i>) | Up to 25 metres |

Native Shrubs in the Kawartha Region

- | | | |
|------------------|--------------------------------|---------------|
| • Beaked hazel | (<i>Corylus cornuta</i>) | 3 to 4 metres |
| • Chokecherry | (<i>Prunus virginiana</i>) | 2 to 3 metres |
| • Elderberry | (<i>Sambucus canadensis</i>) | 3 to 4 metres |
| • Meadowsweet | (<i>Spiraea alba</i>) | 1 to 2 metres |
| • Speckled alder | (<i>Alnus incana</i>) | 3 to 4 metres |
| • Staghorn Sumac | (<i>Rhus typhina</i>) | 3 to 4 metres |

Runoff

Creating a natural filter

Plants within 3 metres or more of any lake, stream, or ditch can help stabilize soil, absorb excess water and sediments, and use up some of the nutrients. One of the most basic methods of managing runoff beside a small waterway is to simply stop cutting the grass along either side. Even uncut grass acts as a 'natural filter.'

Unprotected shoreline



Protected shoreline



To increase the effectiveness of the filter, use native grasses, herbaceous, and/or woody vegetation with large root systems. Deep roots will help stabilize the bank, reducing potential ice damage and erosion, which can also impact water quality and wildlife habitat. Native plants increase biodiversity (butterflies, dragonflies, frogs, mink, and songbirds) and help cool surface waters by creating some shade. You will be contributing to better fishing opportunities, cleaner water for swimming, and improved water quality.

Creating a rain garden



Roofs, driveways, patios, and other impermeable surfaces force a large amount of water to quickly run off into storm drains, ditches, and waterways. A rain garden is a planted depression in the yard that absorbs rain water from hard surfaces. It contains native grasses, wildflowers, and shrubs that thrive in wet conditions.

Rain gardens can reduce the amount of water which flows over the land and into storm drains by as much as 30 percent.

Tips

- Rain gardens are most effective when curvy in shape and with the longest length running across the slope of the land.
- Start by digging a 4 to 8 inch depression with gradually sloping sides as large in circumference as you like. A good rule of thumb is to size your rain garden at 30 percent of the area of the roof from which it will be collecting water.
- Use the soil you removed for the needed depth of your garden to create a small berm (ridge) around the border of the rain garden to help hold large quantities of runoff.
- A 4" to 8" depth will allow water to be captured, but will commonly remain dry between rain events. If you have a large volume of run off to be captured, dig up to 18" in depth.



Suggested species for your rain garden

- Bayberry*
- Black Chokeberry*
- Blue Flag Iris*
- Blue Vervain*
- Buttonbush*
- Canada Bluejoint*
- Fireweed*
- Porcupine sedge*
- Swamp Milkweed*
- Turtlehead*

Directing runoff

Controlling the flow of rainwater across your property can help keep it from reaching storm drains, and allow it to percolate into the ground. Directing rainwater to the middle of your lawn will also keep it away from the foundation of your house. Downspouts that are connected to storm water or municipal waste water systems should be disconnected and redirected into the yard to take the pressure off municipal infrastructure.

Splash Blocks

Available in multiple colours, shapes and sizes, splash blocks disperse rainwater over a wider area. Rainwater pouring out of your downspout can erode soil and cause moisture problems around your foundation. To avoid those headaches, splash blocks positioned beneath your downspouts can direct and distribute rainwater.



Splash block



Downspout extension

Extensions

A downspout extension is a handy accessory that helps your downspout and gutters empty water away from your home and your foundation. These extensions are flexible for easy attachment and help to prevent soil erosion. Most are designed for an unobtrusive look and can be covered with mulch, straw, or stones for a subtle appearance.

Automatic Downspout Extenders

These extenders automatically roll out during rain events to disperse water from your gutters, and then rewind on a spool when the rain stops. Moving rainwater away from your home can protect your foundation and prevent erosion.



Automatic downspout extender

Managing pet waste

When the snow melts or when it rains, pet waste can be washed through storm drains and ditches into local waterways. This waste contains bacteria, potential pathogens, and nutrients. This can reduce opportunities for swimming, fishing, and other lake activities, while contributing to the growth of aquatic plants and blue-green algae. While it may not seem like a big deal if your dog 'contributes' some waste to the neighbourhood environment, consider how many homes have a pet.

A conservative estimate is that 1/3 of all households in Canada have a dog that produces an average of 1/2 lb of waste per day. For example, if a town of 20,000 has 8,000 households and approximately 1/3 (2,500) are dog owners: 2,500 dogs x 1/2 lb daily = 1,250 lbs or 0.56 tonnes of dog waste per day!



Tips for dog and pet owners

- Pick up pet waste from your yard on a daily basis.
- Carry disposable bags while walking your dog to pick up and dispose of waste in the garbage.
- Do not add pet waste to your regular compost pile. Although pet waste composters and digesters may be something you would like to consider using on your property, the materials from pet waste composters are not considered appropriate for use in food gardens.

Collecting rain water for a sunny day

Rain barrels help reduce the flow of storm runoff. When it rains, runoff picks up soil, fertilizer, oil, pesticides, and other contaminants from hard surfaces and landscapes. By using a rain barrel, you will have a ready supply of water for your garden and lawn, save money on your water or utility bill, and reduce large volumes of runoff from entering storm drains and local water bodies.

Rain barrels are now available in different shapes (squares, pyramids) and colours (red, blue, terra-cotta), and can be manufactured to fit any landscape. Using a rain barrel can save you a significant amount of money.

For each inch of rain that falls on 500 square feet (45 m²) of roof, you can collect about 300 gallons (1,135 L) of water.

Tips for selecting and maintaining a rain barrel

- Select a barrel that can hold most of the rain that comes off your roof. In some cases, you may want to install one for each downspout or connect more than one together. If the barrel is elevated, a hose can use gravity to transfer water to your garden and lawn.
- Ensure that your rain barrel has a cover and a tight connection where water enters the barrel to prevent mosquito breeding and to limit the amount of debris which will enter the barrel. Most manufactured rain barrels include this feature.
- Keep your eaves troughs and downspouts clear of leaves and debris.
- Drain your rain barrel before the winter, to prevent the barrel from freezing and cracking.



With the barrel elevated, water easily flows out of the hose near the bottom into the watering can. Nearby gardens and lawn areas can also be watered through this hose.



The downspout empties into the top of the barrel, which features a small garden.

Preventing a large rush of water across the saturated ground during heavy rainfall reduces the amount of sediments and other contaminants that can be picked up and carried into the storm sewer.

Summer

During the summer, dry periods, combined with hot temperatures, can quickly turn that lush spring lawn to beige. Under these conditions, the grass normally becomes dormant. There can also be short periods of heavy rain that washes across hard surfaces and carries nutrients and other contaminants through the storm system into local rivers and lakes.

A natural green

Here are some tips for keeping your lawn it's healthiest during the summer and reducing runoff.

Seven centimetres. Grass that is longer in length makes for a strong, healthy lawn with fewer weeds. Weeds have a hard time taking root and growing when grass is 6 to 8 cm (2 to 3 inches) in height. In addition, longer grass has deeper roots and is therefore more resistant to dry periods. When it is time to cut the grass, make sure the mower blades are sharp!

Grass-cycling. Grass clippings are a free and natural fertilizer. It only takes grass clippings a few days to decompose into valuable food for your lawn. It also provides mulch to keep the roots cool and encourages natural soil aeration with earthworms.

Keep the clover. It's a great plant to have in your lawn. Clover filters nitrogen from the air and fixes it to the soil, providing nutrients that help grass grow green and healthy. It also acts as a source of nectar for pollinators.

Soil testing. If your lawn isn't looking the way you like, a soil test is an inexpensive and effective way to ensure you are adding the right nutrients to your lawn. These tests can save you time, money, and unnecessary fertilizer application.

Soil management. A naturally rich soil that is non-compacted and based on a top-dressing of compost can withstand drought better and allow your lawn to develop deeper roots.

Applying the right amount of water

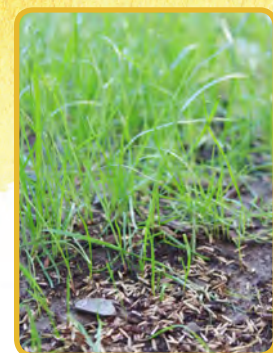
A healthy lawn does not require much water. It only needs 2 to 3 centimetres (1 inch) per week, either by rainfall or watering. Lawns are at their healthiest when they are watered deeply and infrequently.

Measure it. Use a rain gauge or place containers in various locations on your lawn while watering to determine when 1 inch or less of water has been applied.

Monitor. Sprinklers that shoot low to the ground are better than oscillating or fan type sprinklers which may lose much of their water to evaporation and wind. Be sure the water isn't being applied faster than it can be absorbed by the soil. Either reduce the flow or stagger the watering to ensure none is wasted. One hour of watering can use up to 1,300 litres (300 gallons) of water.

Timing. Be sure to water thoroughly but irregularly. This promotes the development of deep roots. Short, frequent watering will lead to short, weak roots. Manual or electric timers can be used to ensure you are watering at the proper times and intervals. Watering is most effective before 7 a.m. or after 8 p.m.

Be O.K. with 'golden' grass. Consider your browning lawn your 'golden lawn.' Dormancy is a natural part of the grass life cycle. Use this time to relax and celebrate the savings you are experiencing on your water bill.



Dry soil. Let the soil dry out between watering to avoid disease and prevent mould. Early morning is considered the best time for watering, as it will reduce the rate of evaporation. During mid-summer, over-watering the lawn makes it easier for germinating weed seeds to survive. Over-watering also encourages the eggs and grubs of lawn pests.

Check with your municipality if there are any bans on watering, or specific days on which watering is permitted.

Hard surfaces

Residential and urban areas typically represent only a small portion of land use within a watershed, but are a major factor in determining the health of the waterways. For example, in the Lake Scugog watershed, urban areas represent only 3.5 percent of the land use but contribute 18 percent of the phosphorus to Lake Scugog.

As rainwater runs across sidewalks, driveways, and roads, it picks up sediments, nutrients (phosphorus and nitrogen), and other contaminants, such as petroleum and residues. It then makes its way through ditches or storm drains into local waterways—'roads to rivers.'



Hard, impervious surfaces channel rain and snow into water bodies. This runoff can carry high amounts of nutrients and other pollutants.

Many homeowners will attempt to improve drainage around their home by diverting water away from their property. Drainage concerns need to be addressed and fixed. Forcing water towards another property or onto the street only sends more contaminants into the storm water system.

Letting the water seep through

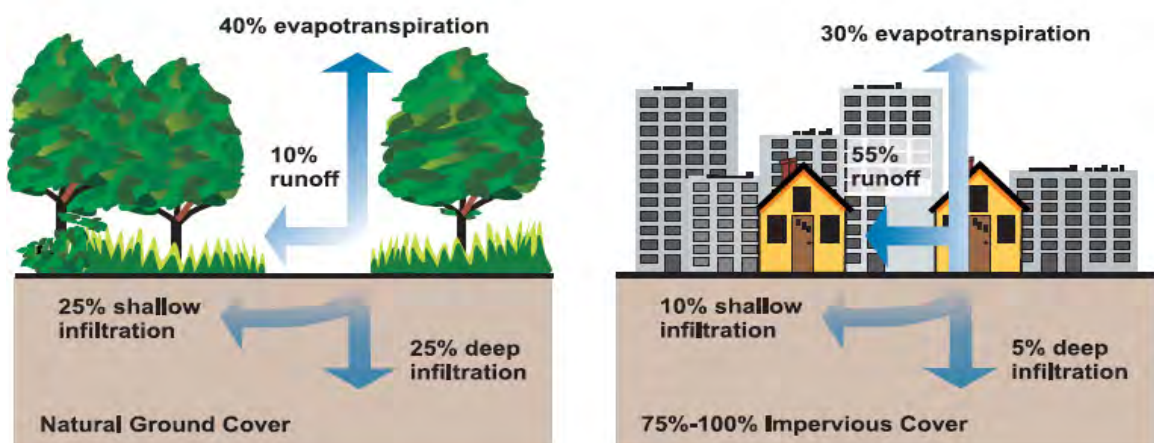
Permeable surfaces are those which allow rainwater to seep into the ground, sometimes as much as 60 percent. They can include grass swales, gardens, forests, as well as special paving materials, called permeable pavers.

The benefits of permeable pavers include:

- Long-term durability
- Recharge of groundwater aquifers
- Reduced water pollution
- Less storm water runoff.

When designing your site with permeable materials, several calculations and considerations must be made. First, it has to support the weight of cars or other loads over the expected lifetime. Always follow the manufacturer's specifications or use a professional installer.

With less hard-surface area, almost all rainfall is either taken up by plants, evaporates, or infiltrates back into the ground. As areas are built up with hard surfaces, rainwater runoff greatly increases, while evaporation and infiltration decrease substantially.



Types of permeable materials

Loose stones and gravel. A stone driveway is exactly as it sounds; loose stones, usually placed over a gravel base. Water is allowed to infiltrate through the stones and into the soil, reducing excess runoff and trapping contaminants. Other types of pavers you can use include bricks or cobblestones.

Permeable pavers. These are interlocking pavers that fit together like puzzle pieces and have gaps between them to allow water to seep down into the ground. You can find different patterns, shapes, and colours to customize your surface.

Pervious asphalt. The difference between regular asphalt and pervious asphalt is the size of particles in the material. By adding a variety of particle sizes to the asphalt, the porosity is increased, allowing for more water to absorb into the ground.

Pervious concrete. Similar to pervious asphalt, pervious concrete reduces the amount of fine particles in the mix. The installation of this type of material requires professional and experienced installers, as the method is different from traditional concrete.



Circular paver blocks



Interlocking stone

Washing the car and other vehicles

When cars are washed on hard, impermeable driveways, the water, soap, and grit from the car travels down the driveway to the storm drain or ditch, and, ultimately, untreated into your local river or lake. This contaminated runoff, even runoff containing biodegradable soap, can cause significant harm to aquatic plant life, fish and other animals. In short, something as seemingly harmless as a car wash can contribute to the decline of water quality.

Avoiding paved surfaces



Although most of us wash our cars at a commercial car wash (automated or coin-operated car washes are generally more lake-friendly than washing your car at home!) recreational vehicles (motor homes, boats, all-terrain vehicles) are commonly cleaned at home.

If you are washing these vehicles on your property, use a minimal amount of phosphate-free soap and wash from a bucket, rinsing with a hose that has a sprayer attachment to conserve water. Direct the excess water toward a vegetated surface to encourage infiltration of the wash water and trap sediments. Whether you're washing something in the garage or washing an item on your lawn, or washing your dog outside in the backyard, that soap and water will find its way into local lakes and rivers. Use only the amount of water and soap necessary to get the job done, and ensure the water is absorbed by your lawn before it has an opportunity to run into the street.

Looking down the street at the gutters can be a good indicator of which land-use practices are occurring on individual lots in your community. Pooling, soapy water and piles of organic matter such as leaves and grass on the street or piled on the storm drain can suggest that an adjustment of practices is required to protect our lakes and rivers.

Leftover soap and water should be poured into the sink or on the grass. Pouring the remnants of the bucket down the driveway sends that dirty, soapy water into the storm drain and into the local lake or river.

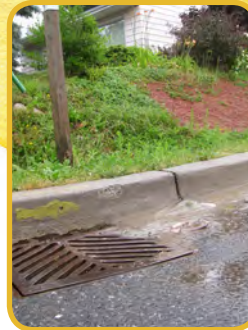
Blue-green algae

Blue-green algae or cyanobacteria are a natural phenomena occurring in fresh water bodies. The amount of available nutrients (especially phosphorus and nitrogen) can determine the growth rate and amount of algae present in a water body. Phosphorus and nitrogen can enter the water in many ways:

- Soil erosion and poor run-off prevention
- Use of fertilizers on lawns and farm fields
- Poor maintenance of septic systems
- Detergents and phosphate soaps
- Grass clippings and leaves, either through the storm drain or blown directly into the water
- Pet waste.



Urban runoff and the resulting transport of soils, sediments, and nutrients into waterways can increase the potential for an algal bloom.



Recognizing the signs of blue-green algae

Early identification is key to protecting the health of you, your family and your pets. Blue-green algae blooms have a specific appearance. Dense blooms appear bluish to green in colour, and the consistency can resemble pea soup. If the blooms are very large, they may form clumps in the water. A new bloom may also smell like fresh-mown grass, while the odour of an older bloom may resemble rotting garbage.

When blue-green algae are present, avoid all uses of the water, including swimming, fishing, bathing, or drinking. Blue-green algae present potential health risks for humans, pets, and wildlife. These include skin and eye irritations; and, if the water is consumed, nausea, vomiting, headaches, stomach pain, and diarrhea.

Boiling water with high levels of blue-green algae does not help. It causes the destruction of the cell wall, which may cause the algae to release more toxins.

If you suspect a blue-green algae bloom, assume toxins are present and call the Ministry of the Environment Spills Action Centre at 1.800.268.6060.

You can also contact your local Health Unit for further information on blue-green algae and the risks it poses to human health. The Ministry of Health INFOLine can connect you to your local unit by calling 1.800.387.5559, or visit http://www.health.gov.on.ca/english/public/contact/phu/phuloc_mn.html



Fall

*Fall is the time to prepare
for winter and spring.*

Late summer to early fall is considered the best time to establish a new lawn from seed. Fall germinations have reduced weed competition and, more importantly, have two cool growing seasons (fall and spring) before the heat-stress of the summer. Although fall is when the grass roots are storing nutrients for next spring, fertilizer applications are not recommended. Additional nutrients can force grass to expend unnecessary nutrients on new and untimely growth. Fall is an optimal time to plant or divide perennials and to amend the soil by aerating or adding organics if there is need for improvement.

Preparing your lawn and garden

Over-seeding. The best time to over-seed a lawn with perennial grasses is in the late fall (late-August to late-September, during a rainy period) to get a head start on creating a thick lawn for next spring. The thicker the grass, the more difficult it will be for weeds to thrive. Use grass species that are suitable to your growing area. Species such as perennial rye and fescue grasses are native and drought-tolerant, and do not require extra fertilizer. Native grass species are also more pest-resistant, hardy, and develop strong root structures which reduce erosion. To ensure success, apply a top-dressing or compost (1/2 inch in depth) before or after over-seeding.

Thatch removal. Before over-seeding, be sure to remove any over-abundant thatch. Thatch is a tightly intermingled layer of living and dead stems, leaves and roots which accumulates between the layer of actively-growing grass and the soil underneath. It is a normal component of an actively growing turf grass. Thatching requires that you either remove the dead grass with a lawn rake, or cut into the soil to provide air and proper circulation. If you de-thatch prior to the winter months, the grass will recover quickly and grow to its full potential in the spring.

Consider compost. Fall leaves can be turned into valuable compost to be used on your lawn next spring. Try mulching your leaves with a lawn mower and leaving these finer particles on your lawn and garden to offer nutrients and act as an insulator blanket for grass and perennials. They decompose very quickly, thereby contributing to the long term development of richer soil, and will give your garden a head start!

Rake leaves instead of using a blower. Once raked up, use leaves as mulch to protect plants throughout the winter or mix them into a compost pile. Multiple options exist for disposing leaves and other organic debris. Do not blow them onto the street or allow these materials to travel to the storm drain. Leaves, twigs, and grass add high levels of nutrients to our lakes and rivers, and contribute to a decline in water quality.



Leaf litter left on your lawn can add nutrients into the soil and acts as an insulator for your grass.

Composting 101

Composting keeps materials out of landfills and literally adds something beneficial to the environment. Compost is decomposed organic waste transformed by bacteria and heat into a rich, soil-like material called 'humus.' Organic materials such as vegetables, fruits, leaf and yard trimmings, paper, and woody materials are used to create compost.

Compost can be added to your garden or applied as a top-dressing for your lawn to improve quality, texture, and water absorption of soils.

What do you need to get started?

- Composter** Available at most hardware stores (or make your own from cedar stakes and chicken wire).
- Air** Turning and mixing the pile regularly is important. Try a tumbling composter to make it easier. Keep it moist but not too wet.
 - Carbon Leaves and tree trimmings (brown materials).
- Nitrogen** Kitchen waste and grass clippings (green materials).



Organic materials such as leaves, grass, and vegetable trimmings become a high quality soil amendment through composting.

The smaller the pieces you put into the composter, the faster the material will break down. Adding big mats of wet grass or leaves will mould rather than decay. Contact your local municipality to inquire about composters and related programs.

If your compost isn't breaking down, add nitrogen rich material such as kitchen waste. Turning and aeration is necessary. If your compost smells like ammonia, add more carbon-rich material such as leaves or twigs. Do not add meats, fats, diseased, or insect-ridden plants, or weeds that have gone to seed.

Pool water



Pool water may contain high levels of chemicals which harm aquatic ecosystems.

Discharging swimming pool and hot tub water containing chlorine, bromine, or copper algaecides into lakes, streams, or into the storm drain damages water quality and is harmful to fish and other aquatic life. Before emptying, the water should sit untreated for at least 4 days to reduce the level of chemicals in the water. Testing the chlorine level and PH of the water can ensure it is safe to remove from the pool or hot tub. If needed, wait a few more days. As copper algaecides will gradually dissipate, do not add any algaecide two weeks prior to closing the pool.

The discharged water should be directed onto a vegetated surface (grass, rain garden, or swale) to encourage infiltration. The discharge should not flow onto any other person's property or create nuisance conditions. If the discharge flow is to occur over bare soils, care should be taken to prevent soil erosion. This can be done by reducing the rate of flow (use a small diameter hose) or using additional piping or hose lengths to transfer the water to a vegetated area. If chlorine or bromine levels in the pool are over 10 mg/L or 10 parts per million (ppm), let the pool water stand for at least one week before adding dechlorination tablets. This avoids the use of additional chemicals.

Winter

Pavement and concrete in urban areas prevent snow melt from seeping into the ground.

Instead, it runs off into storm drains, carrying the sand and salt applied to slippery surfaces into local waterways. Many people are under the false impression that it goes to a water treatment plant. In most cases, storm water and spring runoff flow directly into your local lake or river.



Salt has been used to make roads safer for winter weather, but salt corrodes and pollutes, and may seep into water supplies.

Salt alternatives

Sodium chloride (NaCl) and other salts are often used in excessive amounts to de-ice driveways and sidewalks. Numerous studies indicate that salt is contributing to problems in waterways and contaminating ground water resources. The key to eco-friendly de-icing is to use only as much as you need, or use a less harmful alternative. Adding extra salt doesn't melt the ice any faster.

De-icing Tips

- Avoid salting surfaces which are never used or where sunlight melts the ice.
- Try an alternative, such as sawdust, wood chips, or a natural product containing baking soda or corn fibre.
- Be aware that even de-icers labelled as 'eco-friendly' may contain chemicals that can harm lakes, aquatic life, and plants.
- When you shovel, you can also make a difference. Shovel as soon as possible after a snow storm to avoid compaction and ice formation; and if it's a long-lasting storm, brave the weather and shovel while it snows.

In the spring, be sure to sweep up any sand or other materials on the driveway and gathered near the storm drain before they are washed away with rain water.

Preventing erosion

Erosion can occur from rushing snow melt and seasonally high water levels along water courses. By preventing erosion, you will be keeping sediments and nutrients out of nearby lakes and rivers.

Over the winter and spring, make note of any erosion occurring on your property. Create a plan for putting in plants with deep, strong roots in these areas when the ground is workable and the weather appropriate. The plants will help slow down water and hold sediments and soils in place with their roots. Buffalo grass can be used in locations where a 'lawn-like' look is preferred. Native shrubs such as Sandbar willow, Silky dogwood, and Speckled alder can also be planted to minimize and prevent erosion.

Other types of pollutants

Non-point pollution sources also affect our water, and add to the contaminants entering the system. Here are a few examples of materials that travel into local lakes and rivers via urban runoff:

- Hazardous household waste (HHW) improperly stored or discarded
- Motor oil and grease drippings from vehicles
- *E-coli* from pet and livestock wastes
- Litter and garbage
- Fertilizers and pesticides in gardens and in the home.



Leftover prescription medication, over the counter medications and vitamins require proper disposal. Ask your pharmacist about return programs to ensure these medications don't end up in local waterways.

Disposing of hazardous wastes

Almost 40 percent of all household hazardous waste is improperly disposed of each year. Some of these materials can end up in lakes and rivers. While you are packing up your summer gear and getting ready for the first snow fall, consider checking your home and garage for items needing disposal at your local hazardous waste facility. Cold weather can cause containers to fail, allowing toxins to leach into the environment. For advice and information, please contact your local municipal service centre.

Household Hazardous Waste Materials (HHW)

Here are some of the materials that require drop-off at your local hazardous waste facility:

- Bathroom Cleaners
- Medication
- Nail polish
- Perfume
- Drain openers
- Furniture polish
- Oven cleaner
- Car cleaners and wax
- Fire extinguishers
- Fluorescent light bulbs – mercury
- Batteries
- Detergents
- Lighter fluid
- Flea collars
- Fertilizer
- Pesticides
- Pool chemicals
- Slug or ant bait
- Old gasoline and other surplus petroleum products



Winter temperatures can damage HHW containers. Return unused or leftover materials to the proper facility before the first snowfall.

Making a real difference

Can one household really make a difference? Yes! Our environmental challenges are a result of the many small things we do every day. What may seem like small changes are cumulative, and will catch on with the next generation and within your neighbourhood. When we each do a little, it adds up to a lot.

Suggested Reading and Online Publications

A Homeowner's Guide to Stormwater Management

www.delawareestuary.org/pdf/HomeownersGuideSWMgmt.pdf

Aquatic Plants in Lake Scugog: What's causing them and what you can do

www.kawarthaconservation.com/pdf/LakeScugogNutrientFactSheet.pdf

A Shoreline Owner's Guide to Lakeland Living

www.kawarthaconservation.com/pdf/Lakeland_Living_Guide.pdf

Green Lawns, the Green Way

www.kawarthaconservation.com/pdf/GreenLawns.pdf

Living in Town: What you can do to protect Lake Scugog

<http://www.kawarthaconservation.com/livingintown/index.html>

Ontario Invasive Plant Council

www.ontarioinvasiveplants.ca

Plant wind breaks, save money

www.kawarthaconservation.com/pdf/MTO291_Windbreaks_Bro_EN.pdf

The Shoreline Primer

www.kawarthaconservation.com/pdf/TheShorePrimer.pdf

Toronto Homeowners' Guide to Rainfall

www.riversides.org/rainguide

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