

Otty Lake Shoreline Handbook

An Otty Lake Stewardship Project

May 2010

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Prepared by

Otty Lake Association

In Partnership with

Algonquin to Adirondacks Conservation Association

Centre for Sustainable Watersheds

Rideau Valley Conservation Authority



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The photo on the cover is courtesy of Rick Stojak.

Otty Lake Shoreline Handbook

Dear Otty Lake Shoreline Property Owner,

From 2004 to 2008 the Otty Lake Association worked with members of the Otty Lake community and several community partners who too had a vested interest in the long-term health and sustainability of Otty Lake, to develop the Otty Lake Management Plan. The intent of the Lake Management Plan was to develop a long-term action plan that would help to protect the health of Otty Lake and its watershed area.

We are now working to implement the Plan's recommendations. We know that the health of the lake is important to members of the lake community. We also recognize that lake residents want solid, clear, easy- to- access information to help them make good stewardship decisions.

The goal of the Otty Lake Shoreline Handbook Project is to provide practical, environmentally friendly resource guidelines for Otty Lake's seasonal and permanent residents. Please be advised that the information in the Handbook is as up to date as possible for May 2010. We hope that this binder will remain with your property for years to come, and that you will update it and add related information to it as this becomes available to you.

In the binder you'll find a great information resource section, useful contact information and also a checklist that you can use for taking actions to improve the health of your shoreline and of wildlife habitat.

Your everyday actions and those of your lake neighbours play a huge role in determining the lake's health and the health and vibrancy of the wildlife with which we share our watershed area.

We hope that you will find this a useful tool in helping you protect and care for Otty Lake and its watershed area for yourself and your family and the generations to follow.

Otty Lake Association
Ontario, Canada
May 2010

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The Importance of Healthy Shorelines

Healthy shorelines are vital to maintaining the overall health of lakes and other bodies of water. Shorelines help filter pollutants, protect against erosion and provide habitat for fish and other forms of wildlife.

Shorelines are some of the most ecologically productive places on Earth. They support plants, microorganisms, insects, amphibians, birds, mammals and fish. The first 10-15 metres of land that surround lakes and rivers are responsible for 90% of lake life which is born, raised and fed in these areas. Sometimes called the “Ribbon of Life”, these areas are up to five times more diverse than other areas upland from lakes and rivers.

The Functions of a Healthy Shoreline

1. Help Maintain Clean Water/Water Quality

The shoreline vegetation on your property is vital in retaining, treating and filtering surface runoff before it can reach the water. Runoff is rain and melted snow that run along the surface of the ground. Runoff can contain pollutants such as fertilizers, pesticides, sediment, manure, pet feces, trash, motor fluids (oil, grease, gas), and road salt. These pollutants have negative effects on our waterways: nutrients act as fertilizers which stimulate algae and plant growth; pathogens can contaminate drinking water and sediment impacts fish habitat and nursery areas.

2. Prevent Soil Erosion

Shoreline vegetation and plants help keep soil in place with their underground root systems and prevent topsoil from being exposed and washed away into the lake or river.

3. Reduce Impacts of Flooding

Well-vegetated shorelines provide barriers against moving water by slowing the movement of water downstream, and by reducing the force, height, and volume of floodwaters. This allows them to spread out horizontally across the floodplain therefore reducing the potential for damage to your property.

4. Provide Wildlife with Food and Habitat

As mentioned above, shorelines are vital to many different animals throughout their development and life. Healthy shorelines protect wildlife from weather and predators; woody debris, such as tree trunks or roots in the water provide cover for fish to hide, basking areas for turtles, and resting sites for waterfowl.

Shoreline Ecosystems – What You Should Know

Within a shoreline there are three overlapping, but distinct zones that contribute to the overall health of a property.

1. Upland Zone

Generally, this higher and drier ground will be home to various trees and shrubs along with animals that prefer shoreline habitat. This area, depending on when your home or cottage was built, is often the zone where the residence is located.

2. Riparian Zone

This zone is the transitional area between dry land and water. Here you will find a wide variety of plants and wildlife species because water provides organisms with food and shelter. The vegetation in this area of your property helps reduce runoff and soil erosion. It also shades and cools shallow water.

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3. Littoral Zone

The littoral zone extends from the water's edge to the area in the lake where sunlight no longer penetrates. It is home to organisms such as algae and aquatic plants, fish, amphibians and waterfowl.

Common Signs of a Healthy Shoreline

- Lots of native vegetation
- Different levels of vegetation from taller trees to smaller shrubs and plants
- Dead snags (underwater tree stumps or branches) and stones
- Birds, fish and other wildlife

Unhealthy Shorelines

An unhealthy shoreline can result in accelerated runoff, increased erosion, and increased nutrients entering the water, particularly nitrates and phosphates. Large amounts of these nutrients are harmful to aquatic environments, triggering a process known as cultural eutrophication. Cultural eutrophication occurs as follows:

1. Large nitrate and phosphate supplies released from the land stimulate massive algae blooms. The result is algae so thick that it competes with other plankton species and blocks light to bottom-dwelling plants.
2. As the algae blooms die, the bacteria that break them down multiply and consume large amounts of oxygen in the water body.
3. Without enough oxygen the remaining animal species die off (sometimes drastically – for this reason, some newly eutrophic lakes have many floating fish carcasses).
4. The final result is a water body that is polluted and impoverished (capable of supporting very few types of plants and animals).

Common Signs of an Unhealthy Shoreline

- Area(s) cleared of all or most vegetation
- Lawn that extends right to the water's edge
- The natural shoreline replaced by a hardened structure such as breakwalls or gabion baskets (large stones contained in wire baskets),
- Problems such as shoreline erosion and poor water quality
- Prominent algae blooms and excessive weed growth

Note: Improperly functioning septic systems, removal of shoreline vegetation allowing increased amounts of sunlight to reach the shoreline, and application of fertilizers are all factors that can precipitate algae blooms

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Erosion

Shoreline erosion is a common and natural process on many waterfront properties. There are various causes for shoreline erosion that all have the same outcome: a loss of valuable waterfront property that can result in unsafe shorelines and a deterioration of the natural shoreline environment.

The process of erosion is natural, but normally occurs at a very slow rate, much slower than we would notice. Lakes naturally accumulate sediment at an average rate of about 1 mm/yr. Erosion can become a serious problem near residences at shorelines, resulting in harm to the property and water body.

By taking preventative measures you can help control erosion on your property, helping to create and maintain a strong and healthy shoreline.

Natural Causes of Erosion

- **Wind** – Wind can pick up loose soil particles that have been exposed after the removal of vegetation and blow them away.
- **Ice** – As ice shifts and expands over a watercourse, it can displace shoreline soil.
- **Water** – Wave energy, currents, fluctuating water levels and runoff can wash away soil along the shoreline.
- **Gravity** – Gravity can move loose soils down a slope or pull them through sink holes. Steep slopes are especially prone to erosion.

Human Disturbances

In addition to natural erosion, there are a number of human disturbances that can greatly accelerate the rate of shoreline erosion:

- **Removal of Shoreline Vegetation** – Without plants and other vegetation to grip the soil with their roots, erosive forces such as the wind, rain and waves can erode soil into the water.
- **Runoff** – When the vegetation of a shoreline is replaced by a hard surface like patio stones or pavement water flows along these surfaces rather than soaking into the ground.
- **Boat Wake** – Motorized watercraft create waves which wash onto the shoreline and eat away at the soil bit by bit.
- **Construction** – Construction along or near the shoreline can contribute to erosion if proper precautions aren't taken; cleared lots and freshly exposed soil are particularly susceptible to erosion.
- **Foot Traffic** – When you travel the same routes on your property to access an area, the vegetation ends up trampled, creating areas of bare soil. If the soil isn't covered up by gravel, mulch or wood chips it becomes very susceptible to wind, rain and other causes of erosion.
- **Shoreline Alterations** – Alterations to a watercourse can cause significant erosion; when vegetation along the shoreline is replaced by hard structures such as break walls, wave energy is no longer absorbed and the wave energy is deflected onto neighbouring shorelines where it can cause erosion.

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Impacts of Erosion

Sediments are deposited as a result of erosion and are considered a pollutant when excessive levels occur due to human activities; by volume they are the greatest water pollutant in North America. Most of this comes from overland erosion, but some comes from shoreline erosion which has the following negative effects:

- **Loss of Property** – Gradually the shoreline of your property can erode into the water.
- **Unsafe Areas** – Erosion can cause or aggravate unstable slopes.
- **Loss of Habitat for Wildlife** – With the loss of vegetation along the shoreline there is also a loss of habitat and food sources for shoreline wildlife.
- **Change Characteristics of Water Bottom** – As soil erodes into a water body, the water bottom becomes covered in a layer of soft sediment.
- **Reduction of Water Clarity** – Erosion impacts water clarity since water becomes cloudy when soil washes into it; this means that less light penetrates the water and the aquatic plants end up with less than ideal growing conditions, sometimes impacting fish spawning success.
- **Increased Water Temperature** – Water from overland runoff picks up a significant amount of heat which subsequently raises the temperature of any water body it flows into.
- **Chemicals Pollutants** – Soil that erodes into the water often has harmful chemicals or heavy metals bound to it.
- **Increased Nutrient Input** – Soil particles often have chemically bound nutrients attached to them. Once suspended in water, the chemical bond is broken and the nutrient becomes available for uptake by algae and rooted aquatic plants.
- **Stress on Fish and Wildlife** – Turbid water (clouded by sediments) may hinder the ability of fish to catch prey by reducing their sight, thereby lowering feeding rates and slowing growth. In addition, sediments can clog the gills of young fish, with fatal results.

Signs of Erosion

Here are some signs to watch for to determine whether erosion is occurring on your property:

- **Rills and Gullies** – Rills and gullies are narrow channels carved by overland runoff.
- **Exposed Soil** – Large areas of exposed soil, especially on steep slopes and high banks, are vulnerable to rill and sheet erosion.
- **Slumping, Undercut Banks** – Undercut and slumping banks show that soil is being washed away by water movement (wave action or energy from currents).
- **Cloudy Water** – Extremely cloudy or turbid water can also be an indicator of excess sediment entering the water.
- **Receding Shorelines** – The recession of shorelines is evidence of soil erosion. This is more obvious to landowners on their own properties where they can see the shoreline receding past familiar landmarks.
- **Leaning or Downed Trees, and Exposed Roots** – Trees along the shoreline do fall naturally as a result of storm winds and decay, but sometimes healthy trees will fall along the shoreline because there is not enough soil for their roots. In these cases, the entire tree can lean or fall over, exposing its root mass.

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How to Prevent Erosion

There are a number of steps you can take to protect and prevent erosion on your property:

Protect the Natural Shoreline

The best insurance policy against erosion is to retain the natural characteristics of the shoreline. This means keeping lots of vegetation, maintaining a good buffer strip (no mowing up to the water's edge) and leaving in place all of the stones, boulders, snags and dead branches found along the shoreline. These materials absorb the energy from erosive forces and keep the shoreline glued together.

Reduce Runoff

In general, try to plant and retain native vegetation wherever possible, this will prevent large amounts of runoff from entering the lake. In addition, encourage rainwater to infiltrate the soil rather than travel over it. When rainwater travels over the ground, it can wash the soil away. To encourage infiltration, minimize the amount of paved or hard surfaces on your property (i.e., driveways, decks, patios). Runoff from the driveway can be directed into a settling area, and runoff from the roof should go into a rain barrel or soaking area. This will help maintain the natural, gradual water renewal process rather than allow large volumes of water to enter the river or lake at one time.

Minimize the Wake from Boats (and Other Motorized Watercraft)

Boat wakes not only erode the shoreline, they can disturb aquatic ecosystems, swamp the nests of loons and other waterfowl, damage docks and boats, upset canoes and small boats and create danger to swimmers. The best way to reduce the effects of boat wash and wake on shorelines is simply to slow down. In Ontario, by law, boats must slow down to 10km/hr within 30m of shore. If the boat doesn't have a speedometer, remember that at 10km/hr there will be little or no wake.

Take Precautions during Construction

If you are starting a new building project on your property, plan to control erosion and to keep the disturbed area as small as possible. Ask your contractors to be aware of potential erosion and provide them with a copy of the protection plans. Strongly recommend the use of erosion control equipment such as filter cloths, hay bales, and silt fences. Fill piles should be covered with tarps to prevent soil from being carried away by runoff. If possible, construction should be avoided during wet seasons since softer soil is more prone to damage by heavy equipment.

Limit Impacts of Foot Traffic

Foot traffic can trample vegetation – especially on steep slopes – causing soils to loosen and fall from the shore. Depending on the degree of the problem, you can stop or control access to that portion of the shoreline. Fences, hedges, brush, terraces, boardwalks, or stairs can prevent access and reduce the impact.

Contour and Cover Pathways

Pathways that extend from a building to the water's edge tend to take the shortest route to the water, which is often a direct downward route. This encourages erosion, since gravity can pull soils and runoff straight down the path toward the water. A better option is to position (or if necessary, re-route) pathways to follow the contours of the slope, following an 'S' curve pattern. Any exposed soil on pathways and heavy traffic areas should be covered up with wood chips, straw, and pine needles. They prevent the soil from being blown away or being washed away by rain.

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Dealing with Erosion

If you believe that there is some erosion of your property there are several steps that you can take to determine the best course of action.

1. Identify Areas of Erosion

Examine your property to see if there are areas of erosion.

2. Identify the Cause

It is crucial to try to identify the cause of the problem. Trying to fix an erosion problem may be a waste if the cause of the problem is not addressed. Take a look around your property and see if there are any of the factors mentioned earlier that could be causing the erosion of your property. This may also include looking beyond your property. Consider the natural forces and human disturbances that were discussed earlier. Remember that it could be a combination of factors causing your problem.

3. Site Conditions

There are certain site conditions such as steep slopes and aggressive water movement that require more aggressive control measures and extra consideration and care during project work.

Control Methods

Many methods can be used to control soil erosion. Sometimes the best course of action is to use a combination of methods. Basically there are three erosion control methods to consider:

1. Allow natural vegetation to grow (the 'buffer' technique)
2. Apply the soil bioengineering technique
3. Use hard structural controls

Natural Buffers

Allowing natural vegetation to grow along upland slopes and shorelines is a great way to control soil erosion and is the best defence against most erosion problems. As mentioned earlier, vegetation grips the soil with its roots and keeps soil from blowing or falling away.

Soil Bioengineering

In areas where the erosion problem requires a more active approach, a control measure that can be used is soil bioengineering. This approach uses erosion control structures, usually made with living plant material, which eventually takes root. Soil bioengineering works immediately to control erosion and becomes more effective over time as plants take root.

Soil bioengineering often uses native plants collected/purchased within the immediate area of a project site. This ensures that the plant material is well adapted to site conditions and will have better growing success. While a few selected species may be installed for immediate protection, the ultimate goal is for the natural invasion of a diverse plant community to stabilize the site through development of a vegetative cover and a reinforcing root matrix. Plants that are most often used in soil bioengineering are willow species, dogwood species, and other plants with extensive root systems.

Bioengineering Techniques for Above Water

Live Staking – Willows, dogwoods, viburnums, and poplars can be established with cuttings taken from new growth. The minimum size for cuttings should be at least a foot long and a

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half-inch in diameter. Bigger cuttings will work very well; the extra height gives them an advantage over competing plant species.

Fascines – Fascines are made out of live plant material and are sometimes referred to as wattles or bundles. Fascines are bundles of branch cuttings tied together in a roll. Once they are placed along the ground the cuttings will begin to root and take hold of the soil.

Brush Layers – Brush layers are similar to fascines in that cuttings are used and trenches are dug. However, instead of tying the cuttings together, they are placed loose in the trench with the bottom end pointed into the ground and the top (the growing end) sticking out of the trench.

Brush Mattresses – Brush mattresses are constructed from branches wired together to form a mat-like covering. They are used to cover large open soil areas. With a secure, firmly anchored base (toe), they can withstand considerable wave or current energy. The shoreline armouring effects of brush mattresses make them the natural equivalent to riprap (loose stones along the shore).

Maintenance of Bioengineering Structures

In the case of all of these living structures, the brush or live cuttings should start to root within 6 weeks. The first year of growth is critical since the vegetation is just getting established and is subject to many different stresses. The soil should be kept moist while the brush starts to take root. The structures need to be carefully monitored and repaired as needed. In particular, you need to watch fluctuations in water levels. High water can uproot and kill new plantings. It may be necessary to place hay-bales or fascines in front of plantings to protect them from high water and wave action until they can get established.

Bioengineering Techniques in the Water

Fibre Rolls - Fibre rolls (also known as fibre bundles or fibre logs) are a common material used in soil bioengineering. Fibre rolls are simply rolled up mats made up of coir (the fibre from the outer husk of coconuts) or jute (a vegetable fibre). These rolls are generally staked into the toe of the slope or slightly off shore. They absorb and deflect wave and current energy, sheltering a vulnerable shoreline. They can be purchased from a landscaping company.

Brush Bundles - Another way to reduce wave energy before it hits the shore is the use of bundled brush. Brush bundles are constructed by stacking and tying a cylindrical pile of branches together. Like fibre rolls, they create pool areas where vegetation can grow and eventually form a barrier against erosion.

Plant Anchors - When planting in the water, it is necessary to anchor new plants until they take root and can hold themselves in place – otherwise, wave energy can scour them away. In some cases, you may need to use both wave breaking devices and plant anchors to successfully establish vegetation in the water.

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There are two main methods of anchoring aquatic plants: fibre mats and fibre bags

Fibre Mats - The same fibres (coir and jute) used to make fibre rolls are also woven into mats or blankets. These can be rolled out, staked in the water, and then planted with native aquatic plants like cattails, bulrushes and water lilies.

Note: This method will not work with aquatic plants that require a great deal of sunlight.

Fibre Bags - Some aquatic plants can be anchored to the bottom by placing a rooting plant in a fabric bag weighted with rocks. The roots are able to grow through the fabric and into the soil. The fabric biodegrades and eventually the plants hold themselves in place.

Hardened Surfaces

Structures made out of rock, concrete, metal and other materials were once commonly used when it was thought that the only way to combat erosion was to take a hard and aggressive approach. People began putting in concrete break walls, gabion baskets and riprap. These structures do work well in the short term to prevent erosion – but a further look reveals that ultimately they often do much more harm than good.

What happens when you harden your shoreline?

Hardened shorelines deflect wave energy instead of absorbing it – the energy is deflected to the sides, passing the erosion problem on to neighbouring sites and down, scouring away any sediment or plant life near the base of the wall. The installation of these structures completely obliterates the natural shoreline environment – eliminating food and habitat for all kinds of creatures in the water and out. Installing these structures requires the use of heavy machinery which is both costly and environmentally damaging. Worst of all, these structures will eventually fail.

Types of Hardened Structures

Breakwalls are also known as bulkheads, retaining walls or seawalls. They are completely solid structures generally made of concrete, metal or wood. Breakwalls are built to prevent the sliding of soil or to protect against wave action. No breakwall will last in the long term because it, in effect, self-destructs by promoting erosion of the very soil that supports it. The vertical breakwalls deflect waves, which end up scouring the bottom right in front of the wall, undercutting it and causing it to eventually fail. Also, the flat rigid face of the wall is hammered by each wave impacting it. Over time this will cause cracks and fractures in the wall. In addition, the inside (landward) face of a breakwall is very vulnerable to surface erosion. Any overland runoff will carry away soil from the inner face, digging channels and robbing the wall of support.

Retiring a Breakwall

If there is currently a breakwall on your property that is beginning to fail, there are several steps you can take to retire it.

1. First dig out the soil from behind the wall.
2. Re-grade the slope of the shoreline to a slope of 25 degrees or less.
3. Place a geotextile filter cloth along the slope. This permeable fabric cloth can be purchased at a landscaping supply store. It will protect the soil and secure the slope.

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4. Tear down the wall in sections so that the pieces of the wall lie back on the slope. This can be done with the use of a sledge or jack hammer.
5. The gaps should then be filled with cobble-sized stones or riprap.
6. The final step is to plant some native vegetation to help hold the soil together. Plants such as willows or dogwoods are good choices.

Note: You will need to obtain a permit to retire your breakwall.

This will provide you with a much better solution for erosion control on your property – not to mention a much more visually appealing shoreline.

Softening Riprap

- Plant shrubs in open spaces among the rocks; move rocks if necessary to create space.

Softening a Breakwall

If your shoreline has been hardened with a breakwall that is in good condition, there are various things that you can do to soften it and reduce its effects on erosion.

- Restore or plant a strip of deep-rooted vegetation along the top of the retaining wall; this will help filter runoff before it enters the water and reduce the risk of erosion by holding the soil together.
- Plant overhanging native shrubs to help provide shade and keep water cool. You can also drill planting holes into the wall and plant cuttings or container plants.

With approval, there are several things you can do with a breakwall below the high water mark:

- Anchor a log or two against a retaining wall to provide wildlife habitat and help break the force of waves and undercurrents. This will help reduce the scouring action of waves breaking against the wall.
- Add rock riprap to the base of a retaining wall at a forty-five degree angle to help break the force of waves and improve habitat for fish and wildlife. Gradually sediment may start to deposit among rocks, and aquatic plants may grow.
- Create shore ladders, or steps, of riprap from the base of the wall to the top. These will help provide wildlife, such as amphibians, access from the water to the land.

Gabion Baskets

Gabion baskets are another erosion control structure that you may see along shores or rivers. They are essentially wire baskets filled with large stones. The wire baskets are linked together to form a wall along the shoreline. Like concrete retaining walls, this erosion control technique works well in the short term and is often used in high-energy situations or when erosion needs to be stopped immediately.

Riprap

Riprap is one of the most common techniques used for controlling erosion along the shoreline. Riprap consists of large stones placed in the water and up the slope of the shoreline. Of all the hardened control structures, riprap is probably the most economical, as well as the most effective.

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Riprap works well in areas of high water and aggressive water movement. It is also effective against ice movement. Because riprap is made up of many smaller pieces, the movement of a few pieces does not compromise the effectiveness of the overall structure. If the shoreline or bottom soils shift, the main structure will still work (this feature is not shared with the other hard control techniques). The rough surface of the riprap breaks up wave action so waves don't run up as high on the slope as they do on smooth concrete faces and exposed soil. Riprap can be an effective solution for undercut banks because it provides protection at the toe where water action erodes the soil. However, like other hardened control structures (although to a lesser degree than retaining walls) riprap still deflects wave energy causing erosion problems for neighbouring properties and elsewhere. It also replaces vegetation along the shoreline, taking away natural habitat. The rocks on their own do not provide food or shelter for most wildlife. And, in addition to creating a rather unnatural looking shoreline, the rough surfaces of the rocks also make it hard to access the water for recreation.

If you have riprap along your property, adding vegetation above or between the rocks where possible will help create a more natural environment and will help further control erosion. If you are thinking of installing riprap on your property, it is recommended that you complement it with other bioengineering techniques and plantings.

Approvals

Before beginning any restoration work, you will need to look into permits and approvals required for your project. See the Permits section.

Shoreline Buffers

A buffer is a permanent strip of trees, shrubs, grasses and ground cover alongside a watercourse that helps to protect or 'buffer' the water body from impact, whether the impact stems from human actions or natural processes. The proper size for the buffer strip is unique to each property. The ideal buffer strip is one that is at least 30m wide, extending from the lake and heading upland. However, a buffer strip of this size is not feasible in all areas and any size buffer is better than none at all.

The Benefits of Buffers

Depending on their design and location, buffers can:

- Protect and improve air and water quality
- Reduce soil erosion caused by wind and rain
- Stabilize the banks of streams, rivers and lakes
- Trap water-borne sediments that pollute streams, rivers and lakes thereby reducing up to 80% of sediment
- Trap fertilizers, pesticides, organic chemicals, heavy metals, salt and other contaminants that pollute ground and surface water (reducing a significant amount of phosphorus and nitrate)
- Trap bacteria and other pathogens that cause water-borne diseases in people, livestock and wildlife (removing up to 60% of pathogens from runoff)
- Provide habitat for fish and wildlife by providing corridors for movement
- Help prevent flooding
- Make the landscape more beautiful and properties more valuable

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Why plant buffers?

By planting and maintaining buffers, you can help to prevent some of our most serious environmental problems.

Water Pollution

Despite improvements in how we manage chemicals and waste in homes, our ground and surface water remains at risk of being polluted. Harmful viruses, bacteria and other pathogens can migrate into waterways from livestock operations and septic systems that are located too close to waterways. The consequences are deterioration in the quality of drinking water and a degraded, potentially dangerous environment. Buffers help by trapping pollutants before they reach waterways.

Soil Erosion

When soil particles and other sediments are carried by wind and runoff into creeks, rivers and streams, they clog the gills of fish. They may also obscure their vision, making it difficult for them to find food and see predators. Sediments cover places where fish feed, hide from predators and lay eggs. By filling water channels, sedimentation also causes permanent physical changes in waterways that affect aquatic life and contribute to flooding.

Destruction of Natural Shorelines

Shoreline development and unnatural approaches to landscaping can harm land and aquatic habitat and reduce the quality of water for human consumption. The destruction of natural shoreline vegetation increases shoreline erosion by eliminating the plant root systems that provide stability. It also increases the risk of pollution and sedimentation by removing natural traps. Buffers planted along waterways can help to reduce these problems by stabilizing soils, trapping pollutants and shading and cooling the water. In addition, they can reduce the risk of flooding.

Destruction of Habitat and Loss of Biodiversity

The decline in forested areas along streams, rivers and lakes has led to the decline of both land and aquatic species. Buffers can help by providing travel corridors between larger areas of natural habitat and protected areas along waterways where wildlife can safely drink and feed.

How to Begin a Buffer

Before beginning a buffer strip, consider the layout of the lot, how the property is used (e.g., paths, recreation), the budget, how much time you want to spend on it, the look you want to achieve, and privacy issues. There are three options available to establish a buffer:

1. Natural

- Decide what size buffer you would like – the bigger the better
- Stop mowing and let nature take over. Dormant seeds, as well as seeds brought by birds and other wildlife species, will start to grow
- Leave natural debris such as fallen trees, stumps and boulders in place (when not hazardous)
- Weed out competing species, especially in highly developed areas

2. Enhanced

- Help nature along by actively planting a few plants or shrubs

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- Allows buffer to be established more quickly than by natural processes alone
- Works well in areas with natural seed stock

3. Landscaped

- Combines the important functions of a natural shoreline with the visual appeal of plants, well-defined and pleasing curves, and other accents like benches, stepping stones, etc.
- Requires considerably more time and money

Sources of Expertise and Assistance

There are sources to help you plan buffers and work them into your farming operation or recreational property. Some offer funding support or may be able to direct you to funding sources. For more information, contact the following (see the Contact List for full contact information):

- | | |
|---------------------------------------|---|
| • Your local municipality | • Local Ontario Ministry of Natural Resources & Forestry office |
| • Your local conservation authority | • Ducks Unlimited |
| • Your local stewardship council | • Ontario Ministry of Agriculture, Food and Rural Affairs |
| • The Ontario Environmental Farm Plan | |

Shoreline Planting Tips

When naturalizing your shoreline there are several tips that you can follow to help increase the survival rate of your plants:

1. Plant Native Species of Plants

Survey the area around your property and take note of the plants and tree that are abundant and healthy. This will give you an indication of what type of vegetation will have the best chance for success on your property.

2. Plant a Variety of Species and Ages

Planting a variety of native species and species of various ages will help minimize the chance of a disease being transferred from the new plants to the already existing plants on your property.

Where to Obtain Plants and Trees

There are several nurseries in the area where you can obtain plants and trees of various ages and species. **For a list of these nurseries refer to the Contact List.**

Where and When to Plant

When planting new plants you should try to mimic how they grow in the wild. Plants prefer to be in groups of their own kind; for example, instead of having a cedar every 2 metres; plant them in clumps of three, spaced out with groups of other species. The position (low wetlands, mid-slope, lakeshore, etc.) of plants already on your property can indicate where the same species is most likely to succeed. When planting on your property you also need to consider the spacing of wild plants; some cluster together, while others need space.

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Aquatic plants should be planted in the spring after the water levels have fallen. This allows them to establish root systems capable of keeping them alive over the winter. Upland plants can be planted in the spring or autumn while it is cool.

Note: If you are planting aquatic plants a permit may be required if the water level is below the high water mark. See the Permits section.

Preparing the Site

The last step before the plants go in is to get the site ready for them. To maximize their chances of survival, you should remove any nearby invasive species that might crowd out the new arrivals. Purple loosestrife, crown vetch, reed canary grass, and common buckthorn are examples of the type of species that should be removed before the start of planting. Aside from removing invasive species, no other preparation is needed. If the plants are selected and placed well, they will not need purchased soils, peat moss, or fertilizers – the site will already have everything they need. In fact, such soil amendments may cause the plantings to grow too fast and then flop over, or encourage weeds to compete with them.

Planting Techniques

Live Staking or Cuttings

Live stakes are approximately metre-long sections of woody branches or stems cut from live shrubs. The cuttings are taken in the spring or fall and are cut flat on top and at an angle on the bottom (about 45 degrees). The stakes should be taken from hardy species that root easily. The most common choices for live stakes are native willow and dogwoods. When placing the stakes in their location there are a few things to remember: if the stakes are being used on their own they should be placed in groups of five and arranged like the dots on a die. They should be inserted perpendicular to the slope to promote better root growth. Drive about 70% of the stake underground to force the stake to root. In order for roots to form, it is important that the stakes have good contact with the soil; tamp the soil down around the stake after it has been planted.

Container Plants

Container plants should be soaked thoroughly before planting them (a dry root ball can repel water even when the ground above it is being watered). The plants should be gently removed from the containers, supporting the root ball to keep it intact. Cut away only the roots that cannot be worked out of the container holes. If there are roots wound around the circumference of the root mass, they should be combed out to keep the plant from strangling itself. The plant should be buried so that the top of the root ball is flush with the surrounding soil. After planting, the new arrival should be watered very well to encourage deep root growth. If the plant is in a dry or upland area, it will need regular watering for the first few months. A deep soaking once a week will help the plant more than sprinkling it frequently.

Ball-Root Plants

Some nurseries cover larger plants with a burlap wrap around the root ball. These give the root ball limited protection and should be handled gently and supported while carrying the plant. When planting it is a good idea to remove the burlap wrapper, if it can be done without the root-ball disintegrating.

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This is best done by placing the plant in its hole, undoing the bindings on the wrapper, then having one person lift the plant slightly while another slides out the wrapper. Otherwise, consult the directions under the Container Plants paragraph above.

Bare-Root Plants

Occasionally larger plants can be purchased with bare roots. They have often been 'rescued' from construction sites and are usually quite inexpensive. They should be planted as quickly as possible – the same day is best. If bare-root plants must be stored for a short time, the roots must be kept moist by covering the roots with damp straw, compost, soil, or wet burlap. However if stored for a longer time and the plant is dried, ensure the roots are kept dry. Planting suggestions are the same as for container plants.

Mulching

Mulching is the process of spreading out a layer of some kind of shredded protective material (cardboard, bark mulch, wood chips, etc.) over a site. It is usually a good idea to mulch around any freshly planted site – particularly one with water nearby. Mulch prevents the freshly turned soil from eroding, discourages competing plants and holds moisture in the soil.

Mulch should not be used right on the water's edge where wave action will wash it away; a biodegradable erosion control mat would work best there. Mulch needs to be coarse enough to stay in place and light enough to allow the plants to grow. Bark mulch and shredded hardwood work very well. Clean straw works well with quick-growing plants that can establish themselves before the straw rots away. Wood chips, cardboard, and shredded newspaper are too light and are prone to getting blown or washed away. Manure and compost should be avoided near a water body since their nutrients will wash into the water causing problems.

Mulch can be laid down before planting and when planting time comes. The mulch can be brushed aside from the individual planting holes and replaced afterward. When proceeding in this manner you should be careful to plant into the soil (not the mulch), and keep the mulch away from the plants' stems. Mulch can be laid down up to one inch deep for herbaceous plants and three inches deep for shrubs and trees.

Shoreline Naturalization Programs

Natural, well-vegetated shorelines are one of the best defenses in protecting water quality. The Rideau Valley Conservation Authority (RVCA) has a Shoreline Naturalization Program (March 2017) that helps waterfront property owners establish or enhance natural shorelines. The program provides site visits by experienced biologists, with the know-how to plan, recommend the plants you need and local sources for plant stock and provide extra muscle for the planting. And, best of all, the program has grants of up to \$1,000 for approved shoreline naturalization projects.

Watersheds Canada also offers a shoreline naturalization program called The Natural Edge. The program includes a free site visit to discuss shoreline concerns, provide recommendations, and assess planting conditions; a personalized planting plan, including photos of selected planting areas and ideal plant species; the ordering, delivering, planting and mulching of all plants; a free Stewardship Manual to

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ensure that the newly planted vegetation thrives in the first few years of establishment and growth; and follow up and support with your new plants.

The Otty Lake Association also offers subsidized native plants to its members, with assistance from RVCA

Natural shorelines (often called the Ribbon of Life) are critical to keeping our local streams, rivers and lakes clean and healthy. They act like natural filters catching and holding all kinds of nutrients and contaminants running into the water from the upland area. Vegetated shorelines are the best protection against erosion and provide valuable habitat for birds, fish and other wildlife. If you enjoy swimming, fishing or spending time along healthy streams, rivers and lakes, natural shorelines are your best friends.

To find out more or to set up a site visit with RVCA, please contact Meaghan McDonald, Shoreline Stewardship Technician, at 613-692-3571 (1-800-267-3504) ext 1192 or meaghan.mcdonald@rvca.ca

For Watersheds Canada, please contact Chloe Lajoie, Natural Edge Coordinator at 613-264-1244, or lajoie@watersheds.ca.

Water Sources

Surface Water

Surface water is water from lakes, streams, and rivers; this water source runs the highest risk of contamination from outside sources. Contamination can originate from manure storage, landfills, mishandled fuels, pesticides, solvents, and other chemicals.

Ground Water

Ground water (like surface water) is water that originates from the water cycle. It starts with precipitation such as rain or snow which is then filtered through the soil and rock, ending up in the water table. The depth of the water table fluctuates due to the amount of precipitation received and the demand placed on it by users. As with surface water, ground water is subject to contamination from many sources, including improperly handled fuels, oils, chemicals, pesticides, faulty wastewater treatment systems, manure storage, wastewater storage, faulty well caps and landfills. The extent of contamination depends on the amount and strength of the contaminant and the ease with which it travels through the soil.

Types of Wells

There are two main types of wells. These are the dug or bored well and the drilled well.

Dug or Bored Wells

A dug or bored well has a relatively wide opening (45 - 90cm) and can only access the top levels of the water table. It relies heavily on rainwater for replenishment. Dug wells are usually used in areas where the water table is close to the surface, so this type of well is susceptible to contamination.

Drilled Wells

Drilled wells are relatively small in diameter (10-20cm) and are sunk to a much greater depth than a dug well (up to several hundred meters). This makes them less susceptible to contamination since water at that depth has usually been thoroughly filtered. Drilled wells have a watertight casing which may

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extend quite deep below the surface to prevent surface water from entering the well unfiltered. Drilled wells are low-maintenance and typically stay watertight over extended periods of time.

Well Placement

Regulation 903 of the Ontario Water Resources Act specifies all requirements for any type of construction with regard to (water) wells. Provincial regulations outline minimum distance requirements for wells as follows:

- 10m (33 ft.) from a watertight septic tank
- 15m (50 ft.) from a sub-surface weeping tile effluent disposal field or evaporation mount
- 50m (165 ft.) from sewage effluent discharge to the ground
- 100m (329 ft.) from a sewage lagoon
- 50m (165 ft.) from above ground fuel storage tanks
- 3.25m (11 ft.) from existing buildings
- 2m (7 ft.) from overhead power lines if the line conductors are insulated or weatherproofed and the line is operated at 750 volts or less
- 6m (20 ft.) from overhead power lines if the well:
 - Does not have a pipe and sucker rod pumping system
 - Has a PVC or non-conducting pipe pumping system
 - Has well casing sections no greater than 7m (23 ft.) in length
- 12m (40 ft.) from overhead power lines for all other well constructions
- 500m (1,641 ft.) from a sanitary landfill, modified sanitary landfill or dry waste site

Well Maintenance

All wells must be properly maintained to prevent contamination. There should be a raised area around the top of the well casing. This allows the runoff to flow away from the well casing, thus lowering the risk of contamination.

- A visual inspection of the well should be carried out at least once a year in order to make sure the well cap is secure and that no wildlife or dead plant material have been able to enter the well. Such material can be a source of contamination.
- Check for erosion around the well cap or well casing, which can allow runoff to enter the well.
- The well casing should be checked by an inspector every two years for defects (i.e., leaks).
- Well water should be tested at least three times a year (the best time is after a heavy rainfall) to ensure that there is no contamination; the local health unit will test the water free of charge, but will only tell whether there are any bacteria (*E. coli*) or total coliforms present in the water.
- If problems are found, some examples of treatment include: the use of filters, uva/uvb light filters, distillers, ozonators, reverse osmosis or activated carbon filters.

Plugging an Abandoned Well

Ontario Regulation 903 under the Ontario Water Resources Act states that all wells that are not being properly maintained must be plugged. Landowners should never attempt to plug an abandoned well on their own. Instead they should hire or consult a drilling contractor. A reputable contractor will know all legislation, as well as acceptable materials pertaining to the process.

Well Pollutants

“Why should I have my well water tested?” or “How often should I have my well water tested?”

It is recommended that you have your well water tested three times per year. Groundwater quality may change for many different reasons. The most common cause of change is human activity – whether it be agricultural (i.e., farming), chemical spills or faulty wastewater treatment systems. In many cases your water may taste, smell, and ‘look’ just fine, but there is the potential for microorganisms to be present. If so, your well must be treated in order to provide safe drinking water. Below is a list of some water contaminants that may be found in your water, keep in mind that other contaminants not listed below are potentially harmful and could be found in your water.

Pathogens (bacteria, viruses, protozoa)

Storm water runoff is one of the biggest sources of contamination. When rainwater runs into lakes and streams, it can carry with it fecal matter from cats, dogs, cows, and other mammals living in the area. Contamination can also occur through inadequately treated wastewater (municipal sewage, leaky sewage lines or malfunctioning septic systems). Birds, in particular gulls, domesticated ducks, and geese, have become a serious contamination source.

Note: Coliforms are bacteria found in the large intestine of humans and other animals. While a few strains of *E. coli* produce serious toxins, most coliforms are not harmful. Measures of *E. coli* or fecal coliform are often used as indicators of possible contamination by fecal matter, and the *potential* for contamination of other pathogens.

Nitrates

Nitrate (NO_3) is composed of nitrogen (N_2) and oxygen (O_2). It is found naturally in the environment, in the air, soil and water and is a bi-product of the decomposition of plants and animals. The use of fertilizers on gardens, farms and lawns also adds nitrate to the environment. Nitrate can percolate into the groundwater; elevated groundwater nitrate levels are generally found when runoff passes through barnyards and feedlots. High levels can also result when excessive amounts of fertilizer are applied to a property, or when a septic system fails. Shallow wells, dug wells with casings, and wells with damaged, leaking fittings or casings are more susceptible to nitrate contamination. Excessive nitrate levels in drinking water can result in serious health problems for infants, such as Blue Baby Syndrome.

Note: The Ontario Safe Water Drinking Act (2002) recommends that nitrate levels should be below 10mg/L in drinking water.

Lead

Lead usually leaches into water by means of plumbing pipes and solder joints. Therefore only lead-free materials should be used. Lead can also be present in the standing water in the pipes themselves. It is good practice to allow water to run for a minute before drinking. Lead poisoning causes severe, irreversible health effects. It affects various organs in the body and the nervous system. It also leads to blood and brain disorders and causes mental retardation in young children.

Water Treatment Methods

To determine the type of treatment system to install, you should know which contaminants need to be removed. In most cases, purification systems are added to reduce water contamination, improve taste, or reduce odour and hardness. The most common water treatment methods include:

Ultraviolet radiation treatments

Ultraviolet radiation treatments help eliminate bacteria, viruses, moulds and other living microbiological elements. Water passes through a cylinder where it undergoes ultraviolet radiation exposure. Depending on the amount of suspended solids in the water, some microorganisms can be shadowed from the light and therefore remain active in the water system. Even though most bacteria are killed by exposure to ultraviolet rays, the cryptosporidium cyst (also known as giardia or beaver fever) is resistant to UV radiation. For this reason, a UV system is usually combined with another treatment method.

Reverse Osmosis

Reverse osmosis helps improve water odour, taste and clarity, while removing most inorganic minerals and contaminants such as nitrate, salts and calcium. This process involves filtering water through a membrane which traps most of the particles. The treated water is then separated from the rejected water and passes through a chamber where it is then available for consumption. Even though this process can be costly, it does help improve water clarity while removing most microscopic parasites.

Chlorination

This type of water treatment involves adding chlorine to the water which destroys and eliminates most bacteria. This water treatment method must be precise because if the system fails, the addition of too much chlorine to the water supply could render it toxic.

Note: Although inexpensive, chlorination can potentially form dangerous organic chemicals produced by chlorine reacting with certain metals found in the water. For this reason, carbon filters are normally added to the system, reducing excess chlorine and eliminating most chlorine by-products.

Carbon Filters

Adding carbon filters to a water system helps remove most pesticides, mercury and radon gas as well as many vaporizing organic chemicals. The activated carbon filters are very porous, absorbing most organic compounds and help improve odours caused by iron and hydrogen sulfide. Within the filter, water passes through cellulose fibres before being filtered through carbon granules. The filtered water then tunnels through additional cellulose fibers before reaching the outlet port.

Ozonation

Ozonation helps remove inorganic minerals, bacteria, most pesticides, and improves water colour and odour. Ozonation is a filtration process that exposes water to artificially produced ozone gas. Even though ozone gas is one of the strongest disinfectants, it doesn't remain in the water for a long period of time. For this reason chlorine is normally added to the distribution system to protect the water quality. Although, expensive, this water filtration method kills all microbiological contaminants effectively.

Distillation

Distillation involves the evaporation of water leaving most particles and impurities behind. The water vapour is then cooled, producing very pure distilled water. This treatment process removes most pesticides, salts, nitrates, fluoride and most heavy metals from the drinking water. Although effective, this purification method is time consuming and costly.

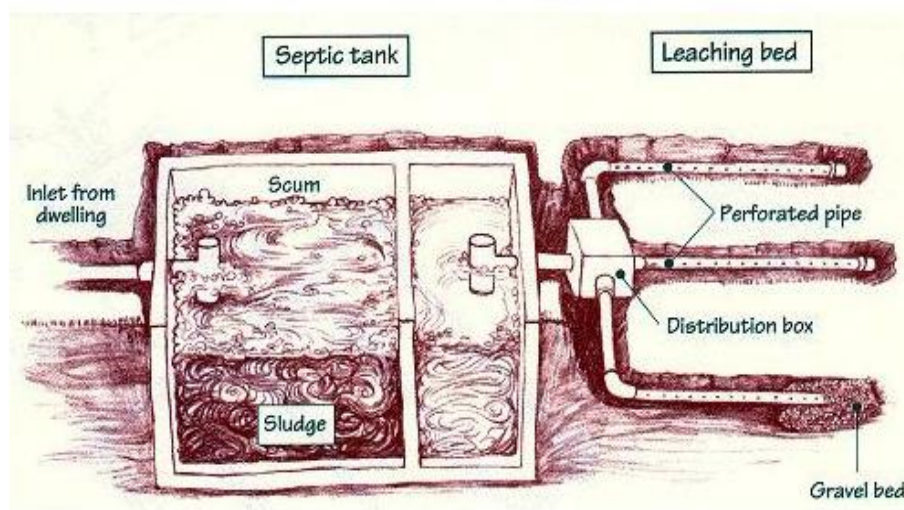
Septic Systems

In Ontario alone, there are over 1.2 million on-site wastewater treatment systems. This term describes the various types of systems that treat wastewater, with the vast majority being conventional septic systems.

Septic systems are a good way to treat waste – as long as they function properly. Faulty septic systems can be extremely hazardous since improperly treated effluent can harm both your health and the health of the environment.

What Is a Septic System?

Because wastewater can contain bacteria, viruses and other contaminants, it needs to be treated before it is released back into the environment. A properly functioning septic system uses natural processes to treat contaminants so they will not harm the environment or human health. Septic systems have two main components: the septic tank and the leaching bed. Both components use a combination of



Septic System Diagram
(Living by Water Workshop In A Box Presentation)

physical, chemical and biological processes. For more information you can download a copy of SepticSmart - Understanding Your Home's Septic System at www.rvca.ca/news/septicmart/Septic_Smart_English.pdf

Waste to Water: How it Works

Step 1: Raw sewage moves from your house or cottage into the septic tank.

Steps 2 and 3: In the tank, the sewage flows through a series of chambers where it separates into solid portions, which remain in the tank to break down, and liquid portions (effluent), which move to the leaching bed. Beneficial bacteria work to break down the solid portions (known as the scum and sludge layers).

Step 4: The partially treated effluent leaves the septic tank when new wastewater flows into the tank.

Step 5: The effluent moves through a distribution system to the leaching bed (tile bed).

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Step 6: The effluent reaches the leaching bed and flows through a series of perforated pipes.

Step 7: Some of the effluent is drawn upward and is absorbed by the vegetation covering the leaching bed. Gravity then carries the rest into the soils, which filter the remaining pollutants from the effluent. Bacteria found in the soil then breaks down the toxins remaining in the effluent. The effluent travels down from the soil until it reaches the groundwater and is reconnected with the water cycle.

Approval Process

If you are planning to install or replace a septic system it must meet requirements outlined in the Ontario Building Code and an approval from your township must be obtained prior to the installation of the system. Once completed the septic system must be inspected before filling takes place. It is suggested that you contact your Municipal Office at the beginning of your project and they will direct you through the appropriate steps. Otty Lake lies within both Tay Valley and Drummond/North Elmsley Townships. **Please refer to the Contact List for information on how to contact your township.**

The Ontario Building Code also sets out minimum distance requirements for the installation of a system. Most new septic systems on new building lots are now required to be installed 30m from open water (such as a lake or river). They must be a minimum of 15m from your drilled well and 30m from a dug well. They must also be at least 5m away from a swimming pool or vegetable garden.

For a description of Classes of Sewage Systems and further information on septic system regulations see Permits/Septic Systems, page 40.

Note: The role soil plays is a vital one; 40% of the wastewater treatment happens in the septic tank, but the remaining 60% of the treatment happens in the soil.

Why Are Septic Systems a Problem?

In areas near shorelines it is particularly important to maintain your septic system properly because soil and water conditions near shore may make the system less efficient in treating wastewater. Incomplete treatment can result in health risks for you and water quality problems.

Health risks are the most serious concern related to failing septic systems. Hepatitis, dysentery, and other diseases are spread by bacteria, viruses, and parasites in wastewater. These disease-causing organisms, called pathogens, could make near shore water unsafe for recreation.

Inadequate treatment also allows excess nutrients to reach your lake or stream, promoting algae or weed growth. Algae blooms and abundant weeds not only make the lake unpleasant for swimming and boating, but they also affect water quality for fish and wildlife habitat. As plants die, settle to the bottom, and decompose, they use up oxygen that fish need to survive.

If too many solids escape from the tank to the leaching bed, the entire system will ultimately clog up.

There are several types of septic tanks: steel, concrete, plastic or fibreglass. If you do not know what type of septic tank you have you should find out and have it inspected for decay.

Steel Tanks

Steel tanks are only present in systems 35 years or older. They are no longer legal to install. They have a simple structure: a single one-chambered tank with inlet and outlet pipes. Since they have no special

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mechanisms to slow the water down, they tend to allow much more suspended solids to escape than a more modern design. They can also become rusted out and effluent can leak into the ground.

Concrete Tanks

Concrete tanks are the most common tank type and have been in use for about forty years. They usually have a more sophisticated design than steel tanks and use several methods to slow water movement:

- A partition wall dividing the tank into two chambers with small openings halfway down to allow water to pass through
- 'Baffles' which are concrete slabs suspended from the roof of the tank hanging halfway to the bottom
- 'T' shaped entry and exit pipes

The weakness of concrete tanks is their tendency to deteriorate over time. The action of the water slowly breaks down the concrete, the baffles often fall in after approximately thirty years, the tank may start to leak, and even the partition wall may eventually collapse. The use of harsh cleaning chemicals, such as chlorine bleach and liquid plumber, can accelerate the process.

Plastic and Fibreglass Tanks

Plastic and fibreglass tanks are usually two-chambered, and have a similar structure to concrete tanks. They are relatively light and are often used in remote locations where the tank has to be transported in. However, they are more fragile than other tank types and can break if the ground shifts.

Effluent Filters

Effluent filters are strainers installed into the outlet pipe from the tank. They are not present in every tank, but are strongly recommended since they result in less stress on the leaching bed. The filters can be added to new systems, or retrofitted to older systems.

Effluent filters are easy to maintain. Once a year, slide the filter out and wash it off with a garden hose over the tank. Some filters even come with an alarm that sounds when they need cleaning. Effluent filters are highly recommended in prolonging the life of septic systems. Effluent filters are mandatory in new systems.



Zabel Effluent Filter
(Living by Water Workshop In A Box presentation)

Note: The filters remove 90% of the suspended solids that would have otherwise moved to the leaching bed.

The Importance of Soil

The soil filter is the last line of defence for breaking down any remaining bacteria, viruses, and other contaminants in the wastewater before it reaches ground and surface water. As the effluent moves through the soil, the solid particles and bacteria in the effluent are caught in the soil pores. The effluent passes through the soil, moistening and adding nutrients under the leaching bed. Soil bacteria then colonize this area. These 'good' bacteria are hard at work throughout the soil removing harmful bacteria, viruses and other contaminants.

Maintaining Septic Systems

The maintenance and care of your septic system is your responsibility. You control what goes into it and how well it is maintained. If a septic system is not properly maintained, it is more susceptible to malfunction.

Because the wastewater from a failing septic system can contaminate your well, your neighbour's well and the shoreline environment, a failing system is not just your concern, but a concern for everyone and everything that uses the area. If you notice a problem, deal with it right away for the sake of everyone's health.

Avoiding Problems and Dangers

The first step is to be familiar with your system. You need to know where the tank and bed are, what type of a system it is, and keep a written history of when it was installed, pumped, inspected, etc. Aside from knowing your system, there are four main things you can do to properly maintain it:

1. Regular Pump-Outs

The easiest and most important thing is to have the tank pumped out on a regular basis. The majority of system failures occur because the tank wasn't pumped often enough. Depending on the use and size of your septic system you should have your system pumped every 3 to 5 years.

2. Regular Inspections

It is important to inspect a septic system regularly. A good opportunity is when the tank is being pumped out. At this point you should take the opportunity to:

- Check the scum and sludge depth.
- Inspect the structure of the tank and baffles: look for any large cracks or deterioration.
- Check the fit of the access lids and arrange for repairs as necessary. The lids should fit firmly into the receiving grooves of the tank and should not be cracked or chipped.
- Listen for water running into the tank once it's been emptied. If you hear water entering the tank from the house, when no one is using any water, this can indicate leaks or a running toilet. Water running into the tank from the sidewalls or the top of tank can indicate cracks or breached seals. Water running into the tank from the outlet pipe can reveal substantial problems with the leaching bed. The problem could be as simple as a blocked leader or header pipe, or as complicated as a malfunctioning, saturated bed.

If you are unsure or unable to inspect your septic system yourself, hire a professional such as a septic inspector, a licensed contractor who installs or repairs septic systems, or a representative of a firm that pumps out septic tanks.

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As well, both Drummond/North Elmsley and Tay Valley Township support Septic System Reinspection Programs which, as of April 2010, are being provided by the Mississippi-Rideau Septic Office. **See Contact List.**

3. Protect the Leaching Bed

The leaching bed is a sensitive area of the septic system. The breakdown process in this area involves both bacteria and soil. When these components are compromised or removed, the system does not completely treat the wastewater running through it.

You need to:

- Avoid compacting the soils or damaging the distribution pipes in the leaching bed by keeping heavy machinery (like cars) and heavy foot traffic off the leaching bed. Compacting the soil can crack the distribution pipes, which causes greater volumes of effluent to be released into the leaching bed, saturating and ultimately clogging it.
- Avoid saturating the leaching bed by watering the lawn over the bed.
- Keep trees away from the septic system especially ones with creeping roots such as: Willow, Birch, Poplar and Cedar. It is recommended that a distance of 5m around the leaching bed be kept clear of trees and shrubs (at least 10m from Poplar and Willow trees). Ensure there is a vegetated buffer between your leaching field and a lake or stream.

4. Control Inputs

To reduce stress on the septic system and the environment, it is important to control the volume of both liquids and solids put into the system. Canadians are among the world's biggest wasters of water, using on average 340L of water per day.

It is recommended that you:

- Install water saving devices (i.e., water saving taps, showerheads, toilets and appliances) which will significantly reduce the amount of wastewater entering the system. This will greatly reduce the chance of the system being overloaded and contaminating ground and surface water.
- Practice water saving techniques: don't leave the tap running unnecessarily (e.g., shaving, brushing teeth, doing the dishes). Fix leaky taps or running toilets right away; a tap that drips can waste up to 55 litres in 24 hours. Use dishwashers and washing machines only when fully loaded, and spread loads out over the week.
- Avoid using commercial cleaners and opt for the more environmentally friendly alternatives found at health food stores. Chemical cleaners, solvents, antifreeze and cigarette butts all contain toxins that will kill the beneficial bacteria in a septic system. These bacteria are required throughout all of the stages of the treatment process. Without them, your system becomes useless.
- Reduce the amount of solids that have to be broken down. Items that normally go in the garbage should not be added to wastewater; a good rule of thumb is, 'if you didn't produce it, it shouldn't be going down your system'. Fats, oils and greases can clog pipes and cause the system to back up. Garburators and other systems that add solids should be avoided.

Additives

Many property owners wonder if they should be using septic additives in their systems. You should avoid using these additives as they are **not effective**. There are 3 main types of additives.

1. **Starters** are often advertised for use in a new system or in one that has just been pumped to get the bacteria going again. In reality, one use of the toilet will provide enough bacteria to get the system going. The additional bacteria won't harm the system; it will just be an unnecessary cost.
2. **Feeders** are advertised as adding food for the bacteria to increase the rate of activity. In reality low bacterial activity is likely due to excessive disinfectants or cleaning products being put down the drain, which kill the bacteria. By limiting the use of these cleaners, bacterial activity will be restored and returned to normal. Like starters, they are unnecessary.
3. **Cleaners** are chemicals that claim to clean the tank and pipes, and increase the time between pump-outs. These chemicals may clean the grease from the pipes, but they also kill the bacteria. They may also cause solids in the tank to mix with the liquids and become re-suspended. If this happens, the solids will flow out into the septic drainage pipes, which will inevitably clog the system. By trying to save the cost of a pump-out, you may be causing thousands of dollars in repair costs.

Note: To maintain a healthy system: watch what goes down the drain and have the tank inspected and pumped out regularly.

How to Tell if There is a Problem

Unfortunately it isn't always easy to tell when there is a problem with a septic system. Since most of the components are underground, it is common to discover a problem long after the breakdown has occurred. However, there are a few symptoms that may indicate a problem:

- Look for patches of abnormally healthy looking grass or vegetation on the leaching bed. These patches may be doing well because of wastewater nutrients sitting in soil just below the surface. This is a sign that the leaching bed is full. Normally these nutrients would filter down through the soil with the effluent, making room for more effluent to move through.
- If the ground over the leaching bed is soft or spongy, it can indicate that the leaching bed is saturated (full).
- Pools of dark water on the surface point to the same problem.
- When toilets and drains start backing up or they make gurgling noises and take a long time to drain, it can indicate that there is a blockage in the system or that the system is full.
- Odours can also indicate a problem. When the beneficial bacteria that break down contaminants in the soil are drowned out or suffocated by a saturated leaching bed, another bacteria group takes over. These (anaerobic) bacteria work in the absence of oxygen and produce a strong odor when breaking down contaminants. This odor can warn of a saturated leaching bed. Odors can also indicate that the tank cover is not completely sealed or buried.
- Foul smells in the house can indicate that wastewater is backing up into the house, or that the house-to-tank pipe is broken causing wastewater to leak around the foundation.

Why Septic Systems Fail

It is estimated that over half of all septic systems in Ontario are failing to some extent. Regardless of the type, or its age, all systems can malfunction, even new ones. There are a number of reasons why this might happen, but most are preventable.

If you experience a problem with your septic system, the first step is to follow the proper maintenance procedures listed above. If difficulties persist there may be a structural problem with the system.

Improper Siting or Installation

Many failed systems in Ontario are the results of poor siting or improper installation.

Before installing a new septic system, ensure that the contractor is certified to install septic systems. Your Municipal Office can assist you in locating a list of such contractors. Throughout the installation process, an official septic system inspector must inspect the work; they will visit the site a number of times to ensure that the system is up to code before issuing a permit. The inspector will insure that:

- The system is the proper size for the load
- The system is far enough away from any wells, and complies any other distance restrictions
- The distribution box is working
- The leaching bed is composed of the appropriate layers of filter material (gravel, etc.)
- The pipes are laid into the leaching bed properly (level surface-no angles)
- The leaching bed soil is covered in sod or planted with grass seed to prevent soil erosion
- The leaching bed is not buried too deeply (the backfill over a leaching bed cannot be deeper than 0.6m and must be permeable to allow oxygen to reach the bed. The soil bacteria which break down the effluent require oxygen to live).

Undersized Tank or Leaching Bed Area

Problems may arise when the tank or system is not the proper size for the volume of wastewater being produced. If the tank is too small for the volume of wastewater, the solids and scum layers in the tank build up too quickly, flow out into the bed and clog it. A leaching bed too small for the load placed on it will simply clog within a few years.

The larger the volume of waste water, the bigger the tank and bed need to be. If you have plans to build a new bathroom or bedroom, purchase additional water-using appliances, or convert a seasonal cottage into a full-time residence, you will need additional septic capacity. If the tank is too small, you can make some improvements such as adding on an extra tank, adding an additional filtering unit, or expanding the leaching area.

High Groundwater Table

The importance of establishing the high groundwater table before the installation of a septic system cannot be overemphasized. If there is not at least 0.9m of unsaturated soil between the base of the absorption trench and the high groundwater table, the effluent may not be adequately treated before it rejoins the water cycle. Once it reaches the water table, viruses and bacteria like *E. coli* – not to mention all the chemicals that were put down the drain – can move great distances and contaminate aquifers.

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The water table may rise due to changing environmental factors and prevent the leaching bed from working properly. For these situations, purchasing a composting toilet to remove sewage is an effective solution. The existing septic system will be sufficient to treat the household grey water (wastewater from sinks, showers, etc.). However, grey water still requires a separation of 0.9 m from ground water and therefore it should be noted that a raised leaching bed is required in areas of seasonally high groundwater

Distribution Box or Header is off Level

Sometimes the distribution box can settle differentially from the rest of the system (systems with pumps are especially prone to this). This is typically the result of poor compaction of the material in the septic bed directly beneath the distribution box.

A distribution box that is off-level will cause effluent to flow unevenly to the bed, so that often only one part of the bed receives effluent. When this happens the soil under the section receiving all the effluent will clog prematurely. In these situations the distribution box will need to be reset by a licensed septic installer.

Physical Damage

The tile bed can be damaged or crushed if vehicles are driven over or parked on it. The roots of trees and deep-rooted shrubs such as Willow and Dogwood can also cause significant damage. It is recommended that a distance of 5m around the leaching bed is kept clear from trees and shrubs and at least 10m from Poplar and Willow trees. Ensure that there is a vegetated buffer between your leaching field and a lake or stream. This will absorb excess nutrients, help retain water, and prevent erosion.

The Dangers of a Failing Septic System

There are a number of dangers associated with faulty septic systems and the incomplete treatment of wastewater.

One of the biggest concerns is bacterial contamination of drinking water. Often, only a small amount of contaminated water can be extremely harmful. When ingested (through drinking water or when swimming), bacteria such as *E. coli* and Fecal Streptococci can cause serious health problems and some strains are even fatal.

Nutrients like phosphorus get into the septic system through detergents and cleaners used in the house as well as through regular waste. If the nutrients are not properly absorbed by the septic system soils, they can reach our surface water. Once this happens, a whole host of lake wide problems can ensue. Added nutrients like phosphorus can cause plant growth and algae blooms to occur. This overgrowth makes swimming and boating difficult. In addition, this overgrowth can lead to the depletion of the dissolved oxygen supply in the water. Depleted oxygen levels can disrupt the natural ecosystem balance, killing fish species and other aquatic organisms.



Excessive Weed Growth
(Living by Water Workshop In A Box Presentation)

Alternative Wastewater Treatment Technologies

Conventional septic systems don't meet everyone's needs. Some sites are too small or otherwise unsuitable for a 'regular' septic system. You might want to take some stress off your old leaching bed, or significantly increase the use of a smaller bed. Fortunately, there are alternatives to septic systems. These alternatives give you more options when building or retrofitting. For example composting toilets remove human waste from the wastewater equation entirely, while advanced treatment systems process wastewater very thoroughly making it much easier to dispose of. Some of the cases where you should consider alternative systems are:

- Cottages that are being converted to full-time residences
- Old or abused leaching beds
- Homes or cottages that are close to lakes and rivers
- Areas where there is shallow bedrock or a high groundwater table
- Areas where there are clay soils
- Heavily sloped sites

Note: Any alternative wastewater treatment system to be installed must be either a type approved by the Ontario Building Code, specifically approved by the Municipal wastewater inspector or approved by the Building Material Evaluation Commission.

Composting Toilets

Composting toilets work by breaking down organisms that can be dangerous to human health (known as pathogens) and eliminating human waste, into a stable soil material that is not unlike the soil found in outdoor composters. These toilets look good, don't smell, and require very little maintenance. Depending on the capacity of the toilet, costs range from \$1,000 to \$3,000. There are several different types of composting toilets. For more information, contact the Centre for Sustainable Watersheds or the Ontario Rural Wastewater System site at Baxter Conservation Area to determine what type is right for you.

Sanitary Sewage Systems (Privies/ Outhouses)

Outhouses are generally used in remote areas such as a seasonal cottage, or for temporary purposes such as construction sites. Construction requirements can be found in the Ontario Building Code.

Sanitary Sewage Systems (Greywater)

Greywater is waste water that does not include human waste and comes from sources such as dishwater, laundry tubs, washing machines and bathtubs. The Ontario Building Code states that Class 2 greywater system installations are permitted when the amount of the water being released into the soil does not exceed 1000 litres/day, or in an area without pressurized water.

You should contact your approval agency (Health Unit or Township Office) to obtain the proper approval and your local township for the minimum horizontal clearance distances for the various systems (see the **Contact List**).

Advanced Treatment Systems

Typically, a traditional septic tank treats raw sewage only partially and produces a primary quality effluent. An advanced treatment unit will treat wastewater to a higher standard. These systems may be added on to an existing septic tank, or may replace the tank completely. The unit will still be hooked up to a leaching bed of some kind, but because the effluent is cleaner, the leaching bed carries a lighter sediment load. For this reason it can legally be much smaller than a standard system.

Advanced treatment types depend on aerobic (with oxygen) bacteria to break down the waste. Aerobic bacteria break down waste faster than the anaerobic (without oxygen) types in a conventional septic system. This results in a much faster 'turn around time' in the system. Aerobic bacteria also produce fewer odours.

For information on specific types of alternative treatment systems, check the Ontario Building Code website www.obc.mah.gov.on.ca.

Docks

If you need to replace your existing dock or install one for the first time, you may require a permit prior to construction. Your first contact should be the Rideau Valley Conservation Authority (See Contact List). Keep in mind that you are more likely to get permission if the type of dock you want to install is environmentally friendly and located away from wetlands and fish spawning grounds.

Note: Docks running between islands (floating bridges in other words) and rafts fall under the Canadian Coast Guard authority. To obtain approval for these projects they must be contacted before the start of your project.

Permanent Dock Types

This type of dock remains in place year round and is sometimes used in conjunction with floating docks to accommodate changes in water levels. These docks are stable and can last for years, but they do have environmental implications. Supports made from cribs or concrete piers damage fish habitat and prevent water flow through and underneath the dock. Generally, permits are no longer granted for permanent dock types.

There are three types of permanent docks:

Crib Docks

A "crib" is used as the foundation for this type of dock. A crib is generally made of square cut timber that is assembled in opposing pairs, one pair laid out on top of the next to create a box-like shape. The box is then filled with rock. From an environmental point of view, crib docks work best when the crib is located above the high water mark. The crib is then used as an anchor for more environmentally friendly dock types such as floating docks, cantilever docks or pipe docks.

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Permanent Pile Docks

A permanent pile dock is similar in appearance to the more environmentally friendly pipe dock (see below) but instead of resting on the surface of submerged land the poles (piles) are sunk into the sediment in pre-drilled holes. The poles can be made of wood, tubes of steel, or plastic. Flow through underneath the dock is still permitted and there is limited contact with submerged lands.

Concrete Piers

A concrete pier is a huge block of cement. This type of dock is very expensive to construct and is the most environmentally destructive. Concrete piers restrict the flow of water and consequently destroy aquatic habitat. They usually cover a large area and smother anything beneath them.

Environmentally Friendly Docks

These docks are a more environmentally friendly option. They can be taken out of the water for the winter season and cause minimal disturbance to fish and shoreline habitat. There are three types of environmentally friendly docks:

Cantilever Docks

Generally, a cantilever dock's frame stretches from the shore out over the water. A cantilever dock sits completely out of the water, so that water levels do not affect the installation of the dock. Having no contact with the water, cantilever docks do not disturb river or lake bottoms, do not restrict the natural movement of water, and do not disrupt fish habitat.



Note: Picture Taken from Department of Fisheries and Ocean's <http://www.dfo-mpo.gc.ca/regions/central/pub/dock-quais-on/05-eng.htm> (July 6,2009)

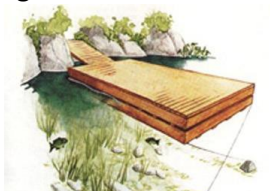
Advantages

- More protection from winter ice which helps increase the dock's life span
- No disruption to water or water body floor
- Can be used in shallow water

Disadvantages

- Can be made out of wood but may need steel reinforcement if on a large body of water with heavy wave action
- May be expensive to buy or build
- May not be suitable for places with large changes in water levels

Floating Docks



Floating docks cause minimal disturbance to fish and shoreline habitat by having minimal contact with land and substrate interface. Floating docks are relatively inexpensive, easy to build and are very versatile in situations of fluctuating water levels and difficult installation sites.

Note: Picture Taken from DFO's <http://www.dfo-mpo.gc.ca/regions/central/pub/dock-quais-on/05-eng.htm> (July 6,2009)

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Advantages

- Usually considered an acceptable choice by regulatory agencies
- Relatively easy to build and inexpensive
- Distance between the top of the dock's deck and water surface remains constant
- Can be pulled to shore in fall to protect from ice damage
- Create cooler/ shaded areas for fish
- Adaptable to many types of shorelines

Disadvantages

- Can lack stability if too small; a minimum size of 2m x 6m is recommended
- Blocks sunlight to aquatic plants
- Heavy; pulling ashore may not be practical and can damage banks
- May not last as long as others since most of its surface is in constant contact with the water

Pipe Docks

Typically, simple pipe docks are the least disruptive to the aquatic environment. They have minimal contact with the lake bottom, are smaller in size than other dock types, and sit out of the water.



Note: Picture Taken from Department of Fisheries and Ocean's <http://www.dfo-mpo.gc.ca/regions/central/pub/dock-quais-on/05eng.htm>

Note: Pipe docks are not suitable for muddy lakebed conditions, since the pipe legs will sink into the mud. However, a few inches of mud (silt) or blue clay generally cause no problem if concrete patio slabs or large base plates are placed under the legs for support.

Advantages

- Generally the least costly dock option and easiest to construct
- Least environmental impact with minimal damage to submerged lands and sunlight can penetrate the water below
- Usually considered an acceptable choice by regulatory agencies
- Due to the lightweight design they can easily be removed for winter

Disadvantages

- Maximum water depth is 2m or 6ft
- Distance between dock surface and water surface varies due to fluctuations in water levels; adjustable legs may be possible
- Very sensitive to ice pressures; should be removed for winter
- In an unprotected shore area, pipe docks are vulnerable to wave action damage

For additional information, refer to The Dock Primer on the DFO web site at www.dfo-mpo.gc.ca/canwaters-eauacan, under "Contact Information", under "Infocentre", then "Guidelines and Factsheets"

Shoreline Access

As a waterfront property owner you need access to your shoreline for various activities. There are several low-impact solutions for accessing the shore that are environmentally friendly and support the health of your property. Any kind of regular access through your buffer to the water's edge can have an impact on the sensitive soils and fragile banks which often are associated with shorelines. You can minimize these effects with the following recommendations:

- Avoid a steep path that cuts straight down a bank or bluff to the water; such a path can be difficult or even dangerous to navigate, and can create a source of erosion which flushes sediment into the water; use gentle S-curve switchbacks instead.
- The conservation authority generally requests that the shoreline access path be no more than 1 m. wide.
- On steep slopes, build stairs with landings instead of a trail to access the waterfront; stairs make shoreline access easier and safer, help your shoreline withstand frequent use, and decrease erosion; strategically placed landings also give you a place to rest and enjoy the view.
- Add a step or two on the trail, especially where the slope is greater than 10%.
- When constructing trails, place them in areas where they will not interfere with runoff.

Stairs, Decks and Other Structures

When constructing stairs, decks, gazebos or other structures, check with your municipality in regards to setback and size limitations.

Consider some structural procedures to make stairs, decks and gazebos environmentally friendly as well as functional:

- Place your support stringers on concrete pilings to keep the wood from contacting the ground; this approach reduces the amount of cutting into the slope or bank.
- Build a boardwalk, stairs or deck 10 – 50cm (4-20in) over vegetation, with spaced boards and no backs on stairs. This will allow sunlight and rain to penetrate between the boards, allowing vegetation to grow underneath; vegetation will keep soils intact and protect against erosion.
- Leave 1 inch between planks to allow water to drain, and leaves and needles to fall through
- When constructing stairs, place them in areas where they will not interfere with runoff.
- Avoid removing ground cover from areas that may easily erode, such as areas beside structures.
- Plan the structure so that it uses only the necessary space.
- Try to use materials that are environmentally friendly and do not contain chemicals.

Be careful with pressure treated wood: If you are planning to use pressure treated lumber for decking, all cutting, end sealing, staining etc. should be done well back from the water. The wood should be completely dry before being attached to the dock structure. Also never use creosote treated wood (railway ties) in or near the water. These practices will help to reduce the amount of contaminants released into the lake. Use untreated cedar or hemlock timbers for structures below the average annual high water mark. When submerged, these timbers will last a lifetime.

For further information go to:

www.dfo-mpo.gc.ca/regions/central/pub/factsheets-feuilletsinfos-on/C3-eng.htm

Alternative to Treated Wood

Cedar is a naturally durable wood that lasts 15-25 years untreated. It contains natural oils that act as preservatives to help the wood resist insect attack and decay. It is the best choice for your dock or raft.

Plastic Lumber

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Plastic lumber is another choice that works best in a low-load, structural applications, such as decking planks used for docks and walkways. It is not intended for primary structural load-bearing elements, such as beams and posts. When installing plastic lumber, consideration should be given to the effect temperature fluctuations have on the expansion and contraction of the product.

Beaches

Throughout the local area there are very few natural beaches. Beaches are often viewed as a desirable feature for a waterfront property, **but there are problems related to creating a beach on your property.**

- An artificial beach will disappear; waves, currents, ice and other erosive forces remove sand over time. Even pulling up your boat, or walking on sloping sand constantly, can push the sand from an artificial beach downhill and into the water.
- By adding more sand to an eroding beach, you risk gradually filling in your favourite waterways, silting the habitat of fish and other animals and possibly damaging the quality of your drinking water. Drifting sand can also inflict all these problems on your neighbours.
- Imported sand, especially unwashed building sand, can bring in unwanted seeds or insects that may be inappropriate for your area.
- When you clear shoreline vegetation to create space for a beach, you lose one of your critical tools for runoff and erosion control, as well as habitat for wildlife.
- The creation of new beaches is not permitted by approval agencies in many areas. Most land below the high water mark or 'natural boundary' of a water body belongs to the Crown and is public land. If you alter it without prior approval you can be fined.

Permits

Before you embark on any project on or near a shoreline of any lot which abuts a navigable waterway (such as Otty Lake), you will likely require a permit. Depending on the type of activity, a permit may be needed from a federal, provincial, or municipal government department (or sometimes a combination).

The Contact List at the back of the Handbook provides contact information for these organizations and others.

Obtaining a Permit for Marine Work, Construction, or Repair

The Rideau Valley Conservation Authority (RVCA) should be contacted prior to any marine work, including any shoreline alteration or the construction, repair or modification of any structure that is below the high water mark to determine what approvals are required. The RVCA may forward you to the local Ministry of Natural Resources office which is responsible for any development over the bed of the lake.

In some circumstances your application may need to be reviewed by other government agencies such as the Department of Fisheries and Oceans or Ministry of Environment. In 1998, Conservation Authorities in Ontario began to assist the Department of Fisheries and Oceans in its implementation of the Fisheries Act, Section 35.

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Note: In-water activities should not occur during local fish spawning and nursery periods since they could disturb spawning behaviour, smother eggs and kill young fish. The following schedule indicates when in-water work is not allowed in the Otty Lake area:

Warm and cool water fish communities from March 15th to June 30th

Generally when shoreline permits are necessary, the RVCA requires that an upland vegetative barrier be established to aid in the protection of water quality and bank stabilization.

Conservation Authority Permit Process

The RVCA's current jurisdiction (April 2010) is between the low water mark and the high water mark. It is anticipated that flood plain mapping for Otty Lake will be available soon. This mapping will be distributed for public review prior to adoption by the Conservation Authority.

Note: Keep in mind that other approvals may be necessary. Approval from one government agency does not guarantee approval from another agency.

Shoreline Stabilization

Shorelines play an important role in providing habitat for fish and other aquatic organisms. A healthy shoreline also prevents soil erosion and nutrient loading. Any shoreline work or alteration to the shoreline requires permission from the Rideau Valley Conservation Authority and generally also the Ministry of Natural Resources. Maintaining a natural buffer along the shore will limit/prevent shoreline erosion.

The types of stabilization techniques that **can** be approved include:

- Shoreline plantings (preferred)
- Bioengineering techniques
- Rip Rap with shoreline plantings

The following will **not** be approved:

- New vertical walls of any type including Armour Stone Walls. (Vertical walls create wave refraction, scouring and offers little habitat value)

Repair to existing walls can be approved if it is evident that the wall is being repaired and not replaced.

Permits for Septic Systems

Design, construction, operation, and maintenance of septic systems are regulated by the Ontario Building Code. The Code covers building permits for septic systems and is enforced by municipalities.

Classes of Sewage Systems

The Ontario Building Code designates five classes of sanitary sewage disposal:

Class 1: A chemical toilet, an incineration toilet, a recirculation toilet, a self-contained portable toilet, and all forms of privy including a portable privy, an earth pit privy, a pail privy, a vault privy, and a composting toilet system, all of which can receive only human waste

Class 2: A greywater system, which can receive only greywater waste

Class 3: A cesspool, which can receive waste only from a Class 1 System

Class 4: A leaching bed system, which can accept both human body waste and greywater waste

Class 5: A sanitary sewage system with an on-site holding tank for sanitary sewage produced on-site, prior to removal by a haulage service provider; it can accept both human body waste and greywater

Building Permit Required

A building permit must be obtained before any installation, extension, or alteration of a sanitary sewage system can take place. **Contact your Municipal Office for direction to the appropriate approval agency.** Permit applications are typically associated with:

- New construction on a vacant lot
- Alteration or additions to an existing building
- Construction of a new system for an existing building
- Corrective work or repairs to an existing system
- Upgrade of an existing system

The approval agency provides a permit application package to the property owner. It typically contains an information package with sewage system worksheets, a property description and applicant information sheet, a site description, calculations and intended system type sheet, a site plan and applicant or agent signature sheet, a completion notice and a sewage system fee schedule.

See the Contact List for Tay Valley and Drummond North Elmsley Townships and the Lanark, Leeds and Grenville District Health Unit.

Aquatic Plants

Aquatic plants are an important part of a natural aquatic ecosystem, especially in the ecology of shoreline areas. They provide habitat for fish to spawn, feed and hide from predators. Aquatic plants help maintain water quality by stabilizing sediments. Having too many aquatic plants can interfere with boating, swimming and other recreational water activities, and at times, some control may be necessary. **(Working Around Water? Department of Fisheries and Oceans (DFO) Factsheet Series [Ontario Edition])**

Regulations for Aquatic Plants

The beds of most water bodies in Ontario are legally public land. In order to remove aquatic plants by physical or mechanical methods, approvals from one or more agencies and a work permit from the applicable authority may be required. To obtain approval for in-water and shoreline works in our area,

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your first contact should be the Rideau Valley Conservation Authority. **For more information on controlling aquatic plants refer to:**

www.dfo-mpo.gc.ca/regions/central/pub/factsheets-feuillets/infos-on/l2-eng.htm

Control Methods for Aquatic Plants

- Raking
- Removal by hand
- Mechanical harvesting
- Cutter-bar devices
- Bottom barriers (mats or blankets)
- Chemical methods (herbicides)

Note: Anyone proposing to apply herbicide for the control of aquatic plants must first obtain a permit issued by the Ministry of Environment under the Pesticides Act. However, the application of pesticides can be very harmful to fish and is a practice that is generally not approved.

To preserve fish habitat, hand removal and raking are the preferred methods. If disturbance of the lake bottom is minimized and all cuttings are removed from the water, cutter-bar devices or mechanical harvest methods are acceptable. DFO discourages the use of bottom barriers such as mats or blankets as they restrict the natural processes in lake and stream bottoms.

How Much to Remove

The amount of plant material that can be removed depends on the conditions of the waterfront. Factors include what fish species are present, the abundance and distribution of plants, and the reasons why you are controlling the plants.

Removal permits may be granted provided that the proposed area for plant removal is not within a sensitive habitat. A sensitive habitat includes fish spawning, nursery, and feeding areas as well as areas of important aquatic vegetation. Also included is cover for fish, and fish migration routes. The permit will also specify the exact time of removal.

Note: The Ministry of Natural Resources will determine if the proposed area of removal is considered 'sensitive habitat'.

Timing is Critical

Warm-water fish species spawn during spring and early summer. Removing aquatic plants at this time could kill eggs and young fish or other aquatic organisms. Any aquatic vegetation removal should adhere to the fishing timing moratorium (March 15th – June 30th)

Dredging

Dredging may be harmful to fish and their habitat. If your project involves dredging (removal of rocks or sediment from the bottom) you will need to seek approvals for dredging.

Disposal

the plants that are removed by physical or mechanical methods should be disposed of well above the average annual high water mark to ensure that no sediments, plant materials or nutrients leach back into or re-enter the water. This includes plant material removed using any method as well as any dredged material.

Lawns

In North America, lawns now account for more than 20 million acres of land use. Often chemical fertilizers are applied to these lawns, and it is not uncommon for a typical, chemically manicured lawn to have between five to ten times the concentrations of chemical fertilizers and pesticides per unit area than in an agricultural setting. **One of the main problems with using chemicals on shoreline properties, especially lawns, is that over 55% of precipitation runs off short lawns. On a shoreline property, the runoff goes directly to the adjacent water body, where it can upset the natural ecosystem.** Lawns should certainly not be eliminated but they should be placed further back from the shore and natural lawn care methods should be used, as discussed below.

Pesticides

There are over 6,000 pesticide products registered for use in Canada today. The overall impact these pesticides have on humans and wildlife is generally unknown until prolonged exposure has occurred. Even though pesticides sprayed on fields and crops can be washed off to a certain extent, the remnants of these chemicals cause serious problems to both the environment and human beings.

What Are Pesticides?

Pesticides are a combination of chemical ingredients specifically designed to kill organisms considered to be undesirable, such as insects, weeds and fungi. These chemical products include herbicides, insecticides, fungicides, nematocides, rodenticides and even algaecides (for pools). Pesticides are composed of active ingredients which often include carcinogens and/or toxic substances. These active ingredients include all chemicals found in the pesticide that kill, disperse, attract or control the targeted pest. The remaining ingredients (i.e., water, solvents, propellants etc.) are called non-active or inert ingredients and are not used to kill or harm the targeted species. This does not however, imply that these inert ingredients aren't harmful.

Human Health Risks

Even though many precautions and regulations regarding pesticides are enforced, these toxic substances can still impact the health of humans. In most cases, pesticides are easily absorbed through the skin, inhaled, or ingested where they attack various organs. Pesticides can aggravate existing health problems and can even cause new ones. Evidence is building on the negative and previously unknown side effects of these chemicals. The risk in children is also a growing concern. Some behavioural and learning disorders are being linked to pesticide exposure in breast milk and in utero. Children have a higher surface area (skin) to volume (body) ratio and higher metabolic rates than adults, which disproportionately increases their exposure rates. With increased exposure comes increased risk of cancers, birth defects, nervous system impairment, immune suppression, and reproductive hormonal and genetic damage.

Health Risks to Flora and Fauna

Pesticides also have a great impact on the flora and fauna. Wildlife faces many of the same threats as humans, which increase exponentially with the millions of tonnes of unnatural chemicals entering their habitats on a yearly basis.

Other problems that can occur in wildlife due to pesticides are bioaccumulation and biomagnification:

Bioaccumulation

Bioaccumulation is a tendency for some pesticides to build up in tissues of living organisms over a period of time. The concentration of chemical products in living tissue increases and reaches a concentration that is much higher than the surrounding environment. Pesticides increase in concentration as they move up the food chain, thus increasing in toxicity. When referring to bioaccumulation in the food chain, the term biomagnification is often used.

Biomagnification

Biomagnification is the capability of some pesticides to gather as they advance through the food chain. Concentrations of chemicals in each step of the food chain are amplified and accumulate and since humans are at the top of the food chain, we experience health repercussions. Fish, for example, are very sensitive to certain pesticide residues. Their flesh becomes contaminated with pesticides that persist for years after their exposure. Higher pesticide levels are found in larger, older fish that have large amounts of body fat. Pesticide bioaccumulation then occurs within humans that eat fish.

Natural Lawn Care

Since more and more people are becoming aware of the negative impacts pesticides and fertilizers have on wildlife and humans, alternative natural methods of lawn care are being developed. The best defense against pests and diseases in a lawn is to use common gardening practices:

- Leave your lawn approximately 10 centimetres high to encourage the growth of stronger and deeper roots.
- Leave grass clippings on the lawn, so nitrogen will naturally return to the soil.
- Do not over-water as fungus and disease often prosper in these conditions.
- Scald weeds with hot water to help remove them.

Alternative Methods for Control of Garden Pests

- Remove insects with pressure sprayers of air or water, or pheromone traps, baits and lures.
- Repel insects from flower beds and gardens using hot pepper wax (which can be found at most garden centres).
- Prevent weeds from growing using physical barriers around plants (such as mulch).
- Use natural weed killers (such as corn gluten) which can feed turf grass and help eliminate weeds.
- Remove weeds by hand.
- Prevent further weed growth after removal by covering the weeded area with a blend of compost and grass seeds; this natural mixture will also help the soil regain a healthy composition.

Retiring a Lawn

Transforming your lawn to a more natural environment will help protect both your lake and groundwater. In areas close to shorelines, grass is not a good choice of ground cover. Turf grass has a short root system and does not bind to the soil; this can cause erosion along the shoreline. Turf grass along a shoreline also permits much more runoff and pollutants to pass over it toward the surface water. By retiring areas of your lawn that are not actively being used and establishing a buffer, you will reduce maintenance and protect your shoreline from erosion.

How to Retire a Lawn

You can naturalize your lawn in manageable sections by adding or increasing wildflower gardens, shrub borders, adding a rockery, or expanding forest and field habitat.

Note : Try not to disturb the soil too much when you retire your lawn, as digging can liberate weed seeds that are buried and dormant, in the soil of your property.

The first step in lawn retirement is to simply stop mowing. There should still be enough dormant native seeds in the soil, and local seed stock, to regenerate the site naturally. If this option is not possible, planting native plants and shrubs will help.

Note: Native plants have co-evolved with the pests and pathogens and therefore do not require applications of pesticides to survive.

Living with Wildlife

Throughout Ontario there is a variety of wildlife species that are beneficial to you and your property. However some species can cause problems if proper precautions are not taken. Some recommendations for minimizing wildlife problems include the following:

Block Access

- Block all means of entry for insects, rodents and bats via foundations, porches and steps; through doors and windows; through holes in roofs or eaves; through cracks in floors, ceilings, and walls; and through access points for wire and pipes.
- To avoid trapping animals or their young inside, be sure that all possible intruders have left before sealing up entrances; fall is a good-time for pest proofing.
- Seal with, caulk, weather-stripping, expandable foam, crumpled heavy-duty aluminum foil, metal flashing and/or steel wool.
- Use fine wire mesh screens on all doors, opening windows and vents including attic and under-floor vents.

Discourage Contact

- Trim tree limbs that touch your roof or the walls of your home or outbuildings.
- Store firewood and lumber away from main buildings, or in a special shelter.
- Minimize outdoor light use, and use yellow light bulbs in all outside light fixtures to reduce the number of flying insects attracted to the house light.

Keep Food Away

- Use animal-proof garbage cans, and if feasible, keep garbage cans in a shed or garage until garbage can be removed. If there are bears in your area, and you can't safely store your garbage indoors, construct a very sturdy container and remove your garbage often.
- Keep pet food inside to avoid attracting wildlife; if you must feed pets outdoors, remove food dishes and any leftover food after feeding.
- Keep all food (including pet food) in sturdy rodent and insect-proof containers; remember that rodents can chew through some plastics.
- If you have orchards or berry bushes, fence your orchard and harvest the fruit (including the windfall) to discourage bears.
- Maintain your compost; turn it regularly and cover with dirt or leaves; improperly maintained compost piles and bins attract many animals, including skunks and raccoons.
- If there are bears in your area, consider indoor worm composting.
- Keep barbecue equipment clean and store your barbecue in a secure area; wildlife is attracted to the rich odours.
- Prevent bird feed from accumulating on the ground; use feeders with large trays or add a higher lip around the platform to prevent spillage; keep feeders away from decks where it can be hard to clean up spilled seeds.
- Avoid using suet in feeders as this can attract other wildlife; fill feeders only when bears are in hibernation; when bears are active there are plenty of food sources for birds.

For more information on the MNR Bear Wise Program refer to
www.mnr.gov.on.ca/en/Business/Bearwise/

Species at Risk

What is a Species at Risk?

A species at risk is any plant or animal that is at risk of extinction or of disappearing within the province. To determine whether a species is at risk, first it is considered by the Committee on the Status of Species at Risk in Ontario (COSSARO). Next, a group of experts conducts an assessment using a variety of tools including scientific data, traditional knowledge, and community knowledge. Once a species is determined to be at risk it is immediately placed on the Species at Risk in Ontario (SARO) list. In Ontario there are currently 185 species of plants and wildlife classified as Species at Risk.

Within the classification of Species at Risk there are several levels that are used to determine the severity of concern for a species. These levels are as follows:

Extinction – a species formerly indigenous to Canada that no longer exists anywhere

Extirpated – a native species that no longer exists in the wild in Ontario, but still exists elsewhere (e.g. Greater- Prairie Chicken)

Endangered – a native species facing extinction or extirpation (e.g. American Badger)

Threatened – a native species at risk of becoming endangered in Ontario (e.g. Eastern Hog-nosed Snake)

Special Concern – a native species that is sensitive to human activities or natural events which may cause it to become endangered or threatened (e.g. Monarch Butterfly)

Why Are ‘Species at Risk’?

Both human and natural factors cause species to become ‘at risk’. Human factors include habitat degradation, over harvesting, changing land uses, landscaping, invasive species introduction, persecution and pollution. Natural factors include specialized life history, disease, small geographic range, large territory size and rarity of habitat. The most common factor that contributes to a species becoming ‘at risk’ is a loss of habitat.

Note: Habitat is the key to the development and continued existence of any species; habitat provides shelter, food and breeding ground for wildlife and therefore is essential to the future generations of a species.

What You Can Do

You, as a landowner, play a significant role in the protection of species at risk by:

- Reporting sightings of species at risk, and
- Allowing wildlife habitats to form on your property and maintaining them (for example protecting vernal pools, and leaving dead fallen trees and cavity trees – these provide both habitat and food sources)

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Ministry of Natural Resources & Forestry Stewardship Approach

The Species at Risk Stewardship Program is the key piece in the Ontario's Endangered Species Act of 2007. It contains several features that promote the protection of Species at Risk:

- Education and outreach
- Incentive programs to support private landowners, and
- Funding for stewardship activities

The Ontario Species at Risk Stewardship Fund aims to create public involvement and provide support for private landowners to obtain help and resources to protect Species at Risk.

If you are interested in participating in a Stewardship Program related to Species at Risk, contact the Community Stewardship Council of Lanark County or the Kemptville District Office of the Ministry of Natural Resources (see the Contact List).

For further information on the Species at Risk Stewardship Fund, guidelines for eligibility criteria and more information about Species at Risk in Ontario visit the website www.ontario.ca/page/ministry-natural-resources-and-forestry and click on Species at Risk.

Wildlife Habitat and Attracting Wildlife: What You Can Do

You may have some of the following property features that help to attract wildlife species:

Cavity Trees

Large trees with hollow cavities are a vital source of food, shelter, and safety. 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. By retaining cavity trees on your property, you provide important habitat for wildlife.

Fallen Logs

Fallen logs are essential habitat for small mammals, such as moles, certain woodpeckers, toads, and many insect species. As the log rots, the trunk becomes damp and spongy encouraging the growth of fungi (such as mushrooms) and mosses. Reptiles and amphibians will lay their eggs in the moist wood. A decaying log is also great habitat for beetles and ants that burrow under the bark or lay eggs.

Cedar Stands

Cedar Stands provide potential habitat for deer yards. Deer yards consist of a core area of mainly coniferous trees (pines, hemlock, cedar, spruce) with a canopy closure of more than 60% which provide shelter, ease of movement, and protection from predators. The land surrounding the core area is usually mixed or deciduous forest.

Dense Coniferous Forests

These forests provide winter habitat for wild turkeys because they offer minimal snow accumulation on the ground and protection from cold and predators. Coniferous stands used by turkeys are usually on valley floors or lower slopes. Wild turkeys readily move to new food sources and may change roosting sites from year to year. The most consistently used areas have stable, abundant, and high quality food sources located nearby.

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Mast Producing Trees

Mast is fruit and seeds produced by maple, elm and ash, and nuts from oak, black walnut and beech. Mast is the primary fall and winter food for most forest wildlife species for building fat reserves for hibernation. Acorns comprise a significant portion of the fall diets of white-tailed deer and wild turkey.

Vernal Pools

These are temporary wetlands formed in depressions by rain and melting spring snow. Short-lived, they last anywhere from a few days to three to four months before drying up. They are an important breeding habitat for amphibians since they lack predators such as fish and reptiles found in permanent water bodies. Fairy shrimp and water striders also use vernal pools.

Reptile Hibernacula

These are sites that can often be found in large forested areas that have rocky outcrops with crevasses. An ideal habitat site has a forested corridor adjacent to the rocky site. Rocky habitats also provide nesting, den sites and cover for many other species of wildlife, including birds, amphibians and snakes and small mammals such as foxes, skunks, squirrels and rabbits. A male ruffed grouse may also find this an attractive drumming site.

Brush Piles

Brush piles can be constructed with the cut materials from trail clearing or woodlot management (pruning). Pile the brush, approximately waist-high, on a stump, log, boulder, or along fencerows. These provide habitat for snowshoe hare, cottontail rabbits and others. For added benefit, train climbing vines, such as Virginia creeper onto the brush pile.

Leave Dying Material in Place

When safe, you can help attract wildlife by leaving dead standing trees, fallen logs and the mast fallen off of trees on your property. However, note that dead elm trees should be removed as they can provide habitat for elm bark beetles, carriers of Dutch Elm disease.

Invasive Species

Within the local area there are a number of invasive species of plants, trees and aquatic vegetation. The following is a list of selected invasive species that may be found in this area. For a complete list refer to the Contact List for a website address.

Acer platinoides (Norway Maple)

Origin: Europe

Norway maple was introduced from Europe for use in urban landscaping in 1778 and escaped from planted areas into open woods and floodplains in southern Ontario. It is able to colonize and dominate almost any forest habitat, shading out many native species.

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Alliaria petiolata (Garlic Mustard)

Origin: Europe

Garlic mustard was introduced deliberately to North America from Europe for its medicinal value. It grows in disturbed and natural sites, forming dense monocultures. It prefers partial shade and thrives in soils high in lime. It has endangered native Wood poppy, American ginseng and White wood aster.

Alnus glutinosa (European/Black Alder)

Origin: Europe, northern Africa, and western Asia

European black alder was introduced to North America long ago and has escaped from cultivation. It is sometimes seen along bodies of water, where it may successfully self-seed and form pure stands. The preferred habitat is shady, moist to wet areas.

Butomus umbellatus (Flowering Rush)

Origin: Europe

Flowering rush first appeared in Canada in 1897. Flowering rush reproduces by both seed and vegetative spread of its rootstocks. Its seeds are also long lived, which increases the opportunity for spread. Once established, flowering rush forms dense colonies and grows mainly in marshes and shallow water. It can out-compete willows and cattails.

Hydrocharis morsus-ranae (European Frog-bit)

Origin: Europe

European frog-bit is a floating aquatic plant. It was intentionally introduced for horticultural purposes at an experimental farm in Ottawa. It escaped from the experimental farm in 1936, moving into the Rideau Canal. Since then it has continued its spread into many lakes and rivers in Ontario, forming dense mats and limiting light penetration for native aquatics.

Lonicera tatarica (Tartarian Honeysuckle)

Origin: Eurasia

Tartarian honeysuckle was planted as a wildlife shrub by government agencies and as an ornamental in gardens. It quickly spread to colonize open woods, fields, and shorelines. These large shrubs displace native understorey and ground covers as well as changing vegetation structure, and impeding forest tree regeneration.

Lythrum salicaria (Purple Loosestrife)

Origin: Europe

Purple loosestrife was imported by settlers for flower gardens and also was present in soils used for ballast in ships. It degrades wetland habitats, chokes out fish-spawning grounds and competes with wild rice (a valuable food plant for wildlife) and other important native species. Purple loosestrife is very difficult to eradicate once established. To help control the spread of this plant, remove the flower spikes prior to seed set and cut stems off at ground level to inhibit growth. Any cuttings should be bagged and burned.

Myriophyllum spicatum (Eurasian Milfoil)

Origin: Europe, Asia, and Northern Africa

Eurasian milfoil thrives in areas of disturbance. Because new plants grow from each joint on existing plants, it quickly forms dense mats of floating vegetation that prevent light from penetrating down to other aquatic plants. Milfoil spreads when stem pieces break off and are carried away by currents. It

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moves from lake to lake via boats, trailers and fishing gear. Once Eurasian milfoil has established itself, it is impossible to eradicate.

Phalaris arundinacea (Reed Canary Grass)

Origin: Europe and North America.

Reed Canary grass is an aggressive spreading grass that develops dense monocultures that are able to displace native species. It is commonly found growing in areas with purple loosestrife populations.

Phragmites australis (Common Reed)

Origin: Eurasia and Africa.

Common Reed is quite aggressive and very resilient. It is adaptable to periods of flooding and drying and tolerates a wide range of temperatures. It can spread at a fast rate and often out-competes native vegetation. Common reed occupies open areas, preferring the moist soils of marshes, shore areas and ditches.

Poa pratensis (Kentucky Bluegrass)

Origin: Eurasia

Kentucky bluegrass was introduced as a cultivator used in lawns and pastures. It has quickly spread to meadows, fields, and semi-open woods. This species of grass grows early in the season while most plants are still dormant. It grows rapidly and leaves little room for other more desirable plants to grow, as they cannot compete.

Polygonum cuspidatum (Japanese Knotweed)

Origin: Japan

Japanese knotweed was brought to North America as an ornamental plant in the late 1800's. This highly invasive plant is found along roadsides and wetland areas where it out-competes native vegetation. It is extremely difficult to control once established because of its deep, complex root system.

Potamogeton crispus (Curly Leaf Pondweed)

Origin: Africa, Asia, and Europe.

Curly leaf pondweed was introduced accidentally with fishery stock. It forms dense mats of vegetation on the surface of the water, blocking sunlight and increasing water eutrophication.

Rhamnus frangula (Glossy Buckthorn)

Origin: Europe

Glossy buckthorn was imported to North America as horticultural stock in the 1800's. It became naturalized via bird dispersal. Its growth can be dense enough to exclude other species and is one of the most aggressive invasive species of wetland habitats. To control this plant, you must regularly cut it.

Syringa vulgaris (Lilac)

Origin: Europe

Lilac was introduced to Canada as an ornamental shrub and quickly spread to roadsides and waste places. It is a hardy shrub that can withstand cold, harsh temperatures and can grow just about anywhere.

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Vinca minor (Periwinkle)

Origin: Eurasia

Periwinkle is widely planted as ground cover in ornamental gardens and has since spread to roadsides, waste places, and open woods. Periwinkle excludes all other species and prevents re-growth. It can completely wipe out the understory of forests.

Cabomba caroliniana (Fanwort)

Origin: South America

Fanwort is a submersed, perennial, freshwater plant native to the southeastern temperate climates of North and South America. Fanwort is a common aquarium plant, sold in pet stores across North America, which poses a serious threat to Ontario waters. Once present in a water body it crowds out native plants and blocks the natural flow of water.

Zebra Mussels

Zebra mussels were first discovered in 1988 in the Great Lakes and have since spread rapidly throughout fresh water lakes and canals in Canada and the Northern United States. Zebra mussels are native to the Ponto-Caspian region of Europe but were introduced to the St. Lawrence Seaway through the discharge of ballast water from ships. Zebra mussels spread very quickly, their eggs are transferred through bilges and bait wells that are not emptied and cleaned before being placed into a new water body. Zebra mussels cause a number of problems:

- Killing native mussels by fastening themselves to their shells and preventing them from breathing, feeding and moving
- Introducing toxins to any waterfowl that feed on them (Zebra mussels have high concentrations of toxins)
- Clogging water pipes which costs millions of dollars to repair
- Increasing hazards on docks by attaching to surfaces (Zebra mussels can cut and tear your skin)
- Filtering algae from the water which will cause many species to disappear as the ecosystem changes radically
- Increasing water clarity and light, which increases growth in bottom-dwelling aquatic plants

With the variety of problems that Zebra Mussels cause, it is essential that you try to control and stop the spread of this destructive species.

- Use hot water to kill zebra mussels in your boat, but this is only effective on a small bilge or when cleaning live wells and bait buckets.
- Potassium, bromide, ozone and ultraviolet light are other alternatives that will kill zebra mussels, but are difficult to apply.
- Drain water from bilge, live wells, bait buckets, trailers and wheels; wash bait wells with hot water.
- Do not transfer bait from and infected water body; rinse the hull with hot water, high-pressure washer or dry in the sun for five days.
- Flush the engine coolant system with hot water (60C/140°F).
- Carefully inspect screens, water intakes and drain pipes for mussels.
- Leave your boat out of the water for 3+ days in hot, dry weather to kill mussels and larvae.

Zebra mussels are a growing problem in Canada that will not abate until people become aware of their destructive effects and take steps to help stop their spread.

Lyme Disease – March 2017, Article reviewed by Dr Paula Stewart, Medical Officer of Health, Leeds, Grenville and Lanark District Health Unit

Lyme Disease is a bacterial infection caused by spirochete bacteria called *Borrelia burgdorferi*. The bacterium that causes Lyme Disease has been in North America for over a century and has more recently been identified in Eastern Ontario in areas close to Otty Lake. The black-legged tick is the vehicle for transmitting the bacteria that can cause Lyme Disease.

In order to mature, the tick needs a blood feed of 4 to 5 days in each of the larva, nymph and adult phases. During the larva stage it feeds on deer mice and sometimes birds. During the nymph and adult phase it usually feeds on small mammals and deer but may feed on humans. It is during this feeding that the bacteria, if it is present, can be transmitted to its host. It is not uncommon for a person to be completely unaware of a tick bite and feeding as the tick emits an anaesthetic-like substance while it feeds.

Ticks cannot fly, they do not jump and do not move large distances along the ground. They typically seek a host by climbing vegetation (such as grass, bushes or shrubs along forest edges), and wait for a suitable host to come in contact with them. They walk around a bit on the host before deciding to feed.

The tick needs to be attached for about 24 to 36 hours before it can transmit the bacteria if present. The blood meal changes the RNA of the bacteria during that time so it is not killed by the tick's saliva. Therefore, ticks should be removed within 24 hours to reduce the risk of infection. The body does not maintain a natural immunity to the disease and thus, a person can be re-infected.

How do I avoid ticks?

- If you frequent the areas where blacklegged ticks are established, examine yourself thoroughly for ticks when you come indoors. It is important to do this each day. Pay special attention to areas such as groin, scalp and armpits. Use a mirror to check the back of your body or have someone else check it. Nymphs are quite small 1/16", the adults are about 1/8" but the adult abdomen swells during the blood meal so it looks bigger once it has been attached for over 24 to 36 hours.
- Take a quick shower which may help to remove a tick that hasn't attached itself.
- Put clothes in hot dryer to kill ticks.
- Wear light-coloured clothing. It makes ticks easier to see and remove before they can attach to feed.
- Wear long pants and a long sleeved shirt, and wear closed footwear and socks. Tuck your pants into your socks.
- Use a tick-repellent that has "DEET" (following the manufacturer's directions for use). Apply it to your skin and outer clothing. Avoid your eyes and mouth, as well as cuts and scrapes.
- Put a tick and flea collar on your pet and check them for ticks periodically. Ticks on pets may drop off before becoming attached when they come inside, and the tick will then search for another host.

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How do I reduce ticks around my home/cottage?

- Ticks prefer to live in humid, wooded areas.
- Keep the grass in your yard mowed.
- Remove brush and fallen leaves from the edges of your property, especially if your yard is bordered by woods or fields of tall grass.
- A border of gravel or wood chips that creates a physical separation between lawns & wooded areas will help reduce the movement of ticks from their natural habitat into your yard.
- Clean up areas under and around bird feeders, to reduce the attraction of small critters such as mice and voles. These mammals help to transport ticks and are necessary hosts for ticks to complete their life cycle.
- Place children's play structures away from wooded areas to avoid exposure to ticks

What do I do if I find an attached tick?

- Prompt removal of ticks from your skin will help prevent infection, since transmission of the Lyme disease agent usually requires the tick to be attached for more than 24 hours.
- Using fine-tipped tweezers or a tick removal tool, carefully grasp the tick as close to your skin as possible. Pull it straight out, gently but firmly.
- Don't squeeze it. Squeezing the tick may cause the Lyme disease agent to be accidentally introduced into your body.
- Don't put anything on the tick, or try to burn the tick off.
- Thoroughly cleanse the bite site with rubbing alcohol, peroxide and/or soap and water.

When should I seek health care?

- See your doctor or nurse practitioner if you experience any of the following symptoms within a few days to a month or so following a tick bite: a bulls-eye rash at the site of tick bite, malaise, fever, fatigue, headache, stiff neck, swollen lymph nodes, and muscle and joint soreness. These are the early symptoms of Lyme Disease. You will receive a course of antibiotics and a blood sample will be taken for an approved laboratory test to see if you have antibodies to the bacteria. The early blood tests are not very accurate so early treatment is based on symptoms rather than a lab test.
- If the disease is not treated, later symptoms may develop including facial palsy and other neurological problems, and heart problems. A course of antibiotics is also given in this situation and a blood sample will be taken to see if you have antibodies to the bacteria. The later blood tests are more accurate, but some people with Lyme Disease never test positive.
- For some people the disease is not detected and treated early and these people may develop chronic symptoms of fatigue, arthritis or other complications. This is why it is so important to identify Lyme Disease early.

For further information

www.healthunit.org/hazards/documents/lyme.htm

www.health.gov.on.ca/en/public/publications/disease/lyme.aspx

www.phac-aspc.gc.ca/id-mi/lyme-fs-eng.php

West Nile Virus

In recent years the concern over West Nile Virus in Ontario and throughout Canada has grown. As a waterfront property owner you need to be aware of the potential danger that West Nile Virus presents to you, your family and guests.

West Nile Virus is mainly transmitted to humans through the bite of an infected mosquito. The chance of becoming infected is low, but people with weak immune systems or chronic diseases are at a greater risk for developing serious health problems from infection.

What can I do to protect myself and others?

First, protect yourself and others from mosquito bites.

You can also eliminate potential breeding grounds for mosquitoes on your property by:

- Regularly (twice a week) draining standing water from items like pool covers, saucers under flower pots, recycle bins, garbage cans, etc.
- Removing unused items from around your property (e.g., old tires) which have a tendency to collect water
- Changing the water in wading pools, bird baths, pet bowls and livestock watering tanks twice a week
- Covering rain barrels with mosquito proof screens
- Cleaning out eavestroughs regularly to prevent clogs that trap water
- Purchasing an aerator for your ornamental pond, this will keep the surface water moving which will make the water inhospitable to mosquito larvae

Lighting and Light Pollution

When placing lights on your property, remember that they may also be shining on your neighbours' properties and on the surface of the water. Light bounces off the water, which can severely limit the night vision of boaters.

Light pollution occurs when excessive amounts of light and undirected light are present or when light levels exceed requirements. You can reduce undirected lighting by placing lights closer to their intended location. For instance, pathways can be easily lit by solar lights that are placed in the ground.

Note: An easy way to judge whether you have appropriate lighting or not is this: if the light source is more apparent than what it is illuminating, then your lighting methods could be improved.

Five Easy Steps to Responsible Lighting

1. Determine what lighting is needed to illuminate targeted areas. Determine if you need light for safety, as a marker (such as low-voltage garden path lights) or for aesthetic reasons.
2. Use the right amount of light. More is not usually better. Too much light reduces visibility by creating glare and forming dark shadows. It also wastes energy. By creating smooth transitions from light to dark areas, one's eyes can adjust more easily.
3. Avoid letting the light shine sideways or upwards. Use full cut-off, shielded fixtures and aim light to the area where you need it.
4. Use infrared and motion detectors that turn lights on and off as needed. This improves security and reduces electricity consumption. Use timers to control when lights come on.

5. Use efficient lamps: Remember, shielded fixtures with good reflectors waste little light, so you can use lower wattage bulbs.

Note: Your lighting may affect your neighbour's property as well as yours.

Noise Pollution

Noise pollution is excessive sound that is harmful to the well-being of the environment and wildlife. Noise pollution is human made and comes from activities such as boating and driving. Human activities have large implications on wildlife survival and affects aspects such as their reproductive success and habitat choice.

There are several sources that can create noise pollution:

- Motor boating
- Automobile traffic
- Gas powered machinery and heavy equipment
- Aircraft

The effects of noise pollution on wildlife can be varied, including physiological and behavioural responses to noise:

- Alters life history characteristics of species
- Alters habitat type
- Alters season and current activity of the animal
- Alters physiological responses including
 - Increase in heart rate
 - Damaging to metabolism and hormone balance
- Causes excessive stimulation of the nervous system
 - Damages reproductive fitness
- Alters behavioural responses including
 - Head-raising
 - Body-shifting
 - More panicked and escape behaviour is present
 - Energy loss
 - Decrease in food intake
 - Habitat avoidance
 - Abandonment
 - Reproductive losses
 - Hearing loss

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Native Plants Reference List

Note: Appendix 2 of the Report on the State of Otty Lake and its Watershed contains listings for terrestrial plants, aquatic submergent and emergent vegetation, birds, fish, mammals, reptiles, amphibians and Species at Risk that have been observed within the Otty Lake watershed area. This Report is available at www.ottylakeassociation.ca

Native Plants That Grow In Sun

<i>Acer saccharinum</i> –Silver Maple	<i>Liatris aspera</i> - Rough blazingstar
<i>Allium cernuum</i> - Nodding onion	<i>Medeola virginiana</i> – Indian cucumber root
<i>Alnus rugosa</i> - Speckled alder	<i>Monarda fistulosa</i> – Wild Bergamot
<i>Amelanchier arborea</i> - Downy serviceberry	<i>Picea glauca</i> - White spruce
<i>Anaphalis margaritacea</i> - Pearly everlasting	<i>Potentilla tridentate</i> - Three-toothed cinquefoil
<i>Asclepias incarnata</i> - Swamp milkweed	<i>Prunus pennsylvanica</i> - Common pincherry
<i>Asclepias tuberosa</i> – Butterflyweed	<i>Ratibida pinnata</i> - Gray-headed coneflower
<i>Aster novae-angliae</i> - New England aster	<i>Rhus typhina</i> - Staghorn sumac
<i>Betula papyrifera</i> - White birch	<i>Rosa acicularis</i> – Prickly wild rose
<i>Betula populifolia</i> - Gray birch	<i>Rosa palustris</i> - Swamp rose
<i>Desmodium canadense</i> - Showy tick-trefoil	<i>Sambucus canadensis</i> - Common elder
<i>Elymus Canadensis</i> - Canada wild rye	<i>Schizachyrium scoparium</i> - Little Bluestem
<i>Echinacea pallida</i> - Pale Purple Coneflower	<i>Silphium perfoliatum</i> - Cup Plant
<i>Eupatorium maculatum</i> - Spotted Joe Pye weed	<i>Sisyrinchium montanum</i> - Blue-eyed Grass
<i>Juniperus communis</i> - Common juniper	<i>Shepherdia canadensis</i> - Buffaloberry
<i>Juniperus horizontalis</i> - creeping juniper	<i>Solidago rigida</i> - Stiff goldenrod
<i>Juniperus virginiana</i> - Eastern Red cedar	<i>Sporobolus heterolepis</i> - Prairie dropseed
<i>Larix laricina</i> – Tamarack	<i>Viburnum trilobum</i> - Highbush cranberry

Native Plants That Grow In Sun to Partial Shade

<i>Abies balsamea</i> - Balsam fir	<i>Cornus racemosa</i> - Gray dogwood
<i>Acer rubrum</i> –Red Maple	<i>Cornus stolonifera</i> - Red osier dogwood
<i>Anemone Canadensis</i> – Canada Anemone	<i>Corydalis sempervirens</i> - Pale Corydalis
<i>Aquilegia Canadensis</i> - Canada columbine	<i>Euphorbia corollata</i> - Flowering spurge
<i>Asclepias sullivantii</i> - Prairie Milkweed	<i>Eupatorium purpureum</i> - Sweet Joe Pye weed
<i>Arctostaphylos uva-ursi</i> – Bearberry	<i>Fragaria virginiana</i> - Common strawberry
<i>Betula alleghaniensis</i> – Yellow birch	<i>Gaylussacia baccata</i> - Black huckleberry

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Bouteloua curtipendula - Sideoats grama

Campanula rotundifolia – Harebell

Carya cordiformis - Bitternut hickory

Celastrus scandens – Climbing bittersweet

Cephalanthus occidentalis – Buttonbush

Claytonia virginica - Spring Beauty

Coreopsis lanceolata - Lanceleaf coreopsis

Cornus amomum - Silky dogwood

Lilium philadelphicum – Wood lily

Linnaea borealis – Twinflower

Lobelia siphilitica - Great blue lobelia

Lupinus perennis – Wild Lupin

Mimulus ringens –Blue monkey flower

Myrica gale – Sweetgale

Parthenocissus quinquefolia – Virginia creeper

Penstemon digitalis – Smooth White Penstemon

Physostegia virginiana - Obedient plant

Pinus strobes - White pine

Populus balsamifera – Balsam poplar

Potentilla palustris - Marsh cinquefoil

Prunus virginiana - Choke cherry

Gentiana andrewsii - Bottle gentian

Geranium maculatum - Wild geranium

Helianthus divaricatus - Woodland sunflower

Heliopsis helianthoides - False sunflower

Hibiscus moscheutos - Swamp Rose Mallow

Hypericum ascyron – Great St Johnswort

Ilex verticillata- Winterberry

Iris versicolor - Blue flag iris

Rudbeckia hirta – Black Eyed Susan

Rubus odoratus - Flowering raspberry

Sorbus americana - American Mountain Ash

Solidago caesia - Blue-stemmed Goldenrod

Solidago nemoralis - Grey Goldenrod

Spiraea alba - Meadowseet

Thalictrum dioicum - Early Meadow-rue

Trientalis borealis - Starflower

Thuja occidentalis -Eastern white cedar

Vaccinium angustifolium (Low sweet blueberry)

Vaccinium myrtilloide (Common Blueberry)

Viburnum lentago - Nannyberry

Waldsteinia fragariodes - Barren Strawberry

Zizia aurea - Golden Alexanders

Native Plants That Grow In Partial Shade to Full Shade

Actaea pachypoda White Baneberry

Adiantum pedatum - Maidenhair fern

Allium tricoccum -Wild Leek, Wild Garlic

Asarum canadense – Wild Ginger

Caltha palustris - Marsh marigold

Carpinus caroliniana - Blue Beech

Cornus Canadensis – Bunchberry

Cornus racemosa- Gray dogwood

Cornus stolonifera - Red osier dogwood

Dentaria diphylla - Toothwort

Erythronium americanum - Trout Lily

Geranium maculatum - Wild geranium

Impatiens capensis - Spotted Jewelweed

Ostrya virginiana – Ironwood

Polygonatum biflorum - Solomon's seal

Smilacina racemosa - False Solomon's Seal

Stylophorum diphyllum - Wood Poppy

Trillium erectum - Purple Trillium

Trillium grandiflorum - WhiteTrillium

Uvularia perfoliata - Bellwort

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Native Plants That Grow In Full Shade

Acer saccharum- Sugar Maple

Arisaema triphillum - Jack-in-the-pulpit

Athyrium filix-femina - Lady fern

Caulophyllum thalictroides - Blue cohosh

Cornus stolonifera - Red osier dogwood

Gaultheria procumbens - Wintergreen

Maianthemum canadense - Canada Mayflower

Sanguinaria canadensis - Bloodroot

Tsuga canadensis - Eastern hemlock

Native Plants That Grow in Dry Soils

Acer rubrum –Red Maple

Anemone virginiana –Thimbleweed

Bouteloua curtipendula - Sideoats grama

Corydalis sempervirens – Pale Corydalis

Echinacea pallida - Pale Purple Coneflower

Euphorbia corollata - Flowering spurge

Helianthus divaricatus - Woodland sunflower

Juniperus communis - Common juniper

Juniperus horizontalis-Creeping juniper

Juniperus virginiana - Eastern Red cedar

Potentilla tridentate - Three-toothed cinquefoil

Schizachyrium scoparium - Little Bluestem

Shepherdia canadensis - Buffaloberry

Solidago nemoralis - Grey Goldenrod

Native Plants That Grow in Moist To Dry Soils

Allium cernuum - Nodding onion

Aquilegia Canadensis - Canada columbine

Betula populifolia - Gray birch

Campanula rotundifolia – Harebell

Celastrus scandens – Climbing bittersweet

Cornus racemosa- Gray dogwood

Coreopsis lanceolata - Lanceleaf coreopsis

Desmodium canadense - Showy tick trefoil

Elymus Canadensis - Canada wild rye

Fragaria virginiana - Common strawberry

Gaylussacia baccata - Black huckleberry

Liatris aspera - Rough blazingstar

Lupinus perennis – Wild Lupin

Mitchella repens – Partridge-berry

Monarda fistulosa – Wild Bergamot

Ostrya virginiana – Ironwood

Penstemon digitalis - Smooth White Penstemon

Pinus strobes - White pine

Polygonatum biflorum - Solomon's seal

Prunus virginiana - Choke cherry

Ratibida pinnata - Gray-headed coneflower

Rudbeckia hirta – Black Eyed Susan

Rhus typhina - Staghorn sumac

Sisyrinchium montanum - Blue-eyed Grass

Smilacina racemosa - False Solomon's Seal

Solidago caesia - Blue-stemmed Goldenrod

Solidago rigida - Stiff goldenrod

Sorbus americana - American Mountain Ash

Thuja occidentalis -Eastern white cedar

Native Plants That Grow In Dry to Well Drained Soils

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Amelanchier arborea - Downy serviceberry
Anaphalis margaritacea - Pearly everlasting
Arctostaphylos uva-ursi – Bearberry

Asclepias tuberosa – Butterflyweed
Betula populifolia - Gray birch
Rosa acicularis – Prickly wild rose

Native Plants That Grow In Moist Soils

Actaea pachypoda (White Baneberry)
Acer rubrum –Red Maple
Acer saccharinum –Silver Maple
Adiantum pedatum - Maidenhair fern
Allium tricoccum (Wild Leek, Wild Garlic)
Anemone Canadensis – Canada Anemone
Asarum canadense – Wild Ginger
Asclepias sullivantii - Prairie Milkweed
Athyrium filix-femina - Lady fern
Betula alleghaniensis – Yellow birch
Carpinus caroliniana - Blue Beech
Carya cordiformis - Bitternut hickory
Caulophyllum thalictroides - Blue cohosh
Claytonia virginica - Spring Beauty
Cornus amomum - Silky dogwood
Cornus Canadensis – Bunchberry
Cornus stolonifera - Red osier dogwood
Dentaria diphylla - Toothwort

Gaultheria procumbens – Wintergreen
Geranium maculatum - Wild geranium
Geranium robertianum - Herb Robert
Houstonia caerulea - Bluets
Ledum groenlandicum - Labrador tea
Lilium canadense - Canada lily
Linnaea borealis – Twinflower
Lilium philadelphicum – Wood lily
Maianthemum canadense - Canada mayflower
Medeola virginiana – Indian cucumber root
Physostegia virginiana - Obedient plant
Picea glauca - White spruce
Rubus odoratus - Flowering raspberry
Solidago flexicaulis - Zig-zag Goldenrod
Spiraea alba - Meadowseet
Trientalis borealis - Starflower
Tsuga canadensis - Eastern hemlock
Viburnum trilobum - Highbush cranberry

Native Plants That Grow in Moist To Wet Soils

Acer saccharum- Sugar Maple
Acer saccharinum –Silver Maple
Alnus rugosa - Speckled alder
Anemone virginiana –Thimbleweed
Arisaema triphillium - Jack-in-the-pulpit
Asclepias incarnata - Swamp milkweed
Aster novae-angliae - New England aster
Athyrium filix-femina - Lady fern
Caltha palustris - Marsh marigold
Cephalanthus occidentalis – Buttonbush
Eupatorium maculatum - Spotted Joe Pye weed
Eupatorium purpureum - Sweet Joe Pye weed

Heliopsis helianthoides - False sunflower
Hibiscus moscheutos - Swamp Rose Mallow
Hypericum ascyron – Great St Johnswort
Ilex verticillata- Winterberry
Impatiens capensis - Spotted Jewelweed
Iris versicolor - Blue flag iris
Kalmia angustifolia - Sheep laurel
Larix laricina – Tamarack
Lobelia cardinalis - Cardinal flower
Lobelia siphilitica - Great blue lobelia
Myrica gale - Sweetgale
Mimulus ringens –Blue monkey flower

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Gentiana andrewsii - Bottle gentian

Ratibida pinnata - Gray-headed coneflower

Sambucus canadensis - Common elder

Sanguinaria canadensis - Bloodroot

Silphium perfoliatum - Cup Plant

Populus balsamifera - Balsam poplar

Stylophorum diphyllum - Wood Poppy

Viburnum lentago - Nannyberry

Waldsteinia fragariodes - Barren Strawberry

Zizia aurea - Golden Alexanders

Native Plants That Grow In Moist To Well Drained Soils

Abies balsamea - Balsam fir

Allium cernuum - Nodding onion

Betula papyrifera - White birch

Coreopsis lanceolata - Lanceleaf coreopsis

Dicentra cucullaria - Dutchman's breeches

Lupinus perennis – Wild Lupin

Ostrya virginiana – Ironwood

Penstemon digitalis - Foxglove beardtongue

Picea mariana - Black spruce

Pinus strobes - White pine

Solidago caesia - Blue-stemmed Goldenrod

Thalictrum dioicum - Early Meadow-rue

Trillium erectum - Purple Trillium

Uvularia perfoliata - Bellwort

Native Plants That Grow In Rocky Soils

Acer rubrum –Red Maple

Allium cernuum - Nodding onion

Aquilegia Canadensis - Canada columbine

Arctostaphylos uva-ursi – Bearberry

Campanula rotundifolia – Harebell

Coreopsis lanceolata - Lanceleaf coreopsis

Corydalis sempervirens - Pale Corydalis

Geranium robertianum - Herb Robert

Gaylussacia baccata - Black huckleberry

Hibiscus moscheutos - Swamp Rose Mallow

Pinus strobes - White pine

Potentilla tridentate - Three-toothed cinquefoil

Rhus typhina - Staghorn sumac

Rosa acicularis – Prickly wild rose

Solidago nemoralis - Grey Goldenrod

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Native Plants That Grow In Sandy Soils

Acer rubrum –Red Maple
Allium cernuum - Nodding onion
Amelanchier arborea - Downy serviceberry
Anemone virginiana –Thimbleweed
Asclepias sullivantii - Prairie Milkweed
Asclepias tuberosa – Butterflyweed
Betula papyrifera - White birch
Betula populifolia - Gray birch
Bouteloua curtipendula - Sideoats grama
Heliopsis helianthoides - False sunflower
Juniperus communis - Common juniper
Juniperus horizontalis- Creeping juniper
Liatris aspera - Rough blazingstar
Lupinus perennis – Wild Lupin
Potentilla tridentate - Three-toothed cinquefoil
Rhus typhina - Staghorn sumac

Celastrus scandens – Climbing bittersweet
Coreopsis lanceolata - Lanceleaf coreopsis
Desmodium canadense - Showy tick trefoil
Echinacea pallida - Pale Purple Coneflower
Elymus Canadensis - Canada wild rye
Eupatorium purpureum - Sweet Joe Pye weed
Fragaria virginiana - Common strawberry
Gaultheria procumbens – Wintergreen
Gaylussacia baccata - Black huckleberry
Rudbeckia hirta – Black Eyed Susan
Sanguinaria canadensis - Bloodroot
Schizachyrium scoparium - Little Bluestem
Shepherdia canadensis - Buffaloberry
Solidago nemoralis - Grey Goldenrod
Sporobolus heterolepis - Prairie dropseed
Viburnum lentago - Nannyberry
Viburnum trilobum - Highbush cranberry

Native Plants That Are Drought Tolerant

Allium cernuum - Nodding onion
Anaphalis margaritacea -Pearly Everlasting
Aquilegia Canadensis - Canada columbine
Asclepias tuberosa – Butterflyweed
Celastrus scandens –Climbing bittersweet
Coreopsis lanceolata - Lanceleaf coreopsis
Desmodium canadense - Showy tick trefoil
Elymus Canadensis - Canada wild rye
Euphorbia corollata - Flowering spurge
Geranium maculatum - Wild geranium
Heliopsis helianthoides - False sunflower
Juniperus communis - Common juniper

Juniperus horizontalis- Creeping juniper
Juniperus virginiana - Eastern Red cedar
Liatris aspera - Rough blazingstar
Lupinus perennis – Wild Lupin
Monarda fistulosa – Wild Bergamot
Picea glauca - White spruce
Rudbeckia hirta – Black Eyed Susan
Schizachyrium scoparium - Little Bluestem
Silphium perfoliatum - Cup Plant
Sisyrinchium angustifolium - Blue-eyed grass
Solidago rigida - Stiff goldenrod
Sporobolus heterolepis - Prairie dropseed

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Native Plants That Are Salt Tolerant

Amelanchier arborea - Downy serviceberry
Arctostaphylos uva-ursi – Bearberry
Juniperus communis - Common juniper
Juniperus virginiana - Red cedar

Prunus virginiana - Choke cherry
Rhus typhina - Staghorn sumac
Vaccinium angustifolium - Low sweet blueberry
Vaccinium myrtilloide - Common Blueberry

Native Plants That Are Deer Resistant

Allium cernuum - Nodding onion
Aquilegia Canadensis - Canada columbine
Asclepias tuberosa – Butterflyweed
Campanula rotundifolia – Harebell
Celastrus scandens – Climbing bittersweet
Cornus amomum - Silky dogwood
Cornus racemosa- Gray dogwood
Cornus stolonifera - Red osier dogwood
Coreopsis lanceolata - Lanceleaf coreopsis
Ilex verticillata- Winterberry
Iris versicolor - Blue flag iris

Geranium maculatum - Wild geranium
Juniperus communis - Common juniper
Juniperus virginiana - Eastern Red cedar
Kalmia angustifolia - Sheep laurel
Penstemon digitalis - Smooth White Penstemon
Picea glauca - White spruce
Picea mariana - Black spruce
Pinus strobes - White pine
Rudbeckia hirta – Black Eyed Susan
Schizachyrium scoparium - Little Bluestem
Solidago rigida - Stiff goldenrod

Native Plants for Ground Cover

Anemone Canadensis – Canada Anemone
Arctostaphylos uva-ursi – Bearberry
Asarum canadense – Wild Ginger
Claytonia virginica - Spring Beauty
Celastrus scandens – Climbing bittersweet
Cornus Canadensis – Bunchberry
Fragaria virginiana - Common strawberry

Gaultheria procumbens – Wintergreen
Geranium robertianum - Herb Robert
Mitchella repens – Partridge-berry
Parthenocissus quinquefolia – Virginia creeper
Polygonatum biflorum - Solomon's seal
Potentilla tridentate - Three-toothed cinquefoil
Vaccinium angustifolium – Low Sweet Blueberry
Waldstenia fragarioides – Barren Strawberry

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Native Plants for the Septic Bed

Anemone Canadensis – Canada Anemone

Aquilegia Canadensis - Canada columbine

Aster novae-angliae - New England aster

Athyrium filix-femina - Lady fern

Bouteloua curtipendula - Sideoats grama

Echinacea pallida - Pale Purple Coneflower

Elymus Canadensis - Canada wild rye

Fragaria virginiana - Common strawberry

Monarda fistulosa – Wild Bergamot

Penstemon digitalis - Smooth White Penstemon

Rudbeckia hirta – Black Eyed Susan

Ratibida pinnata - Gray-headed coneflower

Solidago nemoralis - Grey Goldenrod

Solidago rigida - Stiff goldenrod

Sporobolus heterolepis - Prairie dropseed

Waldstenia fragarioides – Barren Strawberry

Project Partners

Algonquin to Adirondacks Conservation Association

What is A2A?

The Algonquin to Adirondacks Conservation Association (A2A) is a Registered Charity that works for and with local people to connect wildlife habitat in the unique area between and including Algonquin Park in Ontario and Adirondack State Park in New York. The A2A region is home to a vast number of different plants and animals, many at risk of extinction. Connecting and enhancing their habitat is key to their survival, resulting in healthier air and water for us all.

A2A helps maintain the peace and beauty of nature that are a part of our rural heritage. It works respectfully with landowners, partnering organizations and governments at all levels to achieve its goals. See the website at www.a2alink.org.

Why Connect Habitat Between The Parks?

Wildlife doesn't recognize park boundaries. Parks are not large enough by themselves to provide all the conditions wildlife needs. Animals must move outside protected areas for food, for shelter and to find mates. Plants and animals need connected habitat to maintain healthy populations.

Why Here?

The A2A region is in the top three in Canada for its variety of plants and animals species. The Frontenac Arch and the limestone and sandstone which surround it provide a vast array of soil types and climatic conditions. There are five major forest ecosystems, which include wetlands, uplands and grasslands. Most of the region has escaped the destructive development found in some parts of New York and Ontario. There are still wild places in the A2A region.

What Does The A2A Conservation Association Do?

- Educates the public about the unique character of the A2A area
- Connects landowners with programs to improve or create habitat connections on their land
- Provides maps for landscape level planning
- Works with governments to protect habitat and to reduce animal deaths on highways
- Works with partners to connect habitat and land required for wildlife movement
- Provides various tools for landowners through their website link 'Landowner Resources' on a2alink.org

What's The Hurry?

The A2A area faces significant threats. Threats like global warming, the development of sensitive areas, invasive species, degradation of shorelines and others threaten this valuable ecosystem. It is estimated that we have less than 2 generations to preserve and enhance wildlife habitat connections in the A2A region. You can help by finding out how your land can contribute to wildlife habitat. You can also help by joining the A2A Conservation Association. See the membership page on a2alink.org. Each new member gives us the ability to do more. And you can volunteer to help us accomplish our goals with a charitable donation for A2A projects. It's always easier to preserve the wild than to try to repair it.

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Centre for Sustainable Watersheds (now Watersheds Canada)

Incorporated in 2002 and located in Portland, Ontario, the Centre for Sustainable Watersheds (CSW) is a national environmental charitable organization that works toward a more holistic approach to water resource management across Canada that promotes sustainability, conservation and economic prosperity. It is now known as Watersheds Canada, located in Perth, Ontario, whose mission is to work with landowners, communities, and organizations to protect lakes and rivers through developing effective, transferable, long-term solutions. Current initiatives include:

- Love your Lake - Healthy shorelines for healthy lakes
- The Natural Edge – Shoreline Naturalization Program
- Lake Management
- Lake Links
- Habitat Programs

Watersheds Canada vision is for communities to come together to care for their waters, resulting in clean, healthy lakes and rivers that will support humans and wildlife for years to come.

Otty Lake Association

The Otty Lake Association (OLA) was established in its present form in 1978 and incorporated in 2001. Through the years dedicated Otty Lake volunteers have run programs to monitor the health of the lake encouraging sound stewardship actions and provided information on good environmental practices for the lake's seasonal and permanent residents.

From 2004- 2008 the Otty Lake Association worked with members of the Otty Lake community and several community partners who also had a vested interest in the long-term health and sustainability of Otty Lake, to develop first the Report on the State of Otty Lake and its Watershed and then the Otty Lake Management Plan. The intent of the Otty Lake Management Plan was to develop a long-term community action plan that would help to protect the long-term health and sustainability of Otty Lake and its watershed area. Initiatives such as this Shoreline Handbook flow out of the implementation of the recommendations of the Lake Plan.

Rideau Valley Conservation Authority

The Rideau Valley Conservation Authority (RVCA) is an environmental protection and advisory agency that works with local municipalities, government agencies, special interest groups and the general public. The RVCA strives to protect watershed resources. Their goal is to have clean water, natural shorelines and sustainable land use throughout the Rideau Valley watershed.

Contact List

Government Organizations

Fisheries and Oceans Canada (DFO)

Provides information and permits regulating fish habitat

www.dfo-mpo.gc.ca

Prescott - Box 1000, Prescott, Ontario K0E 1T0

(613) 925-2865

Canadian Coast Guard

Responsible for boating safety and for enforcing the Navigable Waters Protection Act.

www.ccg-gcc.gc.ca

(613) 993-0999

Ontario Ministry of Agriculture, Food and Rural Affairs

www.omafra.gov.on.ca

Ontario Ministry of the Environment & Climate Change (MOECC)

The Ministry of the Environment & Climate Change is responsible for protecting air, land and water. Contact for water quality, algae blooms, air and water pollution.

Environmental Officer (Kingston) - (613) 540-6899

www.ontario.ca/page/ministry-environment-and-climate-change

Ontario Ministry of Natural Resources & Forestry (MNRF)

Responsible for docks, Species at Risk, invasive species, nuisance wildlife, forestry, resources, and reporting abuse

(800) 667-1940

www.ontario.ca/page/ministry-natural-resources-and-forestry

Kemptville— 10 Campus Dr, Kemptville, ON, K0G 1J0

(613) 258-8210 Elizabeth Holmes, PhD, Partnership Specialist

elizabeth.holmes@ontario.ca

Kingston— Ontario Government Building,

Beachgrove Complex, 51 Heakes Lane, Kingston, ON, K7M 9B1

(613) 531-5700

Parks Canada

Water levels, work permits for docks, fill and construction along the Rideau Canal.

Rideau Canal Office - 34 Beckwith Street South,

Smiths Falls, ON, K7A 2A8

(613) 283-5170

RideauCanal-info@pc.gc.ca , www.pc.gc.ca

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Local Municipalities

Township of Drummond/ North Elmsley

310 Port Elmsley Road
Perth, ON K7H3C7
(613) 267- 6500
www.drummondnorthelmsley.com

Tay Valley Township

217 Harper Road
Perth, ON K7H3C6
(613) 267- 5353
www.tayvalleytwp.ca

Municipal Property Assessment Corporation Lanark County, Leeds and Grenville County

Provides property assessments

108 Waltham Rd, Unit A, PO Box 280, Brockville ON, K6V 5V5
Customer Contact Centre (866) 296-6722
enquiry@mpac.ca , www.mpac.ca

Local Health Units

Provide a variety of services to landowners such as septic inspections, well information, and well water testing

Leeds, Grenville and Lanark District Health Unit Smith Falls Office

For information, Call 613-283-2740
or check the website www.healthunit.org

Kingston, Frontenac and Lennox & Addington Public Health

221 Portsmouth Avenue, Kingston, ON K7M 1V5
(800) 267-7875

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Septic System Information

Ontario Onsite Wastewater Association (OOWA)

P.O. Box 831, Cobourg, ON, K9A 4S3
Denis Orendt (905) 372-2722
dorendt@yahoo.ca , www.oowa.org

Sewage Systems and Land Control

www.healthunit.org/landcontrol/default.htm

Mississippi - Rideau Septic System Office

Eric Kohlsmith
613 259- 2421 ext. 256
eric.kohlsmith@rvca.ca

The Ontario Rural Wastewater Centre

Created by the University of Guelph (Collège d'Alfred and the School of Engineering) in partnership with the Rideau Valley Conservation Authority and many industry and government stakeholders.

- The Centre has demonstration sites in Central Ontario at the University of Guelph and paired sites in Eastern Ontario at Collège d'Alfred and at the Baxter Conservation Area.
- The sites offer a wide variety of wastewater courses utilising demonstration technologies to provide a truly hands-on learning experience.
- The Centre researchers bring decades of applied research experience to bear on problems related to rural and unsewered wastewaters.

Baxter Site:

Ontario Rural Wastewater Centre
c/o Rideau Valley Conservation Authority
3889 Rideau Valley Drive
Manotick, ON K4M 1A5

tel: 613 692 3571

fax: 613 692 0831

email: andrea.wood@rvca.ca

Note: Also see contact information for Local Health Units as they are also responsible for septic system information in some municipalities.

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Conservation Authorities

Conservation Ontario

Dedicated to conserving and managing natural resources on a watershed basis (filling/construction along waterways, water quality testing and monitoring, septic re-inspections, trees/shrubs planting, reforestation, shoreline protection, fisheries, septic system approvals and inspections, land use planning review, flood forecasting and warning, landowner incentive programs)

P.O. Box 11, 120 Bayview Parkway, Newmarket, ON, L3Y 4W3
(905) 895-0716

info@conservationontario.ca , www.conservationontario.ca
(to access all Conservation Authorities)

Rideau Valley Conservation Authority (RVCA)

Box 599, 3889 Rideau Valley Drive, Manotick, ON K4M 1A5
(613) 692- 3571

1 – 800-267-3504

postmaster@rvca.ca www.rvca.ca

RVCA Upper Watershed Planning Dept.

Tay Valley Township office
1-800-810-0161, Ext 131
martha.bradburn@rvca.ca

Landowner Resource Centre (LRC)

Provides information for landowners, resource materials and answers to questions.

Box 599, 3889 Rideau Valley Drive, Manotick, ON K4M 1A5
(613) 692-3571, (800) 387-5304 ext. 1128 or 1132

info@lrconline.com , www.lrconline.com

Ontario Stewardship Councils

Ontario Stewardship

Ontario Stewardship's purpose is to link landowners with funding, **information** and expertise. People from the Stewardship Councils aid in shoreline protection, trees/shrubs planting, wildlife habitat protection projects, project funding support.

c/o Ministry of Natural Resources
300 Water Street, Box 7000, Peterborough, ON K9J 8M5
(705) 755-3278

www.ontariostewardship.org

Lanark County Stewardship Council

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99 Christie Lake Rd. Box 37
Perth, Ontario
K7H 3E2
613-267-4200 ext. 3192
fax: 613-267-2793
info@lanarkstewardshipcouncil.ca

Other Environmental Partners

Algonquin to Adirondacks Collaborative Association (A2A)

Partners with other organization to protect the habitat of the unique area between Algonquin and Adirondack Parks, connects citizens with programs to enhance wildlife habitat on their properties, and provides services and resource to landowners through their 'Landowner Resources' on their website

1 Jesse St, Lansdowne, ON, K0E 1L0

(613) 220-7482

info@a2acollaborative.org, www.a2acollaborative.org

Frontenac Arch Biosphere Network

Provides expertise on sustainability issues in area of the Frontenac Arch

19 Reynolds Road, Lansdowne ON, K0E 1L0

(613)-659-4824

info@fabr.ca, www.frontenacarchbiosphere.ca

Canadian Parks and Wilderness Society (CPAWS)

Works for a higher level of protection of wildlife in parks, as well as working to expand protected areas for wildlife across Canada.

Suite 601, 250 City Centre Avenue, Ottawa, ON, K1R 6K7

(613) 232-7297

info@cpaws.org, www.cpaws.org

Canadian Wildlife Federation (CWF)

Dedicated to fostering awareness and appreciation of our natural world

350 Michael Cowpland Drive, Kanata, ON, K2M 2W1

(800) 563-WILD, (613) 599-9594 (Ottawa Area)

info@cwf-fcf.org, www.cwf-fcf.org

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Ducks Unlimited Canada (DUC)

Provides programs and services for the conservation of wetlands.

P.O. Box 1160 Stonewall, Manitoba, R0C 2Z0 Canada
(800) 665-DUCK (3825)

webfoot@ducks.ca , www.ducks.ca

LOCALLY: 1 – 614 Norris Court, Kingston, ON K7P 2R9, 613-389-0418

Eastern Ontario Model Forest (EOMF)

Sustainable forestry practices and innovations

P.O. Bag 2111, Kemptville, ON, K0G 1J0
(613) 258-8241

modelforest@eomf.on.ca , www.eomf.on.ca

ecoPerth

Partners with local businesses, groups and individuals to complete projects that are environmentally sustainable and economically efficient.

info@ecoperth.on.ca , www.ecoperth.on.ca

Federation of Ontario Cottagers' Association (FOCA)

Serves as an information centre, providing assistance and leadership to Ontario's cottage associations and their members.

#201 – 159 King Street Peterborough, ON, K9J 2R8
(705) 749-FOCA (3622)

info@foca.on.ca , www.foca.on.ca

Kingston Field Naturalists

PO Box 831, Kingston, ON, K7L 4X6
(613) 389-8338

www.kingstonfieldnaturalists.org

Lake Networking Group

A gathering of representatives of local lake associations who meet on a regular basis to discuss topics of common interest and concern.

Karen Hunt - mkhunt@ripnet.com

LLGreen/Rideau Environmental Action League (LLGreen/ REAL)

Conducts community-wide environmental projects and promotes environmental improvements within the Town of Smiths Falls and Lanark, Leeds and Grenville Counties.

llgreen@superaje.com , www.realaction.ca

Mississippi Valley Field Naturalists (MVFN)

PO Box 1617, Almonte, ON, K0A 1A0

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www.mvfn.ca

Ontario Federation of Anglers and Hunters (OFAH)

Provides anglers and hunters with information and resources.

4601 Guthrie Drive, PO Box 2800, Peterborough, ON K9J 8L5

(705) 748-6324 , (800) 563-7711

ofah@ofah.org , www.ofah.org

Ontario Woodlot Association

Promotes sustainable forestry practices in private forests to ensure their viability for future generations.

275 County Road 44, R.R. #4 Kemptville, ON K0G 1J0

(888) 791-1103

www.ont-woodlot-assoc.org , info@ont-woodlot-assoc.org

Rideau River Roundtable

PO Box 25 Smith Falls, ON, K7A 4S9

President Peter Au (613) 284-8338

Peter00au@gmail.com , www.rideaaroundtable.ca

Watersheds Canada

Provides programs, services and resources for the protection of Canada's waterways.

115 – 40 Sunset Blvd, Perth, ON K7H 2Y4

(613) 264-1244

info@watersheds.ca , www.watersheds.ca

Lake Planning

Lake Planning, Rideau Valley Conservation Authority (RVCA)

From 2005 to 2008, this group and numerous partners provided information and guidance to lake groups within Tay Valley Township & the Tay Valley Watershed interested in developing lake plans. 2009 onward – the partners remain committed to lake planning and continued support for the development of lake plans to protect the health of local lakes and their watersheds. For more information, contact:

Meaghan McDonald, Lake Planning/Shoreline Stewardship Program Coordinator
(800) 267-3504 ext 1192

meaghan.mcdonald@rvca.ca , www.rvca.ca/programs/LMP_Program

Otty Lake Shoreline Handbook

Lake Planning, Federation of Ontario Cottagers' Association

Offering lake planning support to lake associations
conducting lake planning and community consultations.

201–159 King St. Peterborough, ON K9J 2R8

(705) 749-3622

lakeplanning@foca.on.ca, www.foca.on.ca

French Planning Services Inc.

Excellence in facilitation and environmental planning,
specialists in lake stewardship planning

Eastern Ontario Office — Gord Rodgers

1141 Wood Duck Lane Hartington, ON, K0H 1W0

(613) 374-3521 (phone/fax), (613) 583-5512 (cell)

gordrodgers@lakeplan.com

Main Office — Randy French

RR #2 1016 Holiday Park Drive, Bracebridge, ON P1L 1W9

(705) 646-0851

www.lakeplan.com

Ontario Federation of Anglers and Hunters (OFAH) Invading Species Program

4601 Guthrie Drive, P.O. Box 2800 Peterborough, ON K9J 8L5

(800) 563-7711

www.invadingspecies.com

Financial/Technical Assistance

Rideau Valley Conservation Authority

Box 599, 3889 Rideau Valley Drive, Manotick, ON K4M 1A5

(613) 692- 3571

1 – 800-267-3504

postmaster@rvca.ca www.rvca.ca

Financial and Technical Assistance for Rural Landowners in Eastern Ontario

Provides assistance to landowners on financial and
technical assistance

www.rvca.ca/programs/rcwp/imagespdfs/Funding_Source.pdf

www.rvca.ca/programs/rcwp/rvca_rcwp.html

Rideau Valley Conservation Authority Shoreline Naturalization Program

Offers simple, cost-effective advice and hands-on
guidance to waterfront property owners interested in
enhancing or naturalizing their shoreline.

(613) 692-3571 ext. 1192

meaghan.mcdonald@rvca.ca, www.rvca.ca

Otty Lake Shoreline Handbook

Rideau Valley Rural Clean Water program

Derek Matheson, Rural Clean Water Program Manager
1 800 267-3504, Ext 1134 fax 613 692- 0831
derek.matheson@rvca.ca
www.rvca.ca

Ontario Environmental Farm Plan (EFP)

www.omafr.gov.on.ca/english/environment/efp/efp.htm

Natural Resources and Native Plant Sources

Ferguson Forest Centre

Tree and shrub seedling
275 County Road 44, Kemptville, ON K0G 1J0
(613) 258-0110
ffc@storm.ca , www.seedlingnursery.com

Gardens North

5984 Third Line, North Gower, ON
(613) 489-0065
seed@gardensnorth.com , www.gardensnorth.com

Nature's Way Landscaping

Natural landscaping and environmentally friendly lawn care
520 County Road # 2, Gananoque, ON K7G 2V4
(613) 382-1207, (866) 382-1207
sales@natureswaylandscaping.net , www.natureswaylandscaping.net

Old Field Garden and Wildflower Nursery

Herbaceous Plants
2935 Porter Road, Oxford Station, ON, K0G 1T0
Philip Fry (613) 258-7945
oldfieldgarden@sympatico.ca , www.oldfieldgarden.on.ca

Rideau Nursery

Provides a variety of tree seedlings and other plants
6986 McCordick Road, North Gower, ON, K0A 2T0
(613) 322-2912, (866) 870-5088
info@rideaunursery.com , www.rideaunursery.com

Trees Ontario

Provides landowner programs, tree seedlings and planting workshops
www.treesontario.on.ca

Otty Lake Shoreline Handbook

Wildflower Farm

Mail order seeds

Hwy 12 West, R.R.#2 Coldwater, ON L0K 1E0

(866) 476 9453

info@wildflowerfarm.com , www.wildflowerfarm.com

Community Based Environmental Monitoring

Canadian Lakes Loon Survey

Canadian Lakes Loon Survey was founded as a long-term project of Bird Studies Canada to monitor the numbers and breeding success of loons on lakes across Canada.

(888) 448-2473

www.bsc-eoc.org/cllsmain.html

Canadian Breeding Bird Survey

Provide citizens with the opportunity to assist in the monitoring of bird populations

(888) 448-2473

raptor@bsc-eoc.org , www.bsc-eoc.org/bbsont.html

Ecological Monitoring and Assessment Network

Provides a number of citizen based Nature Watch Program

867 Lakeshore Rd. Burlington, ON L7R 4A6

(905) 336-4414, Fax: (905) 336-4499

eman@ec.gc.ca , www.eman-rese.ca/eman/naturewatch.html

The Great Backyard Bird Count

Collected data is combined with Christmas Bird Count and Project FeederWatch data to provide an immense picture of our winter birds.

www.birdsource.org/gbbc

Invading Species Watch

Offers citizens the opportunity to monitor their lakes for the presence of aquatic invasive species

Invasive species hotline: (800) 563-7711

www.invadingspecies.com

Lake Partners Program, Ministry of the Environment

Water Quality Monitoring

P.O. Box 39 1026 Bellwood Acres Rd. Dorset, ON P0A 1E0

(800) 470-8322

lakepartner@ontario.ca, www.ene.gov.on.ca/en/water/lakepartner/index.php

Otty Lake Shoreline Handbook

Marsh Monitoring Program

This program is designed to provide information on marsh bird and selected amphibian populations, and to contribute to our understanding of their habitat needs.

(888) 448-2473

www.bsc-eoc.org/mmpmain.html

Nocturnal Owl Survey

The goal of this survey is to monitor owl populations in Ontario to determine whether owls are being affected by logging practices.

(888) 448-2473

www.bsc-eoc.org/owls.html

Ontario Birds at Risk Program

The goal of OBAR is to work towards the protection and recovery of vulnerable, threatened, endangered, and other bird species at risk in Ontario.

(519) 586-3531

www.bsc-eoc.org/obar.html

Ontario Hummingbird Project

Ontario Hummingbird Project give citizens the opportunity to participate in the monitoring of the hummingbird population
c/o Cindy Cartwright

581 High Street, Box 1116, Southampton, ON, N0H 2L0

www.ontariohummingbirds.ca

Ontario Turtle Tally

Collect, record and store location and species information on Ontario turtles, including species at risk.

www.torontozoo.com/adoptapond/TurtleTally.asp

Project Feeder Watch

Project FeederWatch is a winter-long survey of birds that visit feeders at backyards, nature centers, community areas, and other locales in North America.

(888) 448-2472

pfw@bsc-eoc.org , www.birds.cornell.edu/pfw

Watershed Watch

Collects data on water quality in the Rideau and Mississippi Valley Watersheds with the help of volunteers to protect against water contamination

(800) 267-3504, (613) 692-3571

www.rvca.ca/programs/wwatch/watershed_watch.htm (Rideau)

HYPERLINK

"http://www.mvc.on.ca/index.php/stewardship/watershed"www.mvc.on.ca/index.php/stewardship/watershed

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