



# Riparian Buffers

*A Guide to Planting Your Own Riparian Buffer System*





## CONNECT TO YOUR SHORE

Whether it was the view, the access to recreational activities, or the connection to nature that drew you to live on the shoreline of a lake, the health of your lake can be enhanced by a buffer planting. A buffer system will improve the water quality of your lake and provide habitat for fish, frogs, turtles, birds, and other wildlife. You can transform your property into a beautiful, healthy shoreline ecosystem.

Nature doesn't recognize the same hard boundaries that we perceive between water and land. This transitional space is referred to as a riparian zone. In order to respect the natural transition between the land and the lake, we must plant buffers, which help control erosion, purify water, create aquatic nurseries, and enhance the lake's overall health.

Planting a riparian buffer is a rewarding and educational experience. Not only will your new view support a vibrant diversity of insects, birds, amphibians, and fish, but you will learn to see your property as part of a larger ecosystem. The interdependencies are nothing short of astounding and extend to the systems of the world. You can start becoming a citizen of the world in your own backyard!

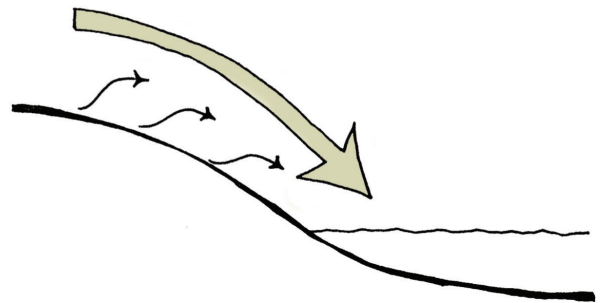
# BENEFITS OF A BUFFER ZONE

## Slow the Rain

A buffer zone, complete with layers of vegetation, fallen leaves, and twigs, acts to slow the rain and increases the time water has to soak into the soil. When rain seeps into the ground it is naturally filtered. This means cleaner water, less erosion, and a reduced flood risk.

## Better than a Brita™

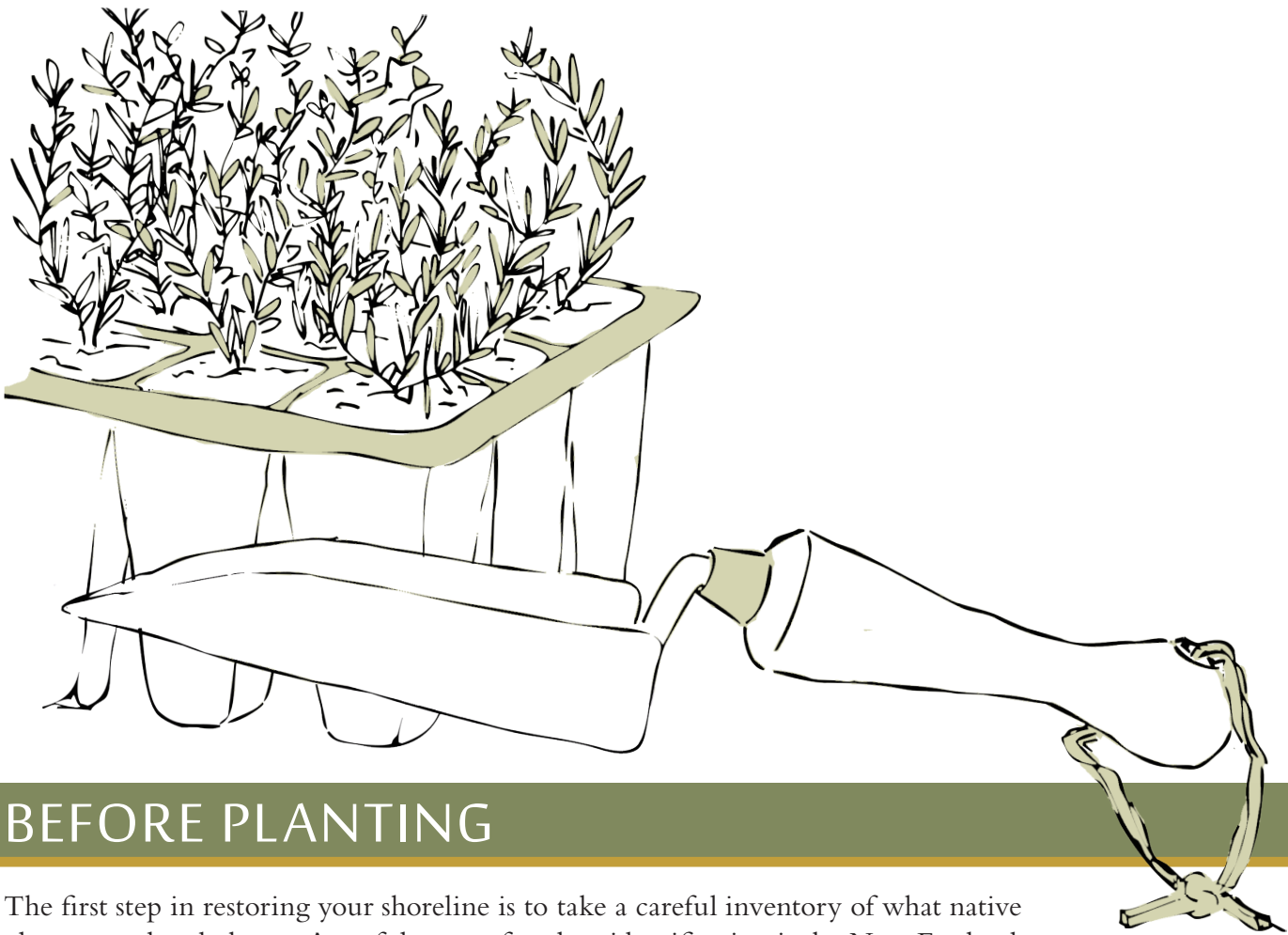
Without buffers, the motor oil that spills on the road, pesticides from the golf course, bacteria from animal waste, and nutrients from fertilizers and failing septic systems, all make their way into our waterways. Excess nutrients pose a particular threat to your lake. Nitrogen and phosphorus are naturally occurring nutrients, but in excess they cause harmful algae blooms that deplete oxygen from the water and negatively impact fish and other aquatic life. A riparian buffer system helps to purify this water naturally and requires little upkeep after establishment.



## Connect to Your Roots

The root system of buffer zones serve as the most effective means for erosion control. Different plants specialize in different zones underground ensuring that your shoreline doesn't wash away.





## BEFORE PLANTING

The first step in restoring your shoreline is to take a careful inventory of what native plants you already have. A useful source for plant identification is the New England Wildflower Society's plant identification site ([gobotany.newenglandwild.org](http://gobotany.newenglandwild.org)). If you are lucky, it could be as simple as stopping mowing. If you choose this method, be sure to carefully remove invasive species. Different invasive plants require different eradication methods, so take some time to learn the appropriate eradication method.

Even if you have some great riparian species, you may want to enrich your shoreline with a variety of buffer plants. A plan is essential—different plants specialize in different soils and sun exposure. We have provided a sample riparian buffer plan as a guide.

In general, the wider and taller the buffer the more your lake will benefit. The buffer that we have designed for a typical residential property is ten feet wide; of course, this plan can be adapted for a variety of sites. Riparian buffers should use native plants because they are the best adapted for the environment, require the least amount of maintenance, and provide the most benefit to wildlife.

Before starting, check with your local wetlands board to make sure your plans do not violate local regulations. When you are planting remember to avoid using heavy equipment near the water's edge as it will compact the soil making it hard for plants to grow.

We have highlighted some of our favorite riparian species common to southern New England on the next pages.



# HIGHLIGHTED RIPARIAN SPECIES



## Pickerelweed

*(Pontederia cordata)*

The blue-violet flowers of pickerelweed bloom in succession on a six inch spike during the summer months. This emergent aquatic plant thrives in shallow quiet water. In addition to being a beautiful addition to a buffer system, some parts of the pickerelweed are edible. The seed can be eaten as nuts and young leaf stalks can be cooked as greens.

## Foam Flower

*(Tiarella cordifolia)*

This whimsical perennial is perfect to illuminate the shady parts of your buffer system. The tiny white flowers bloom for six weeks during the springtime. Foam flower will spread on its own to form one or two foot clumps of foliage.



## Cinnamon Fern

*(Osmunda cinnamomea)*

Cinnamon ferns thrive under a protected canopy. The plant gets its name from the attractive cinnamon-colored frond that shoots up in the middle of the plant. Cinnamon ferns should be planted in the springtime. Cinnamon ferns love organic matter—if available, mix some compost with the soil when planting. As long as the soil is moist, this is a versatile low-maintenance plant.



## Turtle Head

(*Chelone glabra*)

For a beautiful late-season bloom, consider planting turtle head. Turtle head prefers full sun or part shade. Its blooming flowers range from white to deep red and attract an array of butterflies and hummingbirds. This plant prefers rich, humusy soils—add leaf litter or compost to the soil if appropriate for the site.



## Blue Flag Iris

(*Iris versicolor*)

The blue flag iris will add a rich beautiful blue to your shoreline. This flower blooms from late spring to early summer. It grows best in full to part sun. This versatile plant can grow in shallow water and also survive some dry spells, but you should consider adding a layer of mulch to help retain soil moisture. Over time, the plant will slowly spread on its own.

## Golden Alexander

(*Zizia aurea*)

Golden alexander provides a late-spring and early-summer bloom. Its vibrant yellow flowers attract a large array of pollinators. Notably, it is a food source for swallowtail butterfly larvae. Golden Alexander will easily form colonies in sun and part shade.



Photo courtesy of the Dyck Arboretum





Photo courtesy of the Urban Horticulture Institute, Cornell University.

## Red Maple

*(Acer rubrum)*

You may think of the vibrant red leaves in the fall, but did you know that red maple offers something red every season? The buds in winter, flowers in spring, and the leafstalks in summer are all a brilliant red! The fruit of the red maple, samaras, attracts a whole host of foraging birds. This is a great addition to your riparian buffer because of its fast growth rates, wet soil preference, and aesthetic appeal.

## Sweet Pepper Bush

*(Clethra alnifolia)*

This shrub is an important pollination plant for bees. The light pink flowers release a sweet scent when they bloom in July and August. This plant is known for staying free of disease or insect problems. You can easily propagate this plant yourself, but it will also spread to form a colony on its own!



## Serviceberry

*(Amelanchier canadensis)*

Known for their delectable berries, serviceberry trees are also famous for their ornamental flowers. Serviceberry trees do not thrive in waterlogged soil, so it is best to plant where your buffer meets your lawn (this will make it easier to pick the delicious berries in the summer, too!)

Photo courtesy of Gary Bebeau, Friends of Eloise Butler Wildflower Garden





## Hop Sedge

(*Carex lupulina*)

Sedges are particularly good at stabilizing banks, making hop sedge the perfect species to plant on your lake's edge. The plant gets its name from the hop-like seed heads that form in the early summer. These seeds will attract a whole host of waterfowl to your waterfront. The leaves serve as food for various insects, including the caterpillars of moths and butterflies.

Photo courtesy of Jim Vanderhorst, West Virginia DNR

## Dwarf Joe Pye Weed

(*Eupatorium dubium*)

As legend has it, a Native American medicine man named Joe Pye traveled 18th century New England treating typhoid fever with this medicinal plant. It is said that he was able to halt the epidemic ravaging colonial Massachusetts. Today, his namesake plant is used to attract a variety of birds and butterflies. The massive mauve flowers bloom from July to September and come in a range of sizes from 2'-3' tall.



## Winterberry

(*Ilex verticillata*)

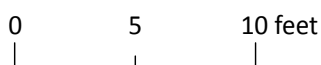
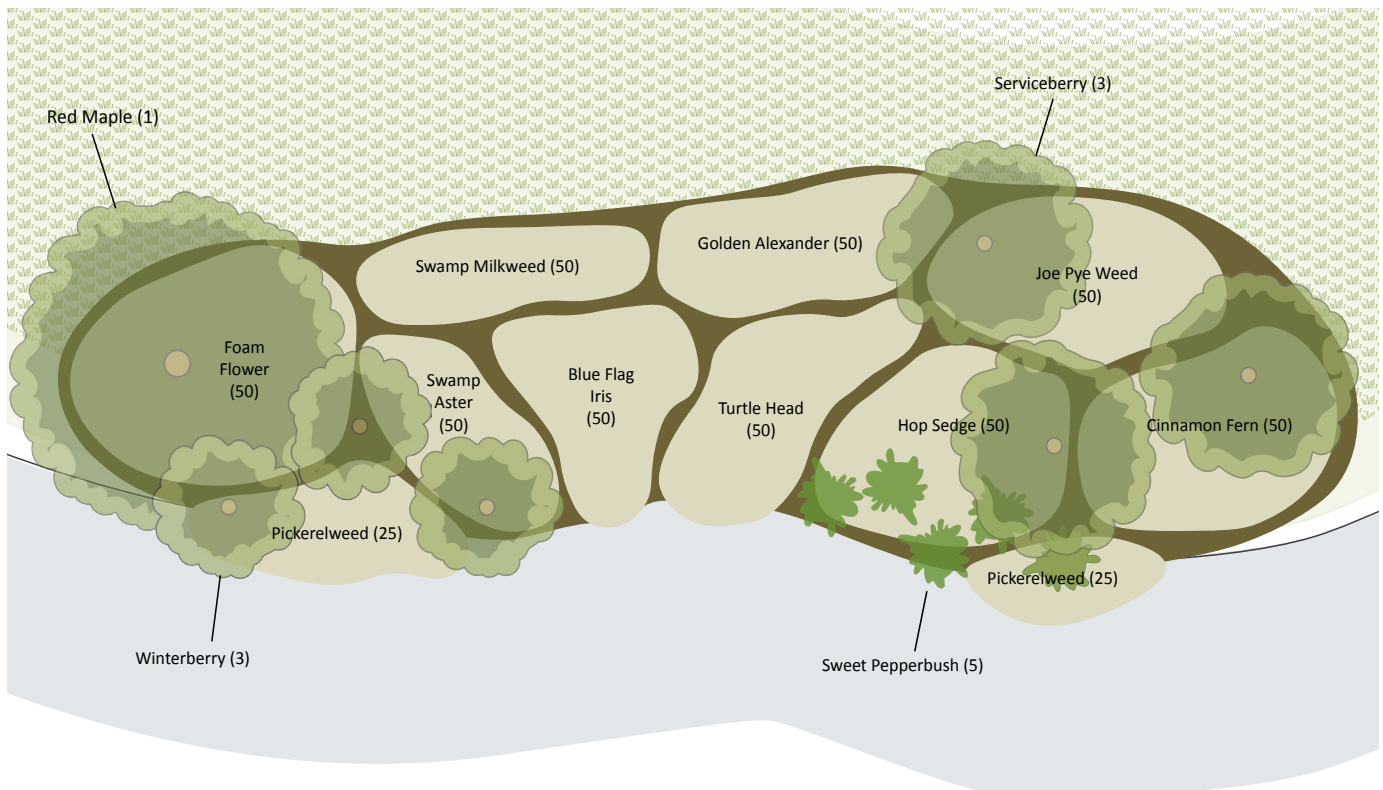
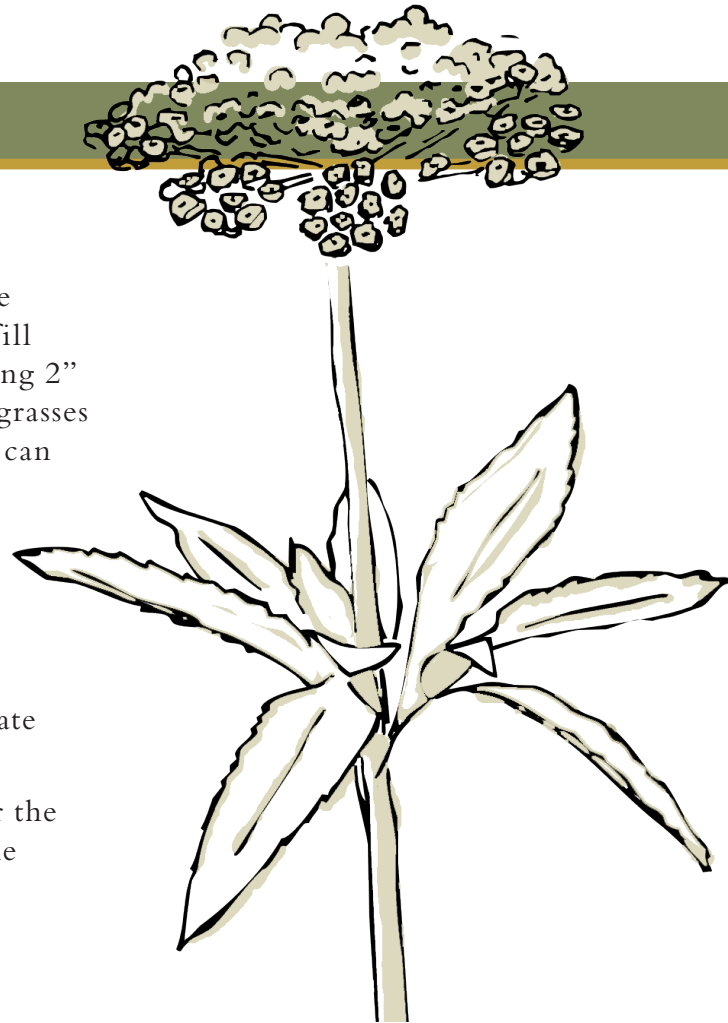
It is important to remember that your buffer can be visually engaging in the winter! Winterberry's vibrant red berries are sure to add some pizzazz to your winter lakeshore view. Winterberry is actually a type of native holly, but unlike the more familiar holly, winterberry loses all of its leaves in the fall to give way to a spectacular display. Only female winterberry plants produce fruit, so you must remember to plant a male for every three to five females.



# BUFFER TEMPLATE

A sample template is provided to help you plan your project. This plan covers about 600 ft<sup>2</sup> and serves to give you a sense of the cost and number of plants needed to fill the space. To keep costs low, this plan is based on planting 2” plugs (50 cell per flat) spaced 15” apart for the flowers, grasses and ferns and two or three gallon trees and shrubs. You can start with larger plants for quicker results, but that will also increase the cost. Additionally, you may have different dimensions or conditions so feel free to make appropriate adjustments. To help determine the number of plants needed for your project, you can use a ground cover calculator such as: [www.midwestgroundcovers.com/Plant-Calculator](http://www.midwestgroundcovers.com/Plant-Calculator). We estimate that plants for this plan cost around \$1,500.

The best time to plant in this region is early spring after the ground thaws, but try to plant before late July so that the plants have time to establish before the winter.



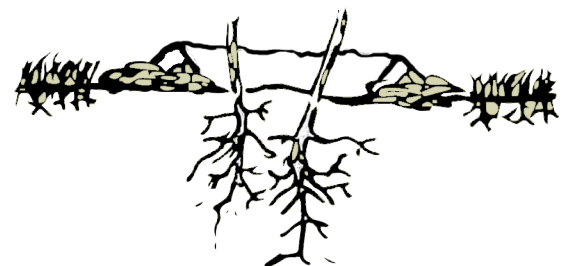
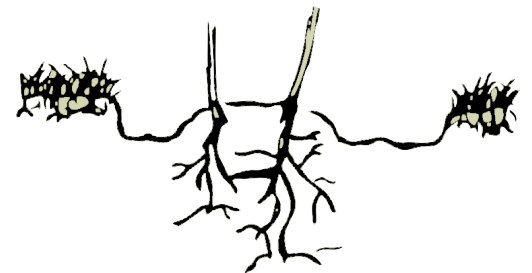


# PLANTING

Water the plants while they are still in their containers. The planting process can be stressful for plants, so keeping them well-watered is the best way to protect the plant before this transition. It's a good idea to plant trees and shrubs first, as these larger woody plants provide shade for plantings that cannot tolerate full sun. Mulching around the trees and shrubs will help reduce surface erosion, suppress weeds, and retain soil moisture. Use organic mulches such as leaf humus, wood chips, pine mulch, or other shredded bark.

## For Trees and Shrubs

1. Dig a hole as deep as the container and two times the width of the plant.
2. Remove the plant from the container and loosen the root ball by pulling it apart with your hands.
3. When you place the plant in the middle of the hole, the top of the root ball should be flush with the ground level. Readjust the hole if this is not the case.
4. Backfill the hole 2/3 of the way. If the soil conditions are poor, mix the original soil with about a quarter compost or loam.
5. Fill the planting hole with water. When this drains, fill again.
6. Continue filling the hole until it is flush with the ground. Gently press the soil to remove air pockets. Construct a small circular wall around the base of the plant; this will help keep water in place for the soil to absorb it.
7. Place about 3" of mulch around the plant, avoiding the area close to the trunk

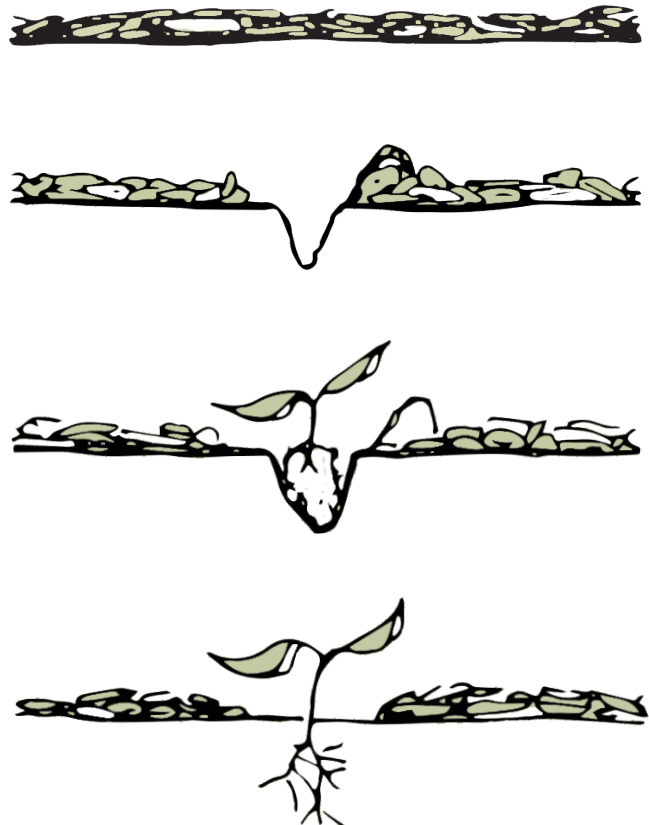






## For Flowers and Ground Covers

1. If you are planting small plants (1 quart or smaller) close together, it is easiest to mulch before planting and plant through the mulch to avoid burying small plants.
2. Push the mulch to the side and dig a small hole for the plant, being careful not to mix the soil with the mulch.
3. Place the plant in the hole with the soil level of the plant at or above the level of the ground. Replace the loose soil around the plant, gently press the soil around the edge, and replace the mulch, tapering it to the plant soil level.
4. Water thoroughly.





# AFTER PLANTING

## Year One

Lack of water is the largest threat to your new plantings. Make sure your planting gets a deep watering once a week. Maintain a circular mound around the plant to ensure the water gets to the plant and doesn't just run off. You should weed the area but avoid raking.

## Year Two

You should only need to water if there happens to be a lack of rainfall. You shouldn't need to replenish the mulch. As always, monitor for invasive species. As the native plants become established, the threat of invasive species will decrease.



If you are concerned about preserving your view to the lake, you might build a viewing deck or practice judicious pruning. If you choose to have a buffer that spans your shoreline and wish to have a path leading to the water, it should cut across the slope instead of straight down. This will help reduce erosion, and you will get to experience more of the living system you helped create.





# A Word About Invasive Species ...



Invasive species have the ability to thrive and spread aggressively outside of their natural habitat. They often form dense monocultures that alter the biodiversity and even the hydrology of a riparian system.

*Phragmites* is a particularly aggressive invasive. This species uses rhizomes and seed to rapidly reproduce to form dense colonies. With the ability to grow high and spread quickly, *Phragmites* easily outcompetes native riparian species. The good news is that a native planting can help prevent *Phragmites* from establishing in the first place.

The best time to control purple loosestrife is when it is in flower, typically mid-to late-summer when plants are easily recognized and before it goes to seed. Check out our online resources for removal techniques. This plant is still sold at some nurseries—so be to spread the word about the invasive nature of this plant.

Your first line of defense against invasive species is knowing what to look for and keeping an eye out to prevent them from getting established. Before removing exotic plants, it is essential to learn proper eradication or management methods. Without proper research, you may accidentally make the problem worse.

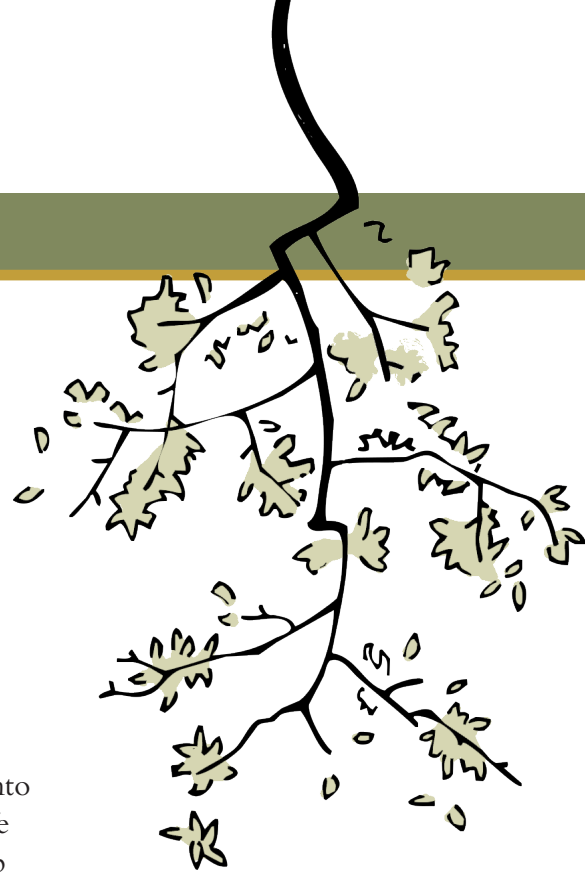




# TIPS FOR A HEALTHY LAKE

## 1) RETHINK YOUR LAWN

Lawns offer very little erosion control and biodiversity. In bare spots, topsoil is washed away and ends up damaging spawning areas for fish. In addition, commonly used pesticides, insecticides and fertilizers are detrimental to your lake's health. If your lawn is in a flat area, try leaving the clippings as a natural fertilizer. In addition, allowing your lawn to grow taller retains soil moisture and deepens root systems. This will increase the amount of water your lawn can absorb. Better yet, consider converting your lawn into a meadow. This will provide a wonderful habitat for more wildlife and will save you time and money. Some homeowners like to keep a mowed border around the meadow to frame it to remind people it is not a neglected lawn.



## 2) LET THE FALLEN STAY DOWN

When a tree falls into a lake, it becomes a crucial food source and a haven for young fish and invertebrates.

The log is hardly dead—it is supporting a vast array of plants and animals.



## 3) YOUR SEPTIC, CHECK IT

One of the greatest sources of water pollution comes from poorly maintained septic systems. A failing leach field can pollute nearby water by introducing nutrients that cause toxic algae and bacteria that make water unswimmable. Have your system checked once a year and pumped every three to five years. Regular maintenance will improve water quality and save you from costly repairs.



A team of volunteers helps to install a riparian buffer system on the lake association's property.

## 4) OH, BEACH NO!

Creating or maintaining a beach might be tempting, but it's a costly mistake—both economically and ecologically. When the sand erodes away, it smothers spawning areas and covers vegetation where frogs and toads lay eggs. This will create a domino effect within the lakeside ecosystem. The frogs and toads eat decaying plants and insects. Without them, this decay serves as fertilizer for the oxygen depleting bacteria. Algae growth will block light from getting to the bottom of the lake, and will stress aquatic life.

## 5) JOIN YOUR LOCAL LAKE ASSOCIATION

The final step is to get involved with your local lake association. If there isn't an association for your lake already, start one! Lake associations can be a positive force in protecting wildlife and monitoring your lake's health. Alone, you can only do so much. When residents come together the positive effects on your lake can be dramatic!



# Resources

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Audubon Society Native Plant Database  
[audubon.org/native-plants](http://audubon.org/native-plants)

Plant Identification & Information  
[gobotany.newenglandwild.org](http://gobotany.newenglandwild.org)

Whole Sale Native Plant Nursery- New England Wetland Plants  
[newp.com](http://newp.com)

Ground Cover Calculator  
[midwestgroundcovers.com/Plant-Calculator](http://midwestgroundcovers.com/Plant-Calculator)

Invasive Plant Information  
[cisma-suasco.org/invasives/overview](http://cisma-suasco.org/invasives/overview)

Highstead Website  
[highstead.net](http://highstead.net)



# Acknowledgements

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Highstead works to inspire curiosity and build knowledge about plants and wooded landscapes in order to enhance life, preserve nature, and advance sound stewardship practices.

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