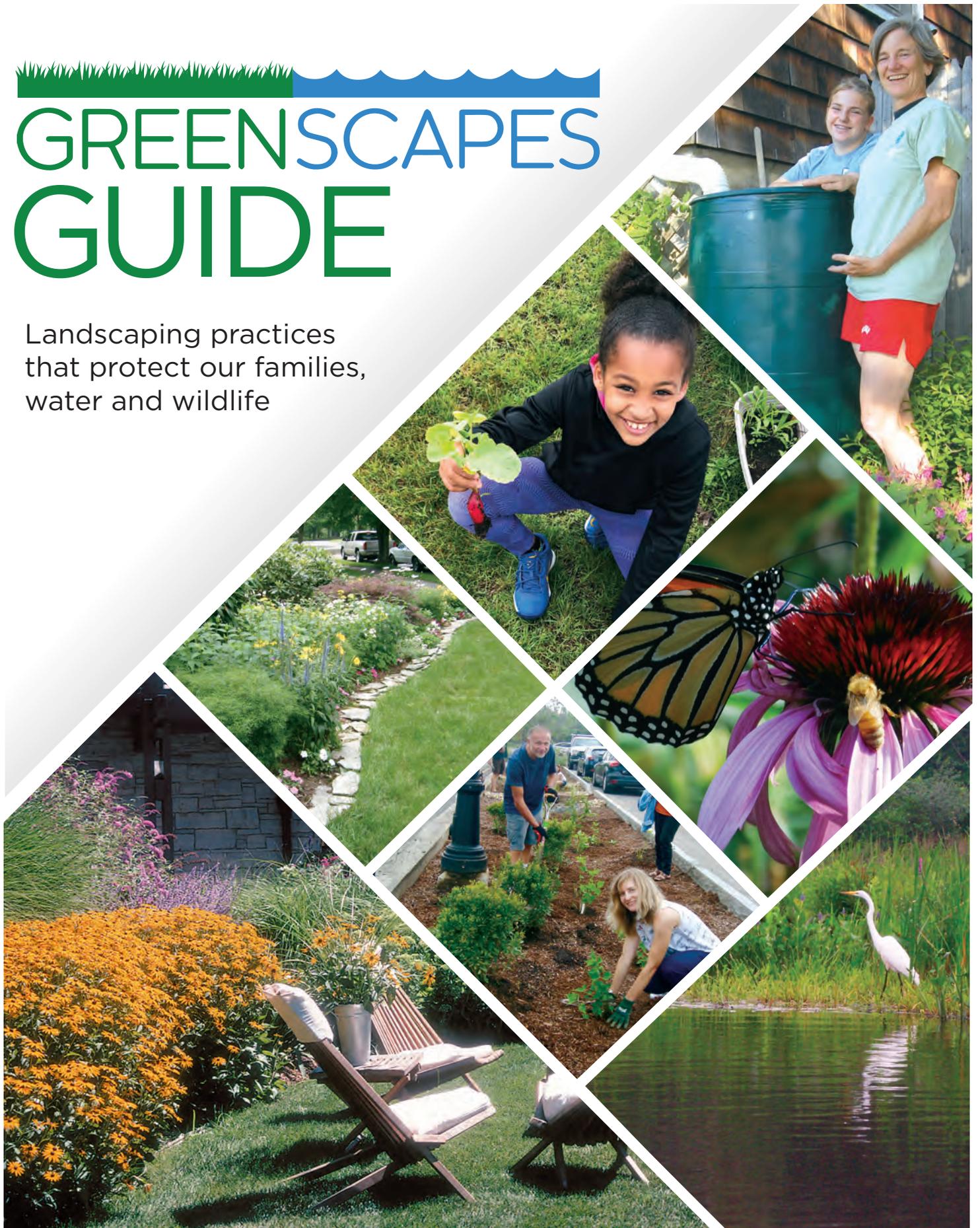


# GREENSCAPES GUIDE

Landscaping practices  
that protect our families,  
water and wildlife





# GREENSCAPES GUIDE

Landscaping practices that protect our families, water and wildlife



## Rethink Your Yard

“When we moved into our house, we inherited a large grassy hill next to our driveway that was ugly and a maintenance nightmare. We decided to try planting native and edible shrubs instead. Four years later, the hill is nicely colonized in beach plums, blueberries, common milkweed and other perennial flowers. Now not only is the hill low maintenance; it is attractive and provides an incredible bounty of berries and foraged foods throughout the year.”

**Nancy Pau, West Newbury**

**p. 4**



## Cut Out Chemicals

“The Lynnfield Town Common construction project brings with it a transition from traditional pesticides and fertilizers to a solid organics lawn care program. Ultimate success of this project will occur when residents are made sufficiently aware of the environmental, health, and cost savings benefits of organic lawn care such that a growing number of residents opt to transition from conventional lawn care methods.”

**Emilie Cademartori, Lynnfield**

**p. 7**



## Grow the Good Stuff

“I can’t imagine not planting native. Ever since we transformed our Ipswich riverfront property from the traditional, non-native plantings we inherited to a haven for wildlife with over 80 native plant species, we have seen the difference in ‘who’ visits our yard. Our bird list is at 98 species and our butterfly list at 25! I like knowing that we have improved our 1/3-acre yard for the time we are given to live on it.”

**Katie Hone, Ipswich**

**p. 11**



## Make Rain an Asset

“We have been interested in water conservation since we moved near the Ipswich River in 2005 and built a 1,000-gallon rainwater collection system. We use rainwater for our 30’ x 40’ raised bed vegetable garden and establishing new perennials or shrubs. We try to only plant drought tolerant varieties. For the most part, our system keeps up with garden demand as we are blessed in the Northeast with adequate rainfall to store for outdoor use.”

**Will Finch & Kim Honetschlager, Reading**

**p. 16**



## In Your Community

“The Penn Brook Elementary School includes an abundance of low impact development features, including a green roof, permeable pavement, an infiltration swale, and more. Every LID feature incorporated allowed Georgetown to get points towards more reimbursement money from the State, so the architects encouraged the Building Committee to include as many low impact development features as possible.”

**George Comiskey, Georgetown**

**p. 20**



## Do It Yourself Greenscapes Projects

Anyone can be a “Greenscaper” by taking small steps towards better landscaping and water management. You don’t need to tackle your whole outdoor space at once. Once you know the needs and limitations of your space, try starting with one of these projects.

**p. 22**



# Why Should I Greenscape?

**Greenscapes are beautiful, natural outdoor spaces that protect our water and wildlife. Greenscaping is good for your family and our environment, while saving you time and money. By following the recommendations in this Guide, you will:**

## Reduce Pollution

### NURTURE A HEALTHY ENVIRONMENT FOR YOUR FAMILY

Nearly 70% of the pollution in our rivers, ponds, and oceans comes from rain and snowmelt that travels across the land. Especially in spring and summer, this stormwater runoff can become highly polluted from landscaping chemicals and fertilizers. Studies have shown that these synthetic products can cause many health problems through direct contact as well as air and water contamination. Greenscapes techniques will help you replace pesticides, herbicides, and synthetic fertilizers with natural solutions, keeping a healthy environment for your family and for the environment around us.

## Conserve Water

### PROTECT YOUR COMMUNITY'S WATER RESOURCES

Most years, we get enough rain to maintain a healthy summer lawn, yet massive amounts of water are still used for irrigation. Massachusetts households that water their lawns in the summer use up to 1900 gallons a week. That's like running your shower for 12 hours! In most towns, water consumption nearly doubles from winter to summer, putting a strain on community water resources. Reducing or eliminating lawn watering through Greenscapes practices can save water, money and time.

## Help Wildlife

### CREATE AN OASIS FOR BIRDS AND POLLINATORS

Plants that are native (indigenous to your area) will bring more wildlife to your green spaces. Native plants attract birds, butterflies and other wildlife that have adapted over centuries to use them as a food source. Using pesticides will kill beneficial bugs along with those considered pests and could also inadvertently harm birds and other small mammals. Using natural plant care practices will assure that your yard is an oasis for wildlife.

## Be Resilient

### PLAN FOR AN UNRELIABLE CLIMATE WITH ADAPTABLE OUTDOOR SPACES

While heavy rainstorms and "flash" flooding are becoming more common, Massachusetts suffered the worst drought in its history in 2016. Future climate forecasts predict an overall increase in dry days and the frequency of daily temps over 90°F, as well as an increase in heavy rainstorms. Planting your landscapes with drought-resilient plants that grow deep roots will help guard against these patterns of drought, heat, and flooding.



Green roof, Ipswich River Watershed Association

## SECTION ONE

# Rethink Your Yard

**Here's the good news: having a beautiful outdoor space doesn't have to be time consuming or costly and doesn't require the use of toxic chemicals like pesticides, herbicides, or fungicides. Once established, natural areas require significantly less money and time to take care of than an expansive lawn.**

### How do I start?

Whether your outdoor space is big or small, dry or wet, shady or sunny, there's a Greenscapes solution for your landscape. Check out the *Do It Yourself* projects in Section 7 for inspiration.

### Understanding Your Needs

Many different factors will guide the opportunities you have for re-envisioning your outdoor spaces.

#### SOIL

Testing your soil will inform you of its deficiencies, including pH levels, which is a measure of how alkaline or acidic the soil is. Armed with this knowledge, you will be able to provide the right soil conditions for healthy plant growth in any of your outdoor areas. To start, order a soil test from UMass or purchase a kit online or at your local home improvement store. If you have acidic soil, like most of Massachusetts, add lime, calcium or wood ash to increase pH to neutral. Most plants prefer a pH around 6.

If you follow the natural Greenscaping practices in this guide, your lawn will already get plenty of nutrients. However, if your soil test shows that you still need more nutrients, choose your supplements and timing wisely. Fertilize in the fall, if at all. Spreading fertilizer in the spring encourages weeds, but fertilizing in the fall helps plants build deep, strong roots.

*For more information on fertilizer, see Section 2.*

#### DRAINAGE

How does water move over, through and around your outdoor areas? Do you have compacted, clayey soil that holds moisture, or is it a sandy, quick-draining mixture? Take a look during a rain storm to see where water puddles or areas that are eroding. *To learn more about your drainage and water needs, see Section 4.*

#### SUN OR SHADE

The amount of sun your space gets determines which plants will work best as well as how much and often you'll need to water. Shady, well-vegetated areas stay noticeably cooler than areas of full sun and sparse vegetation.

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*Lawn reduction is a big part of creating an earth-friendly, sustainable landscape. A smaller lawn means you'll mow less, use less water, and greatly reduce the need for lawn fertilizers or chemicals.*

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### Is Grass Bad?

The iconic suburban lawn is grown with *Poa Pratensis*, a species of grass that, despite commonly being called Kentucky Bluegrass, is not native to North America. Bluegrass requires lots of water and maintenance to stay healthy in our Massachusetts yards. When a lawn starts to brown, many property owners spend countless hours, dollars, and gallons of water, hopelessly trying to fix the problem.

Lawn reduction is a big part of creating an earth-friendly, sustainable landscape. A smaller lawn means you'll mow less, use less water and greatly reduce the need for any lawn fertilizers or chemicals. If you can, consider replacing grassy areas with other kinds of plants. *See Section 3 for ideas.*

### Increase Your Greens

A green lawn doesn't have to be just grass. Let biodiversity be your guide: make a place for clover, dandelions, violets, wild strawberry, and other native ground cover in your yard. Besides being a great lawn substitute, native groundcovers can attract even more beneficial creatures if you plant a variety of groundcovers of varying heights. Newts and toads, and some birds such as thrushes, love to eat slugs and snails that may be attracted by moist, dense groundcovers. Biodiversity not only increases your lawn's resistance to disease and creates naturally occurring fertilizer, but also improves the aesthetics of your space. You could have a colorful garden every spring! Don't want to spread dandelions? Mow before they seed!

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*According to NASA, more surface area in the United States is covered by lawn than by any other single irrigated crop. By amount of land, money and water used in its cultivation, turf grass is the largest crop in the USA!*

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## Fescue to the Rescue

If you're not ready to let go of grass, try replacing your bluegrass with native species that will be much more resilient to drought and disease. Fescues are native grasses that are drought tolerant, pest resistant and can survive in both sunny and shady areas. They require less water, fertilizer and mowing because they are slow growing. All this means less work for you!

- **Tall Fescue:** Great for outdoor spaces that see a lot of foot traffic. It is typically used for athletic fields. This fescue is shade tolerant and likes soil rich in organic material.
- **Creeping Red Fescue:** Very shade tolerant and requires little to no fertilization or watering. This fescue is often added to bluegrass mixtures for increased resiliency.
- **Hard Fescue:** Very hardy, with a beautiful blue-green color. This variety claims perhaps the most attractive quality a grass can have—it requires almost no mowing! It is also a great option for areas abutting roads or driveways as it is naturally salt resistant.
- **Chewing Fescue:** Good option if you prefer to keep your grass short. If you have highly sandy or acid soil, this is also the fescue for you.
- **Sheep's Fescue:** Grows in dense tufts. While it is often used as an ornamental grass it can also be grown as a ground cover.

*Convert traditional lawns into a sustainable organic lawns by using a shade mix seed predominately-fine fescues, which can tolerate sun and shade conditions. These lawns end up being about 60% fine fescues, 20% perennial rye grass and 20% Kentucky bluegrass, because they were predominately Kentucky bluegrass lawns originally.*

CURTIS DRAGON, SALEM





## The Mow You Know

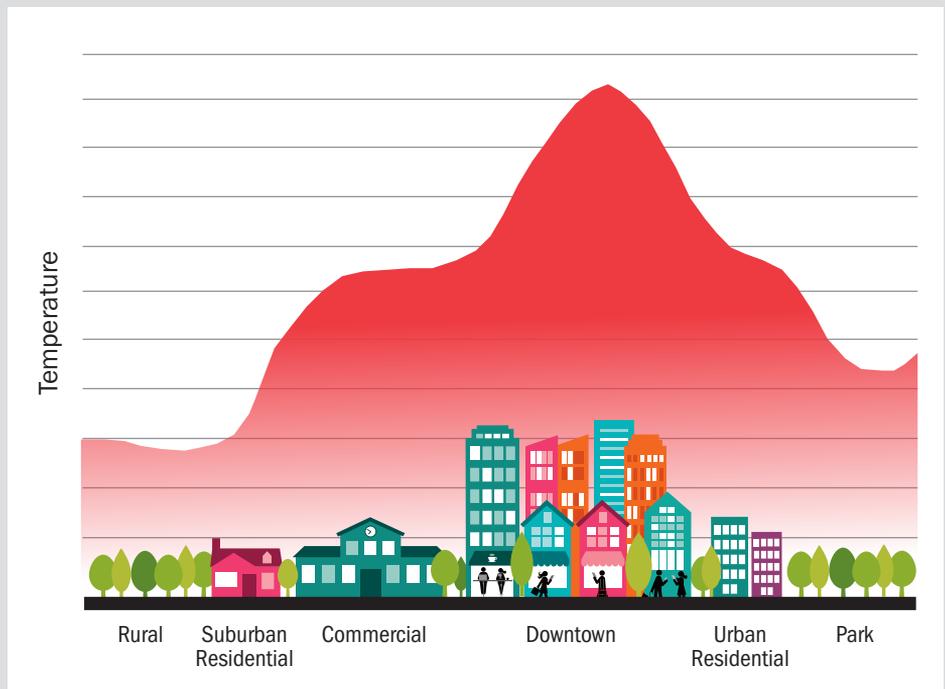
We need to rethink how we mow, because proper mowing techniques are truly the primary key to lush, healthy groundcover.

- **Keep your blades sharp.** Dull mower blades cause serious harm as they rip, rather than cut. Grass that is torn or frayed is weakened and can easily succumb to bacteria and disease, whereas a clean cut makes the plant much more resistant to damage. Many homeowners try to repair the damage done by improper mowing by adding water, fertilizer, chemicals, and pesticides. It's much easier on you, your wallet and the environment if you mow correctly and don't cause damage in the first place.
- **Don't mow too short.** Set your mower to leave the grass 3" tall. This allows the grass to form deeper, healthier roots, while helping to crowd out weeds. Taller grass also helps your soil retain moisture, so watering is required even less frequently.
- **Leave the grass clippings.** They are an easy and natural source of nutrients. Composed of 85% water, they decompose quickly and will not smother your lawn.
- **Wait for dry conditions to mow.** Mowing wet grass can make it more susceptible to fungus and disease and can compact the soil, creating ruts.
- **Help your grass help itself.** Mowing does not let grasses form the seed heads necessary for them to self-sow. If your grass is looking patchy, you may need to over seed: apply grass seed on top of your lawn in the fall, when conditions are cooler and wetter. This is a great opportunity to transition to more resilient, native grasses without having to tear up turf. Mow as short as possible immediately before over seeding so slow growing fescues can compete with the existing grasses.

*Mower blades should be sharpened after every 25 hours of use, or about once or twice per growing season.*

## Stay Cool

More trees, shrubs, and other leafy vegetation means a cooler space for you. Plants reduce "heat island effect" via evapotranspiration. Dark, paved surfaces absorb light and heat much more than surfaces that are vegetated or lighter in color. Imagine what a parking lot on a hot day feels like. To put it simply, the plants are sweating for you! The more trees and green spaces, the more we can balance "heat island" effect. Planting "green" roofs, or even painting roofs white or any color lighter than black, will increase their ability to reflect the light and heat and keep us cooler.



## SECTION TWO

# Cut Out Chemicals

**Your outdoor space is a complex system of many different living organisms. If you look closely at even the healthiest landscapes, you will see a blend of plants and insects. Finding a few weeds or insects in your lawn or garden is not cause for alarm. Nature knows what it's doing and working with it, not against it, will yield the best results.**

Pesticides and herbicides are toxic substances that may pose a health risk to your family, pets, and wildlife. While pesticides are often advertised to target specific species, these chemicals can also harm beneficial insects and can disrupt the ecological balance of a landscape. Bugs aren't the only thing affected by pesticides; birds and small mammals can ingest fatal levels of insecticides by eating contaminated bugs.

Pesticides and herbicides are not necessary for a beautiful, low maintenance landscape. These chemicals rob the soil of vital nutrients and microbes, requiring more and more applications of fertilizers and chemicals to compensate.

The goal of using Greenscapes practices is to encourage healthy, deep-rooted plant growth and rich, fertile soil. These practices work with nature to help your yard naturally resist drought, weeds and disease.

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*Pesticides and herbicides are toxic substances that may pose a health risk to your family, pets and wildlife.*

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### Mulch is Your Friend

Mulch and ground covers can be your best friends, particularly in the areas under trees and bushes where grass won't grow, but weeds will. Organic mulch is very beneficial to plants and soil because it helps retain water, moderates soil temperature, inhibits weed growth and increases the soil's organic matter and microbial activity.

Well-chosen groundcover plants can be introduced into any garden bed as a low-growing base layer, replacing the need for other mulch materials. A living mulch, groundcover provides an insulating cover for the soil—keeping it cooler in the summer and helping it retain its moisture longer.

Hardwood bark mulch and nutshells will take several years to break down, while pine needles decompose quickly and make the soil more acidic. Straw, shredded leaves and composted yard waste will decompose within a year but will significantly increase nutrient availability and plant growth, because they support those important microbes. Mulch should be spread about 3" deep, though optimum depth depends on soil type. Sandy soil, which loses moisture rapidly, benefits from a thicker mulch than clayey soil, which retains water. Before mulching, pull weeds, bugs and mites or smother them with a layer of newspaper, then water well.

Mulching can help combat weeds. To keep plants healthy, use sparingly and never mound mulch up around tree trunks.



## Reconsider the Weed

Although advertisements will try to convince you they are “weeds,” plants such as clover and dandelion can be attractive and useful additions to a lawn. They add color and texture and even provide lawns with nutrients. You can still have a beautiful, lush lawn after stopping a chemical program that you have relied on in the past. Weed control can be done naturally. For starters, grouping plants close together minimizes weeds by giving them less room to intrude and less access to sunlight.



*Dutch white clover, for example, is a beautiful, low-growing hardy perennial that smothers other weeds, prevents erosion, retains moisture, and naturally provides nitrogen in your soil.*

### The Truth about Bugs

There is no guaranteed way to prevent mosquitoes and ticks from entering your yard or outdoor space. However, by sticking to Greenscapes practices, you can make your yard a haven for their natural predators. Birds, beneficial insects and other wildlife will work to keep “bad” insects in check and encourage a healthy environment. That means it’s your job to keep them protected by cutting chemicals out of your landscaping routine.

Keep mosquitoes from reproducing and spreading on your property by eliminating areas of still water where they could breed. The absolute best way to protect yourself and your family from contracting a tick borne illness is to be in the habit of checking for ticks after being outside. Remember that ticks can hitch a ride on any mammal, so that includes your cats and dogs!

### A Few Friendly Neighborhood Insects



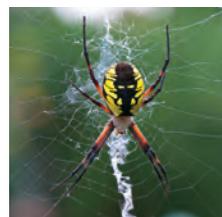
**Green Lacewing:** Larvae voraciously eat eggs and larvae of insect pests, including aphids, red mites, thrips, whitefly, leafhoppers, and mealybugs. Larvae eat for 2–3 weeks, spin a cocoon, and 10–14 days later emerge as adults (which eat only nectar and pollen).



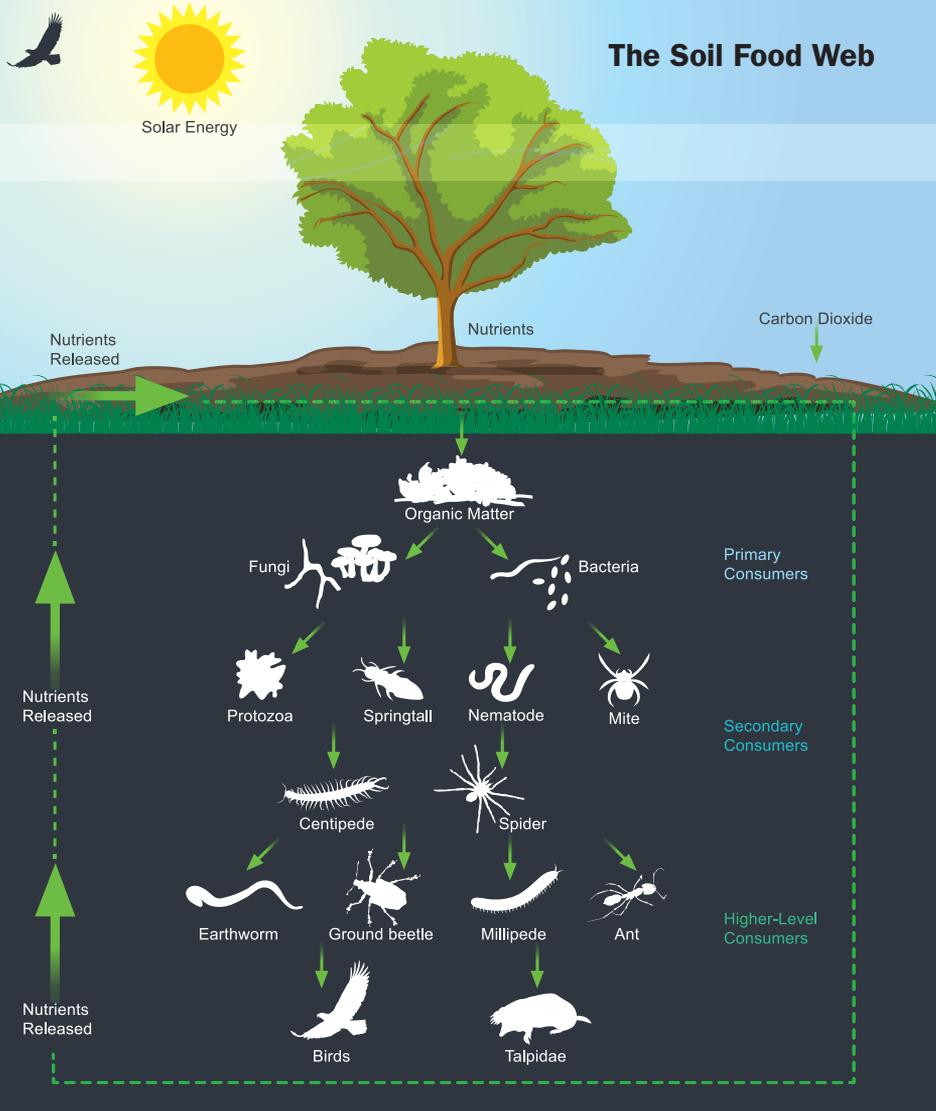
**Lady beetles:** Larvae look like tiny, colorful alligators. Both the larvae and the adults feed on garden pests, including aphids, scale insects, thrips, and mealybugs.



**Damsel bugs:** During their pre-winged (nymph) stage, they feast on insects and their eggs. They grab prey with their thick front legs while their beak pierces aphids, caterpillars, and other soft-bodied insects.



**Spiders:** Over 3000 different kinds of spiders in Massachusetts eat a wide range of insects including aphids, roaches, mosquitoes, ticks, and fruit flies.



**A complex system of organic matter and organisms that live all or part of their lives in the soil, releasing nutrients as they feed and are eaten.**

## Healthy Soil, Naturally

Fertilizers contain nitrogen, phosphorous, potassium, and other elements that help build strong roots and plants. However, as the saying goes, too much of a good thing can be bad. Many of us unknowingly waste time and money by putting too much of the wrong kind of fertilizer on our landscapes, often at the wrong times. This is partially because our soil is not properly balanced (that is, it's too acidic or alkaline) to allow plants to absorb the nutrients they need in the first place. Not only do your lawn and wallet suffer, the environment does as well.



Nature has its own nutrient delivery system in place. By growing an outdoor space with lots of biodiversity, the plants themselves will provide much of the nutrients your soil needs. You can help these natural processes along by doing *less* not more. Grass clippings, dead leaves and cuttings from prunings will all provide natural, free fertilizer for your plants. Try using them as mulch around the base of your plants during your fall gardening. Dead leaves also serve the important function of hosting larvae for beneficial bugs such as fireflies!

If your soil test shows that it's lacking in nutrients, try top dressing with compost (see below for more information). Spread a thin layer of compost (1/2" or less) to add organic materials that help the soil retain moisture. High-quality compost is available in nurseries by the bag or in bulk, or you can make your own. Compost added in the fall will have time to integrate into the soil during winter, but you can also spread compost in the spring. As with any application of additional nutrients, do not spread compost if heavy rains are predicted to prevent runoff of excessive nutrients in waterways.

If you decide to use traditional fertilizers, remember that organic fertilizers and synthetic fertilizers are not the same. Synthetic fertilizers are more concentrated, making it is easier to over-fertilize, burning the plant and potentially harming soil organisms. Synthetic fertilizers also tend to be more water-soluble, leaching out of the soil faster and polluting our water resources. Organic fertilizers release nutrients more slowly, which makes them more effective and less of a contributor to water pollution.

## Compost—Nature's Free Fertilizer

The best way to raise healthy plants is to have healthy soil. One way is to enrich it with compost, sometimes called black gold. You can't find a better soil amendment than compost. It improves soil structure and texture—loosening compacted and clayey soils; it improves the soil's ability to retain moisture and air; it adds important minerals and nutrients; and it stimulates healthy root development. Plants love compost!

Composting is nature's way of converting organic material into humus. Compost is made when kitchen scraps, leaves, grass clippings, etc. decompose. Critters such as microorganisms (bacteria, fungi and molds) along with earthworms and insects convert the plant material into humus. The process of composting is simply a matter of providing these organisms with food, water, and oxygen—then letting them do the work.

# Composting Is Easy



Start with a bin

## Step One: Start with a bin

You can make your own compost bin by using inexpensive wire mesh or even a trash can with a lid and holes drilled into the bottom. Many towns offer rodent-proof bins at a reduced price (contact your Town Hall) or attractive bins can be purchased online and through many garden centers.

An average household can compost between 500 and 1,000 pounds of organic material each year, producing a rich soil supplement out of material that would, otherwise, be thrown away. That's a huge reduction in your household garbage!

For balanced compost, you will need both “brown” and “green” materials. “Brown” materials are high in carbon (but not necessarily brown in color). Brown materials include dried leaves, paper, and woody-type materials. Not necessarily green in color, “green” materials are moist and high in nitrogen. They include kitchen scraps, grass clippings, and coffee grounds. To optimize the composting process, use approximately three parts “brown” to one part “green” material.



Collect compostable materials

## Step Three: Add the materials and add water

Start by putting a shovelful of dirt into your bin. This serves as a “starter”—introducing the desired microorganisms into the compost. Then, add alternating layers of brown and green materials, trying to follow the 3 browns to 1 green

ratio. Add water when you start so that your pile is damp, like a wrung out sponge but not wet. This is critical—only damp materials will decompose. Add water whenever it feels dry.

## Step Four: Keep the pile aerated

Compost critters need oxygen to do their work. Every time you add material to your pile, fluff and turnover the pile with a hoe or pitchfork. More aeration makes compost faster.

## Step Five: Mix your finished compost into the soil

It will generally take from six months to a year to make compost. Finished compost is dark in color and looks like rich, brown soil. For most garden applications, it is fine to use compost that still has some recognizable bits of leaves or twigs — they'll finish decomposing in the soil. To use, mix 1/2 to 3 inches of finished compost into the top 4 inches of soil about one month before planting. Compost can be applied as a top dressing in the garden throughout the summer.



Mix finished compost into the soil

## Compost tea—Nature's perfect plant food

High-quality compost is also available in an easy-to-use, liquid form called “compost tea.” This nutrient-rich brew is made by steeping compost in oxygenated water, which activates the beneficial microorganisms in the compost a million-fold. Compost tea is pH neutral, so you can water with it and never worry about burning your plants. When sprayed on plant leaves, compost tea helps fight disease as well as feed the plant. Visit [www.greenscapes.org](http://www.greenscapes.org) for step-by-step directions on how to turn your compost into compost tea.

## SECTION THREE

# Grow the Good Stuff

**Beautiful landscapes don't need expanses of manicured lawn, or any lawn at all. Replacing grass with low maintenance ground covers, planting beds, gardens, or permeable walkways will add color and dimension to your landscape.**

A garden of native plants can temporarily hold and soak up rainwater that flows off of roofs, driveways, patios, or lawns. Growing the “good stuff” in your outdoor spaces can reduce flooding on your property and recharge groundwater, as well as filtering any pollutants that would otherwise be swept from paved areas into storm drains and eventually our rivers, streams and oceans.

### Get Off the Grass

You don't need to do a complete overhaul! Try small, manageable projects. Almost any plant is easier to maintain than grass—especially shrubs, trees and some types of perennial flowers. You can minimize grassy areas by maximizing your planting beds.

Do you have problematic parts of your lawn, perhaps ones that don't see much use? Do you only have a small outdoor space to work with? These areas might be better suited for something other than grass. How about:

- Areas where weeds are taking over?
- Out of the way areas that can't be easily used?
- Places where you desire increased privacy, such as the sides of the back yard or near windows?
- Tough to maintain areas, such as on a slope, against the house, or at the base of trees?
- Sections with difficult growing conditions like too much shade, too much sun, or poor drainage?

Check out Section 7 for some solutions to these tricky areas of your yard. Some options to consider are herb gardens, pollinator gardens, or gardens specifically designed to help with drainage and rainwater runoff.

You can plan your new space yourself or with help from garden design software, garden centers, or a landscape designer. Talk to neighbors, garden clubs, or your local watershed organization. Your design

should take into account the sunlight throughout the day, existing vegetation, topography, drainage, soil moisture, and intended uses of the property. Plan your work in phases to suit your resources.

### Choose the Right Plants

The right plants are key to success. Plants have evolved to live in certain conditions. Trying to make a shade-loving plant grow in a spot that gets six to eight hours of direct sunlight makes for an unhappy plant. Select low-maintenance, drought-tolerant shrubs, trees, perennials, and groundcovers. When selecting plants, be aware of prevailing conditions in various areas of your yard and take into consideration the plants' light, water, and soil requirements.



**Above: Groundcover next to permeable pavers. Left: Low-maintenance, drought-tolerant shrubs, trees, perennials, and groundcovers.**

# Invasive Plants

**Look familiar? These widespread invasive species will take over your outdoor space. Remove the roots and plant native species. See page 14 for some ideas.**

**Japanese Knotweed**



**Bittersweet**

**Honeysuckle**



**Purple Loosestrife**

## Native Plants

Make a point of selecting native plants for your outdoor spaces, as they have adapted and survived in our environment for centuries and will continue to do so. Most native plants also provide some important function for birds and other wildlife, such as being a food source or shelter. Avoid invasive species or high-maintenance plants that need lots of chemicals and water to survive.

Properly selecting and placing native plants can provide additional functions. Selecting deciduous trees (trees that shed their leaves in winter) for summer shade and evergreens for winter windbreaks can lower costs for heating and cooling 20% or more.

Even if you do not live in an area commonly thought of as having dry growing conditions, it is a smart idea to study up on which plants can adapt to dry areas. Eventually, every garden will experience a period of drought. When you think of plants for dry areas, the first ideas that come to mind are desert plants such as cacti. However, Massachusetts has many drought-tolerant, flowering perennial options, such as echinops (globe thistle), Rudbeckia (black-eyed susan), Echinacea (purple coneflower), and Phlox.

## Deep-Rooted Plants and Rain Gardens

Selecting deep-rooted plants for your outdoor spaces is an important Greenscapes practice. Gardens with deep-rooted plants more easily hold and soak up rainwater flowing off roofs, driveways or other impervious surfaces. With the proper design, these planted areas are classified as rain gardens.

Rain gardens are designed to receive and temporarily capture and filter rainwater flowing off the impervious surfaces around it. An impervious surface is a surface that water cannot pass through, which could include yards with packed soil and tightly manicured grasses. By capturing runoff, rain gardens prevent polluted stormwater from going down the storm drain and out to our rivers, ponds, and bays. Rain gardens also help replenish our aquifers and groundwater-fed rivers and ponds by infiltrating rainwater into the ground rather than allowing it to flow down storm drains.

Rain gardens should be planted in a shallow depression or basin, filled with well-drained soil or sediment and deep-rooted native plants. The plants and their thirsty roots will slow the flow of stormwater, will cause sediment to settle and will remove nutrients and other pollutants. Rain gardens require almost no watering in addition to natural rainfall, making them low maintenance after installation.



## Create your own rain garden

**There are five easy steps to make your very own rain garden.  
More detailed instructions and plans can be found at [www.greenschapes.org](http://www.greenschapes.org).**

### 1. Select your site

Where does water naturally flow or collect? Avoid soggy areas, and instead try to capture the water before it reaches the wettest places in your yard. Keep the site at least 10 feet from building foundations and downspouts, and 3 feet from sidewalks or driveways.

### 2. Check your soil

To ensure that your garden will drain well enough to provide a healthy habitat for your plants, you need to know more about your soil. Determine if water can infiltrate fast enough by digging a hole approximately 8 inches deep and pouring in a few inches of water. If the water drains slower than an inch an hour, you will need to add a layer of gravel to the bottom of your rain garden (at least 6 inches).

### 3. Determine your garden size

To find the ideal size for your garden, you need to determine how much water will be flowing into it. You can do this easily by identifying the impervious upstream areas that will drain into your garden.

### 4. Start digging

Once you know how big your garden needs to be, you're ready to start digging. Avoid the tree root zones. Stay clear of septic tanks and any buried utility lines. Call 811 for Dig Safe information.

### 5. Choose your plants

Select a variety of native, low-maintenance flowers and grasses that will provide color and interest throughout the seasons and can tolerate both wet and dry conditions (remember the rain garden will fill with rainwater periodically). Estimate one small plant per square foot.

# Low Maintenance Plants

The following is a small selection of beautiful plants that are drought-tolerant and require little maintenance once established. Most are native to New England. For more plant suggestions, visit [www.greenscapes.org](http://www.greenscapes.org).

## Perennials



**Sedum Autumn Joy** (*Sedum* x "Autumn Joy"): Well-known favorite that attracts butterflies and moths. Flower heads form in mid-summer and turn from pink to dusty-rose as the summer progresses, becoming dusty-red in the fall. Leave flowers on for winter interest. (Not native to New England.)



**Blanket Flower** (*Gaillardia aristata*): 12"–16" tall bright yellow daisy-like flowers with burgundy-to-plum colored centers will bring vibrant color to sunny borders and butterfly gardens. Vigorous, easy to grow, and salt tolerant. Begins blooming in late June and continues into fall.



**Milkweed** (*Asclepias syriaca*): Small, pink-orange flowered perennial prefers dry to damp soil and full sun.



**Pearly Everlasting** (*Anaphalis margaritacea*): Individual, erect stems—1'–3' tall. Flowers long-enduring, white, dry bracts arranged around a yellow center. Gray-green to woolly-white leaves. Plant in clumps to create a bushy appearance. Attracts American and painted lady butterflies.



**Eastern Red Columbine** (*Aquilegia canadensis*): Erect, 2 ft. tall, branching perennial; showy nodding, red and yellow flowers. A woodland flower, it likes shade to part shade and well-drained but not too rich soils. Attracts hummingbirds.

**Creeping Phlox** (*Phlox subulata*): Evergreen perennial forming mats or cushions up to 5" high. Requires full sun and well-drained soils. Small colorful flowers bloom late spring to early summer.



**Moonbeam Coreopsis** (*Coreopsis verticillata*): Clusters of light yellow, daisy-like blooms with green airy fern-like foliage. Blooms from June through October and is mildew resistant. Stands 24" tall and spreads 18–24" wide.



**Wild Geranium** (*Geranium maculatum*): Delicate but resilient purple flower prefers damp or wet soils and a variety of shade levels. Perfect for a back yard with pockets of sun and shade.



**Scarlet Bee Balm** (*Monarda didyma*): Explosive, red flowered plant can tolerate most soil moisture and shade levels. Sometimes hard to establish, this flower will grow to be 4' tall.



**Liatris** (*Liatris species*): Robust and striking perennial, also known as Blazing Star and Gayfeather, has an interesting vertical spike of purplish-pink or white flowers. Excellent flower for cutting and drying. Attracts butterflies and hummingbirds.





## Ornamental Grasses

**Little Bluestem** (*Schizachyrium scoparium*): Clump forming grass growing from 2'–4' tall. Summer color is green to blue green, with pinkish-tan fall color. Best in full sun and poor soils for massing or as a groundcover.



**Tall Switchgrass** (*Panicum virgatum*): Tall grass with reddish purple tips can tolerate most soils moistures but prefers partial to full sun at all times.



**Winterberry** (*Ilex verticillata*): Small rounded shrub with 3'–4" light green leaves turning yellowish-red in autumn. Striking pinkish fruit with vivid orange seeds. Needs male plant nearby for the female plant to bear fruit. Tolerant of drought and different soil types.



**Virginia Sweetspire** (*Itea virginica*): Deciduous 3'–5' shrub with white flowers June–July and purplish red fall foliage. Grows in sun or shade. Itea "Henry's Garnet" is also a great selection.



**Northern Bayberry** (*Myrica pensylvanica*): Hardy 5'–10' tall shrub with lustrous gray-green leaves. Tolerates full sun to part shade, wind, poor soils and even salt spray. Need at least one male plant for pollination in order for fruit to set. Grayish white berries in winter attract birds.



**American Cranberry** (*Viburnum trilobum*): Classic but underutilized berry bush can tolerate most soil moisture levels and partial to full sun.

## Trees

**Eastern Red Cedar** (*Juniperus virginiana*): Native evergreen with light blue berries that attract wildlife. Useful in masses for windbreaks and screening. Salt tolerant.



**Pin Oak** (*Quercus palustris*): Large 50'–70' fast growing tree. Strongly pyramidal with central leader. Good shade tree. Fall color is red to burgundy.



**River Birch** (*Betula nigra*): Not susceptible to birch borer or miners that plague other birches. This 40'–70' tree has the characteristic exfoliating bark that is enhanced by a range of hues.



## Ground Covers

**Lowbush Blueberry** (*Vaccinium angustifolium*): Low spreading shrub, growing 8"–12" tall. Glossy blue green leaves in summer, turning purple in fall. Flowers are white, bell shaped, turning to a small, dark blue, sweet berry. Grows best in wooded or open areas with well-drained acidic soils.



**Bearberry** (*Arctostaphylos uva-ursi*): Creeping groundcover that grows 6"–12" tall, with glossy evergreen foliage, forms broad mats up to 15' wide but can be slow growing. Red berries in July and August. Provides good food source for wildlife.



**Barren Strawberry** (*Waldsteinia fragarioides*): An ornamental, strawberry-like plant that may be used in a variety of landscaping situations. Drought tolerant. Evergreen foliage but will turn brown-bronze in cold winters.



## SECTION FOUR

# Make Rain an Asset

**You can manage your space so rain becomes an asset to your property instead of a problem to the environment. By adopting Greenscapes practices, you can help keep our water resources clean and plentiful.**

Making rain “an asset” means creating outdoor spaces that help absorb rain and snowmelt into the ground, a process called groundwater infiltration. We can also help keep the rain and snowmelt clean so that pollution collected by the water as it travels across the land—stormwater pollution—is filtered and cleaned before it’s next journey through the water cycle.

### It just rained. Why is there a water ban?

Our communities need enough water for humans, wildlife and nature. Human needs go beyond drinking and bathing. We need water for safety, agriculture, industry, and recreation. However, non-essential outdoor water use, particularly in the summer for landscape irrigation and similar activities, uses huge amounts of water, much of which is wasted due to evaporation, runoff, or overwatering. Typically public water use in the summer is double the amount used in the winter, taxing our local water supplies. This is why towns implement “watering bans” to restrict outdoor water use.

Even with plentiful rain, groundwater levels can drop quickly during increased use and higher temperatures. To protect water supplies and our natural resources, groundwater should not drop below certain levels. By using Greenscapes practices, you will need less water for your outdoor spaces and you can easily follow your community’s water use guidelines. You have a key role in conserving water and protecting your community’s water resources.

### Let your plants tell you when they’re thirsty.

Watering routines shouldn’t be determined by a clock, a calendar or a programmed irrigation system, but instead by a combination of factors including plant type, soil type, drainage and exposure to sun and shade.

### The Spade Test

An easy way to check your soil’s moisture level is the spade test. Dig a very small wedge into your soil. Is it dark, or light and crumbly? If the soil is light in color, loose and crumbly, it is dry. If the soil is dark and damp, let it be. Overwatering can cause fungus and disease.

## Greenscapes Protect Our Watersheds

**W**hat is a watershed? A watershed is an area of land where all the water that falls within it drains or “sheds” to the same place. Every river, stream, lake, pond, swamp, wetland, estuary, coastal bay, underlying aquifer, and ocean has a watershed. Small watersheds are usually “subwatersheds” for a bigger basin. Rainwater, including melting snow, landscape irrigation and resultant pollution, runs downhill into these waterbodies and into the soil to replenish groundwater.

Each one of us influences the quality of life in our watershed by how we treat the natural resources—soil, water, air, plants, and animals. Our watersheds provide water for drinking, public safety and public recreation. Healthy watersheds are vital for a healthy environment and economy.

Your outdoor spaces are a part of your local watershed and can be designed to keep water resources plentiful, clean and healthy.



## Is it possible to overwater?

Of course it is! Too much water weakens plants, makes them more susceptible to disease and causes an unhealthy condition called “shallow root syndrome.”

Water deeply but infrequently to prevent shallow root syndrome. Deep watering is the process of completely drenching a plant’s root system to ensure that it gets more than an adequate supply of water. Generally, to deep water a plant, the water must soak at least eight inches or more beneath the soil’s surface. This encourages strong, deep roots, which helps plants withstand drought and disease.

To stay healthy, plants—even grass—generally need only one inch of water per week. Outside of drought conditions, Massachusetts gets an average of 3.75” of rainfall per month (*MA Water Resources Authority*), nearly satisfying your lawn’s needs!

If your outdoor space needs water, water at dawn or in the early morning. It’s ten times more effective than watering during the day, eliminating evaporation and helping to prevent the growth of fungus. Make sure to allow your soil to dry out before watering again—infrequent watering with a good soak is best.

## Water Plants, Not Pavement

Nothing is more wasteful than a sprinkler or hose that waters the street or the sidewalk. Water by hand, and make sure water is landing on plants and not impervious surfaces like driveways, sidewalks, or walls. Avoid sprinklers that produce a fine mist that easily evaporates and blows off target.



Sidewalks don't need water!



## Watering Rules of Thumb

- In Massachusetts, established plants usually only need watering during the months of June, July and August. Spring and fall usually have increased rainfall and cooler temperatures.
- Keep an eye on the weather forecast. Even if your soil is getting dry, you do not need to water if rain is predicted.
- Abide by local watering restrictions, even if you have a private well. If your town has implemented watering restrictions or a ban, or the State has declared a drought emergency, be sure to comply with the regulations. All wells draw from groundwater sources.

## Slow the Flow

If you’ve thoroughly assessed your outdoor space, then you may have noticed areas where water tends to pool or an area along a driveway, downspout, or sidewalk that suffers from erosion. Using Greenscapes practices, you can turn these problem areas into thriving and beautiful natural spaces! You can “slow the flow” with rain gardens, swales and vegetated buffers. *Learn more in Section 7 Do It Yourself.*



This rain barrel is ready to capture the rain from their roof.

## Harvest Rainwater

Capturing rainwater with a rain barrel or cistern is a Greenscapes double hitter! Not only will you be reducing the amount of stormwater runoff, but you'll have a source of free and renewable water for your plants which can be used when conditions are dry.

Rainwater contains no chlorine, no fluoride and no chemicals. It is an excellent water source for plants, gardens, lawns and any non-potable use. Regular use of a rain barrel can pay for itself in one season. One-quarter inch of rain draining off a one-car garage will fill a 55-gallon rain barrel. New England typically receives 17" of rain during the growing season from May through September. This provides enough water to fill 170 rain barrels that can be used even when water bans are in place. There is no restriction on rainwater use!

## Redirect runoff from your roof and driveway

Most driveways and sidewalks are designed to whisk water away from your property, usually straight to the storm drains in the street, which flow into the nearest pond or river. You can redirect this water into the ground by using a number of easy solutions described in described in Section 7. Generally, if redesigning or constructing a new driveway, we recommend sloping it towards a vegetated area rather than the street.

## Maximize natural areas

The easiest way to protect water quality and reduce the quantity of runoff is to keep part of your landscape natural. Woodlands not only absorb water and recharge groundwater, they also provide precious habitat for wildlife.

## Limit paved surfaces

Instead of using traditional asphalt and paving stones, consider using porous materials, such as permeable pavers, mulch, stone, or shell. There are even porous versions of asphalt and concrete that perform well and look much like the traditional material.

## Create vegetated buffers along bodies of water

Planting a natural buffer of shrubs and trees along rivers, streams, ponds, wetlands, or swamps has huge benefits for the water body. The buffer protects water quality by intercepting chemicals, animal waste, and other pollutants and directing them into the ground where the soil can filter them out. An ideal vegetated buffer is at least 100 feet wide and could include shrubs such as winterberry, elderberry, high bush blueberry, and trees such as river birch, cottonwood, black willow and red maple. A good garden supply store should have plenty of information about native plants that make a great buffer.

## SECTION FIVE

# Stormwater

### Stormwater Runoff

The biggest source of pollution for waterbodies and waterways in Massachusetts is stormwater from rain and snowmelt runoff. In a natural, undisrupted water cycle, water falling on vegetated areas infiltrates into the soil where it nourishes plants, replenishes groundwater and slowly flows into waterways cleaner. In developed areas, however, when rain falls on hard surfaces (buildings, parking lots, roads, roofs, etc.), it cannot be absorbed. As rain and snowmelt runs across these impervious surfaces, they pick up oils, chemicals, fertilizers, pet waste, litter, and other pollutants along the way.

more polluted runoff. Stormwater does not go to a wastewater treatment plant. It flows into the nearest storm drain, which leads to the nearest waterbody, untreated!

Consider the fertilizers, herbicides, insecticides, and fungicides applied to landscapes. If not immediately absorbed by plants, they may end up as stormwater runoff, poisoning fish, plants, and animals that live in the water. People and animals that drink this water or eat the fish can become sick. The excess nutrients, not just the chemicals, are also a component of stormwater pollution. Nutrients from fertilizers or detergents can contaminate our drinking water sources and stimulate rapid algae growth in ponds and bays. When algae dies and decomposes, it consumes oxygen, depleting the supply for fish and other organisms.

Pet waste and failing septic systems can also add an excess of nutrients



into our waterways, along with creating serious health hazards from bacteria and pathogens that often cause beach closures. Always pick up your pet's waste and throw it in a trash receptacle. Never dispose of pet waste in storm drains, or anywhere near culverts, ditches, lakes, or streams.



In our changing climate, rainstorms are growing more intense and erratic. With so much water moving across pavement, flooding is exacerbated which means

*If not immediately absorbed by plants, fertilizers, herbicides, insecticides, and fungicides may end up as stormwater runoff, poisoning fish, plants, and animals that live in the water.*



## SECTION SIX

# In Your Community

**Greenscapes practices work for spaces big and small—that includes places beyond your yard and in your community. Great opportunities abound! Here are some examples from community projects across Massachusetts.**

### Share Your Greenscaping Knowledge

Municipal properties provide opportunities for Greenscapes: schools, libraries, sidewalks, town halls, roofs, parking lots, and more. You can share your Greenscapes knowledge with community partners, including neighborhood groups, parent-teacher associations, boy/girl scouts, local businesses, and so many others.

You might also consider bringing your Greenscapes expertise to your Public Works department or to a municipal committee that is involved in permitting new developments and redevelopments. Low Impact Development (LID) practices, such as rain gardens and porous paving, mimic or preserve natural drainage processes to manage stormwater, typically by retaining rainwater and encouraging it to soak into the ground.

Advocate for these natural methods and LID best management practices to help reduce flooding, protect water resources and increase the health of our environment.

### School Projects

If a community is considering building a new school, work with the building committee to bring examples of Greenscapes practices to the table. Low impact development elements can garner increased state reimbursement funding. LID projects provide teachers with a close-at-hand example to help students understand the importance of saving water and protecting the environment.

The Higgins Middle School in Peabody used natural bio-retention systems to clean and infiltrate the stormwater runoff from the parking

lots and roofs. Recharging the groundwater has reduced flooding downhill of the site.

### Sidewalks and Trees

Even smaller projects like store-front plantings and walkways can make a difference to local water quality and help protect against flooding. Shrubs and trees stabilize the ground, reducing erosion and absorbing water and pollution. They are beautiful, have aesthetic benefits and add color to a streetscape.

The Ipswich Riverwalk Extension in downtown Ipswich (see photograph in header above) includes permeable pavement and colorful plantings to reduce and clean parking lot stormwater before it flows into the abutting Ipswich River.



**Rain flows across sidewalks to the plants' roots when curbing is removed. Rain Garden, Higgins Middle School, Peabody**

## Rain Gardens

Rain gardens are designed to temporarily hold and soak up rainwater that flows off of roofs, driveways, parking areas and roads. They are a simple and cost-effective tool that can help alleviate road washouts and flooding, while protecting against pollution and coastal or riverbank erosion.

Stormwater from two acres of parking lot, boat storage and roofs flowed to one corner at Winter Island in Salem, causing significant flooding and beach erosion. To address these problems and pollution, a large rain garden with a biofiltration system was installed to clean the stormwater and slow the flow into the harbor.

## Green Roofs

Vegetated roofs can be very effective at reducing rooftop runoff. They also improve energy efficiency and reduce heat island effects in urban areas.

A green roof was installed with 10 varieties of low-growing, drought-tolerant plants at Whipple Riverview Place in Ipswich, when it was redeveloped as affordable senior housing. The 3,000 square foot green roof captures rainfall, filtering it before it runs into the Ipswich River. Visible from the Ipswich Town Hall, this green roof provides an educational experience to the public every day.

## Parking Lots

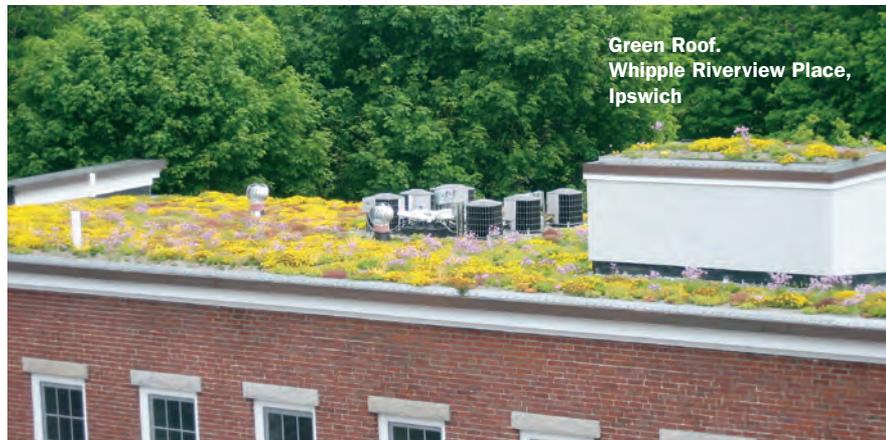
If a community or local business is building or resurfacing a parking lot, ask that they consider including a vegetated swale to absorb stormwater. Parking lots are heavily salted during the winter, and most of that salt ends up washing via storm drains or directly into waterways or wooded areas where it may contaminate vernal pools and other wildlife habitat.

Silver Lake in Wilmington supports swimming, fishing, wildlife, and recreational boating. However, the lake's quality was deteriorating from nutrients, sediment and bacteria entering the lake from the parking lot. LID improvements included 12 rain gardens where the plants process nutrients and contaminants as the water percolates through the soil. Roadway edges were resurfaced with porous pavers and underlying infiltration systems. These LID features dramatically improved Silver Lake's water quality.

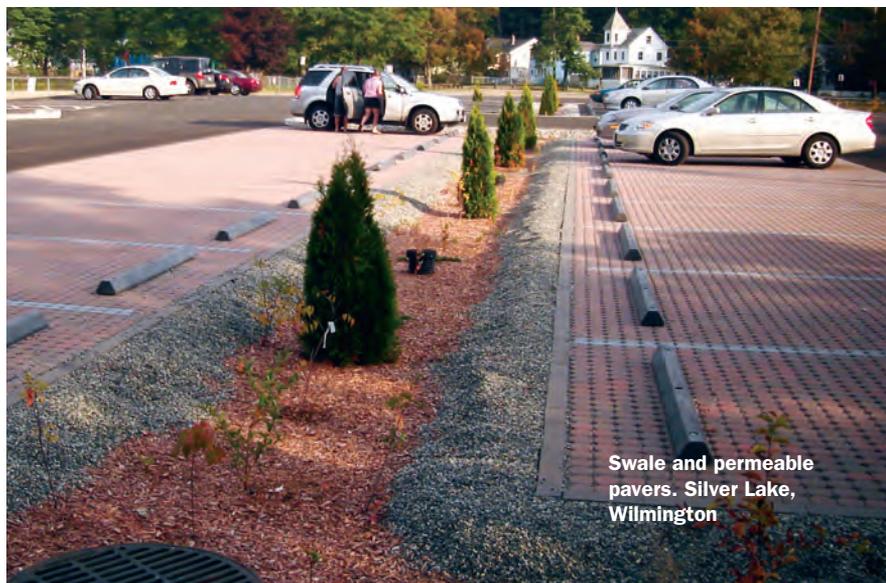
For more examples of community projects across Massachusetts, please visit the Greenscapes Low Impact Development Viewer at [www.greenscapes.org/LIDviewer](http://www.greenscapes.org/LIDviewer).



Rain Garden,  
Winter Island Park,  
Salem



Green Roof,  
Whipple Riverview Place,  
Ipswich



Swale and permeable  
pavers, Silver Lake,  
Wilmington

## SECTION SEVEN

# Do It Yourself

**You don't need to tackle your whole outdoor space at once. Once you know the needs and limitations of your space, try starting with one of these projects.**

### Five More Greenscapes Projects

#### **Downspout Garden: To reduce rain-runoff**

Gutters and downspouts collect water from roofs, keeping the ground below moist for much of the year. Luckily, some beautiful plants can thrive in damp soils, including tall joe-pye weed (which can also hide the downspout), pink turtlehead, dwarf sweet-flag, and lobelia. A downspout garden will do best on the east, west, or north side of a building; a southern exposure may be too hot, or dry out too quickly.

#### **Vegetated Buffer: Keeping your pond or stream clean**

If your property abuts a waterbody, a vegetated buffer between your lawn and your lake, pond, or stream can help protect wildlife habitat and keep your water clean. Shrubs and perennials with good root structures can be planted or areas can remain natural. Buffers will reduce pollutant impacts from stormwater runoff, help protect the bank from erosion, provide flood control and provide aesthetic value. A 50 to 200 foot wide buffer will provide the best overall benefits.

#### **Dry Streambed: For spaces that sometimes are more pond than yard**

A dry streambed is a gully or trench, built to provide drainage and prevent erosion by reducing runoff. It is usually lined with stones and edged with plants to mimic a natural riparian area, though one that has water running in it only in wet weather. Rather than using a concrete swale, you can build an appealing garden feature lined with water-worn stones, substantial enough to withstand a serious downpour and filled with colorful plantings.

#### **Driveway Swale: Tough enough for the rainiest of days**

In areas where water flows heavily down your driveway during rainstorms, plant a swale. A mixture of deep-rooted plants and dense lower growing plants or tufted grasses will give run-off a place to absorb and collect debris and will lessen the force of the water. The size of your swale depends on the impervious area it collects water from, as well as soil conditions. Any size will assist in managing and cleaning stormwater as well as recharging groundwater.

#### **Container Garden: For an urban jungle**

Potted or container gardens are great for beginning gardeners, people who have limited space, or anyone who wants to dress up a patio or a hard-to-plant area. They can be planted with a single plant or a combination of plants, including drought-tolerant succulents, grasses and sedges, or shade-tolerant plants. If you have a little more room, creating raised beds to grow herbs, veggies or even wildflowers could be a great utilization of your space.



SECTION EIGHT

# Partners at Work

The Greenscapes North Shore Coalition is a collaborative of municipalities and partner organizations, working together to keep water clean and plentiful.



The Ipswich River Watershed Association is the voice of the Ipswich River. In partnership with communities, businesses, schools, and other organizations, we work to protect nature and make sure that there is enough clean water for people, fish and wildlife, now and for future generations. [www.ipswichriver.org](http://www.ipswichriver.org)



Salem Sound Coastwatch is leading the way to a healthier sea and shore. Working with North Shore communities, we seek to improve water quality, restore and protect coastal habitats and wildlife, through research, monitoring, education and working cooperatively with communities. [www.salemsound.org](http://www.salemsound.org)



8 Towns & the Great Marsh works with communities to foster stewardship of coastal resources on the upper North Shore by heightening awareness of solutions to pollution problems, providing technical assistance and supporting local research. [www.8TGM.org](http://www.8TGM.org)

## Massachusetts Stormwater Permit—MS4

Recognizing that nonpoint source pollution, i.e. stormwater runoff, is the number one source of water pollution, MS4, a federal-state permit program, requires cities and towns to reduce polluted stormwater runoff by:

- Educating residents, businesses and developers
- Testing water exiting pipes
- Controlling construction site discharge
- Retaining or treating runoff from development
- Ensuring that streets and catch basins are clean
- Developing a stormwater management plan to improve operation and maintenance



The original "Greenscapes Guide" was created by the Greenscapes Coalition in 2007, in collaboration with the North and South Rivers Watershed Association, Eight Towns & the Great Marsh, Ipswich River Watershed Association, and Salem Sound Coastwatch. Guide redesign funded by the Greenscapes North Shore Coalition and MassDEP MS4 Municipal Assistance 2018–2019 Grant.



## Massachusetts Water Management Act Permits

According to studies by the United States Geological Survey, water withdrawals for drinking water are the major cause of low and no flow conditions in rivers throughout Massachusetts. Consequently, the Massachusetts Department of Environmental Protection regulates these withdrawals for many communities with permits issued through the Water Management Act. In support of Mass DEP's efforts to include enhanced outreach and education components in WMA permits, the Greenscapes North Shore Coalition assists member communities with their permit compliance and water-related public education and outreach needs.

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# GREENSCAPES CALENDAR



## EARLY SPRING

- Test your soil (PAGE 4)
- Prepare your compost bin (PAGE 9)
- Apply natural weed control (PAGES 7–10)
- Hook up your rain barrel (PAGE 18)
- Plant annuals and new perennials (PAGE 14)

## LATE SPRING

- Apply mulch to deter weeds (PAGE 7)
- Add prunings and clippings to compost (PAGE 10)
- Check your outdoor space for invading invasive plants (PAGE 12)
- If needed, sharpen mower blades and de-thatch lawn (PAGE 6)
- Usually no need to water before Memorial Day (PAGES 16–18)

## SUMMER

- Follow the watering rules of thumb (PAGE 17)
- Use the Spade Test to check if your yard is thirsty (PAGE 16)
- Don't plant in the summer, but get inspired for fall (PAGES 20–22)
- Kick back and think about all the benefits of gardening the natural way (PAGE 3)

## FALL

- Usually no need to water after Labor Day (PAGE 17)
- Check your mower blades for proper height and sharpness (PAGE 6)
- Seed with fescue and top dress with compost (PAGE 5)
- Plant shrubs, trees, or new garden features (PAGES 14–15)
- Rake and use leaves as mulch or add them to compost (PAGES 7–10)