



Image Courtesy of Chicago Wilderness, © Carol Freeman

A GUIDE TO GROWING ENVIRONMENTALLY FRIENDLY LAWNS & GARDENS





Midwest Grows Green accomplishes large scale behavior change by sharing pesticide and fertilizer information at critical places where lawns and landscapes influence our lives.

See www.MidwestGrowsGreen.org for more information.

This document was adapted from the original authored by Midwest Pesticide Action Center.

One of the Midwest's greatest resources is our freshwater. The Great Lakes and the waterways that feed them hold 84% of North America's and 20% of the world's fresh surface water. At this point in time there are many threats to our water quality including pollution and the global threat of climate change. Sustainable lawn and gardening practices can help reduce both threats, ultimately protecting our water quality. Conventional lawn care practices, such as over-watering, fertilizing, and applying weed killers, all contribute to the degradation of our waterways and the production of greenhouse gases.

The challenges of protecting our water quality and reducing the impacts of climate change may seem too great for one person to tackle. However, with eighty-one million households in the U.S. maintaining at least a small outdoor space, we can make a difference by working together. We can reduce our carbon footprint and residential water pollution by adopting sustainable lawn care and gardening practices. Midwest Grows Green provides the resources you need to make sustainable choices when deciding how to maintain your outdoor spaces.

MIDWEST GROWS GREEN

Midwest Grows Green is an educational program that provides the information you need to grow your landscapes in a way that reduces your negative impacts on water quality and contribution to climate change. The information highlighted here will help your lawn and garden adapt to an already changing environment and produce beautiful outdoor spaces while minimizing pollution. By adopting sustainable lawn and gardening practices, you will also be helping to preserve the natural world for our children and future generations to come.



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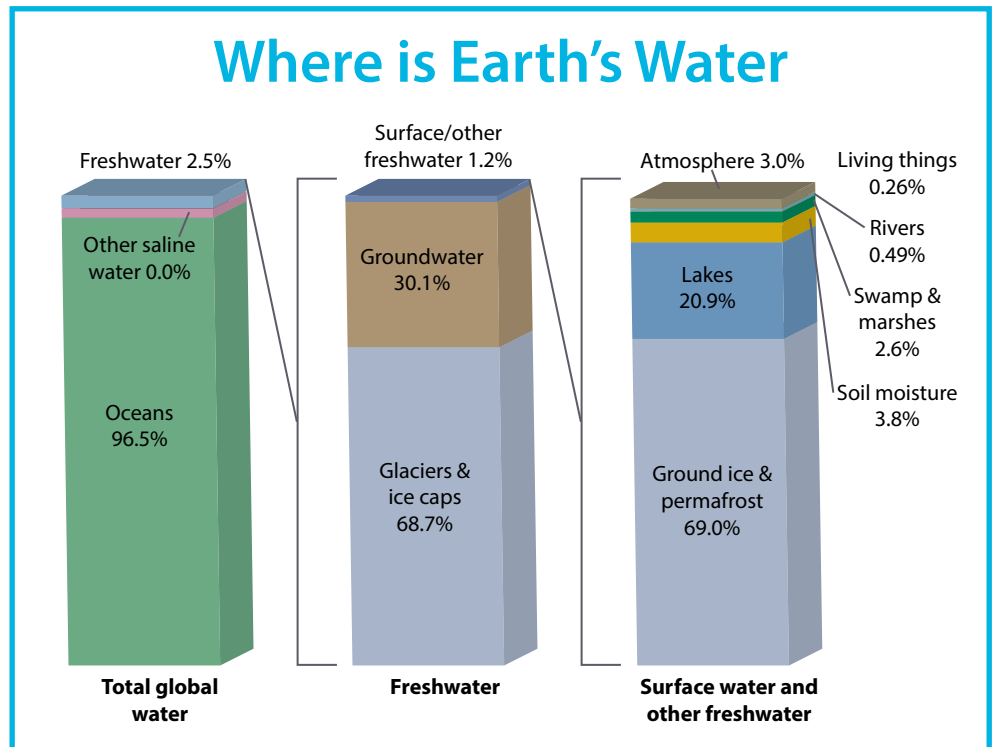


PRESERVING OUR WATER & YOUR LAWN AND GARDEN

The fact is that water is necessary for life on earth. Beyond drinking, freshwater is used to cook, clean, generate power, irrigate land, and dispose of waste. Its protection takes worldwide effort. The choices we make when deciding how to maintain our lawns and gardens directly affect the quality of our freshwater resources.

Of the total amount of water on earth, only 2.5% is freshwater. While some of this freshwater is found in rivers, streams, lakes, reservoirs, and underground aquifers, most of the freshwater supply is locked in glaciers and ice caps. In fact, surface freshwater represents only 1.2% of the total freshwater on earth. See Figure 1.

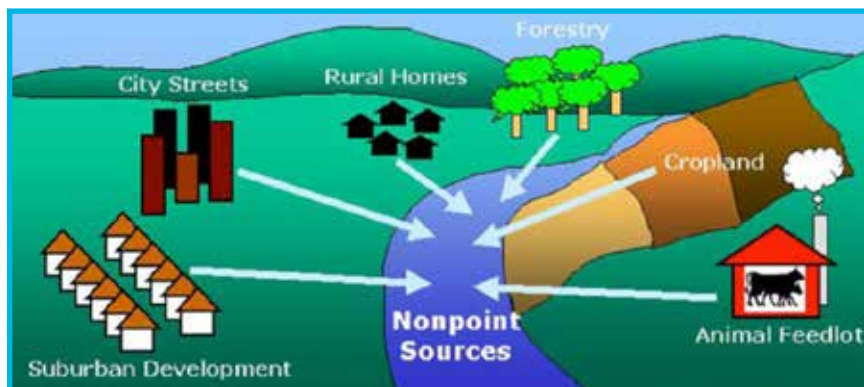
FIGURE 1. DISTRIBUTION OF EARTH'S WATER



SOURCE: UNITED STATES GEOLOGICAL SURVEY. WHERE IS EARTH'S WATER?

Conventional landscaping relies on the use of fertilizers and pesticides. Fresh surface water quality is affected when high-nutrient fertilizers and toxic pesticides runoff of treated surfaces during rain storms and other inclement weather events. Runoff, also referred to as nonpoint source (NPS) pollution, is highlighted in Figure 2 and is one of the largest sources of pollution that impact water quality. In urban areas, where a large percentage of surfaces are compacted or paved, the risk of generating polluted runoff is exceptionally high, as seen in Figure 3.

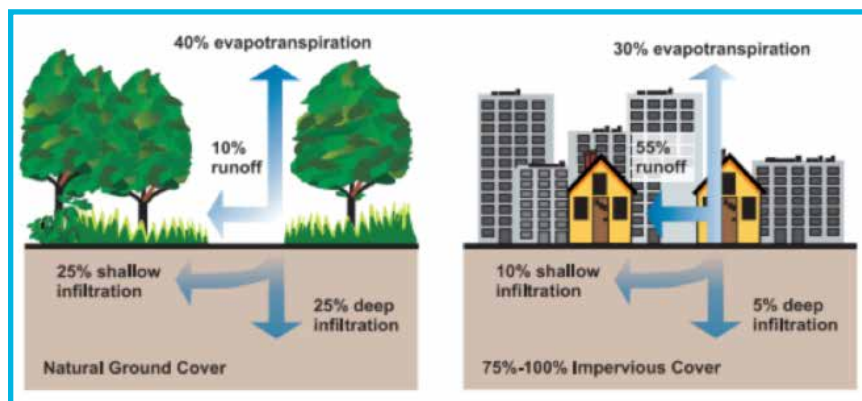
FIGURE 2. DIAGRAM OF NONPOINT SOURCE POLLUTION – NONPOINT SOURCE POLLUTION IS DIFFICULT TO CONTROL BECAUSE IT COMES FROM MANY DIFFERENT SOURCES AND LOCATIONS



SOURCE: NOAA

Lakes in the Midwest are already showing signs of too much nutrient runoff in the form of the extensive aquatic flora growth (algae). The slime layer generated by the growth creates dead zones: areas where sunlight and oxygen are reduced to levels so low that native plant and animal species can't survive. The process is called eutrophication, and it leads to significant declines in water quality.

FIGURE 3. RELATIONSHIP BETWEEN URBAN LAND COVER AND SURFACE RUNOFF. IF LOCATED IN A WATERSHED, RUNOFF LEVELS CAN BE EVEN HIGHER.



SOURCE: EPA

It is important to consider the environmental and health risks imposed before applying fertilizers and pesticides to outdoor spaces. Alternative natural lawn care methods for producing lush, green, open spaces are highlighted in this guidebook. Communities that adopt natural lawn care can effectively reduce their NPS pollution and protect our water quality.

More Resources

For more information on water quality and what is being done in the Midwest, check out these resources:

1. [U.S. Environmental Protection Agency: Nutrient Pollution](#)
2. [The Alliance for the Great Lakes: Clean Water](#)
3. [U.S. Geological Survey's Water Science School](#)
4. [Great Lakes Water Quality Agreement](#)
5. [Healing Our Water—Great Lakes Coalition](#)

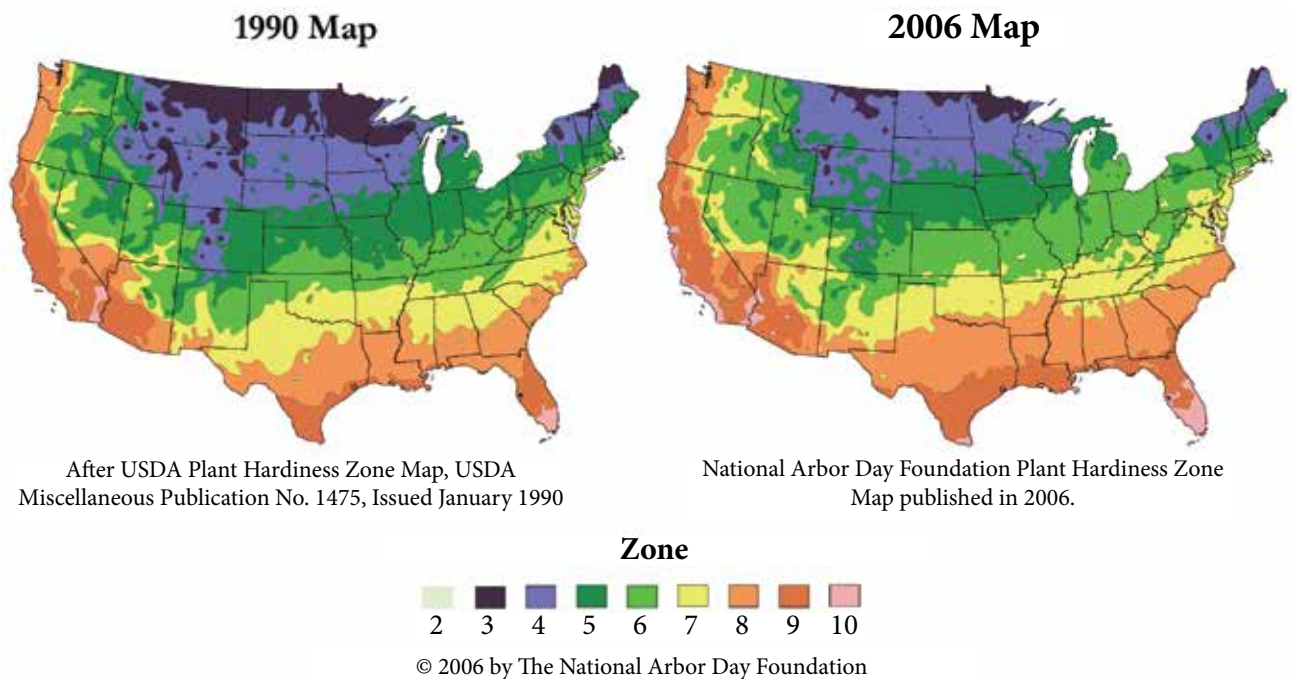


CLIMATE CHANGE AND YOUR LAWN AND GARDEN

Scientists agree that our planet is warming because of climate change. Over the past century, the Earth's average temperature has risen by 1.4°F, a trend that is expected to continue. Even small increases in temperature can result in dramatic and potentially dangerous shifts in our climate and weather systems. Over the last 30 years, temperatures in the Midwest have risen by 2.6°F. We can already see the effects of a changing climate in the lilacs, forsythia, and red maples that are blooming, on average, two weeks earlier than they did 50 years ago. In addition to increased temperatures, heavy rains are occurring about twice as frequently as they did a century ago. With these increased rains comes additional runoff which contains the nutrients and pesticides used to maintain our outdoor spaces, resulting in contamination of our rivers, lakes, and streams.

The U.S. Department of Agriculture's (USDA) Plant Hardiness Zone Maps are the standard by which gardeners and growers determine which plants are most likely to thrive at a certain location. The basis for these maps is the average annual minimum winter temperature. Recently, the National Arbor Day Foundation updated the U.S. Hardiness Zones with data from 5,000 research stations across the U.S. As regional temperatures change with climate change, so do the areas in which plants are able to live. The figure below displays the dramatic shift in these areas, shifts that will force plants to migrate north to escape temperatures too warm for their survival. The changes in these maps provide compelling evidence that the effects of climate change are already underway.

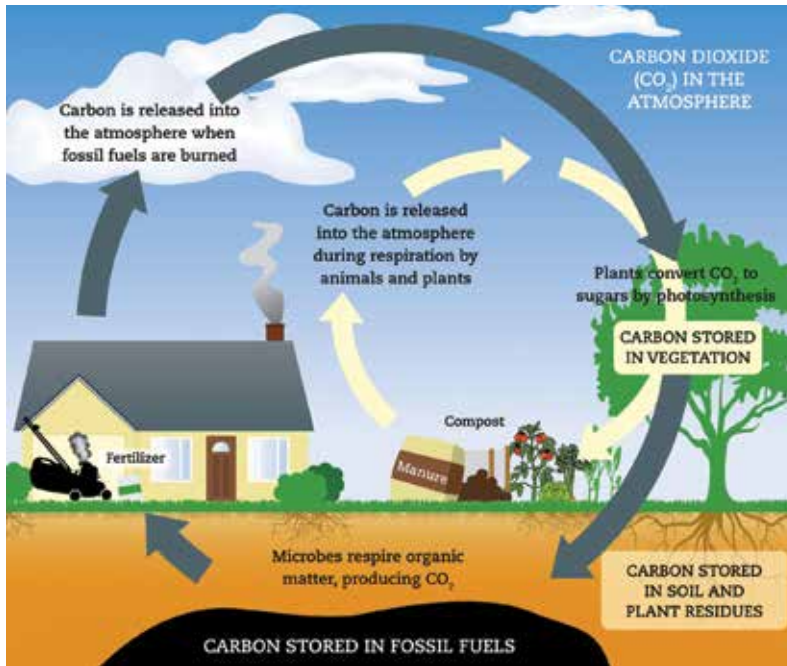
FIGURE 4. DIFFERENCES BETWEEN 1990 USDA HARDINESS ZONES AND 2006 HARDINESS ZONES REFLECT CLIMATE CHANGE



SOURCE: THE NATIONAL ARBOR DAY FOUNDATION

Some of the traditional practices used to maintain beautiful lawns and gardens contribute to climate change. Carbon and other nutrients naturally cycle between the soil, plants, and the atmosphere. However, when we use too much fertilizer, excessive amounts of water, and gasoline-powered maintenance tools, this cycle is altered. The result is the release, into the atmosphere, of high amounts of greenhouse gases, which trap heat. For a simple depiction of this relationship, Figure 5 shows the role that our lawns and gardens play in the production of carbon dioxide, a greenhouse gas.

FIGURE 5. CARBON IS CONSTANTLY CYCLING BETWEEN THE AIR, SOIL, AND PLANTS. CLIMATE CHANGE IS CAUSED BY AN IMBALANCE OF THIS CYCLE, RESULTING FROM THE RELEASE OF HUMAN-GENERATED SOURCES OF GREENHOUSE GASES, INCLUDING CARBON DIOXIDE.



SOURCE: UNION OF CONCERNED SCIENTISTS-THE CLIMATE-FRIENDLY GARDENER

According to the Intergovernmental Panel on Climate Change, a body representing the work of thousands of distinguished scientists worldwide, the prevention of some of the negative effects of climate change is possible if we all start to reduce greenhouse gas emissions today. Therefore, we must act now, starting in our own backyards, to begin solving the problem. We can reduce the risks we face from climate change by making better choices in the ways we maintain our lawns and gardens. Midwest Grows Green will help you to reduce greenhouse gas emissions related to lawns and gardens and help you to prepare for the future climate.

More Resources

For more information on climate change, the local and global impacts, and what is being done in the Midwest, check out these resources:

1. [The City of Chicago: Chicago Climate Action Plan](#)
2. [Union of Concerned Scientists and Ecological Society of America: Confronting Climate Change in the Great Lakes Impacts on Our Communities and Ecosystems](#)
3. [U.S. Environmental Protection Agency: Climate Change Basics](#)
4. [Intergovernmental Panel on Climate Change](#)
5. [Chicago Wilderness: Climate Action Plan for Nature](#)
6. [The Nature Conservancy: Climate Change in the Great Lakes Region Adapting Conservation Efforts for a Sustainable Future](#)
7. [Great Lakes Integrated Sciences and Assessments](#)





TAKING ACTION IN YOUR BACKYARD: FIVE STEPS TO GROWING GREEN

FERTILIZE ORGANICALLY

All plants, including grass, need nutrients to grow and thrive. However, the fertilizers we choose and their use can reduce your lawn's negative impact on water quality and climate change.

Because of runoff, applied fertilizers can negatively affect nearby water sources. Specifically, fertilizers that contain high concentrations of phosphorus and nitrogen can lead to harmful algal blooms in water bodies, creating dead zones. These dead zones compromise the beauty of the water and decrease the number of fish and other wildlife it can support.

Most conventional fertilizers are made from ammonia, which is extracted from natural gas. In addition to concerns over the use of this nonrenewable resource, the complex extraction processes are energy intensive and release large quantities of greenhouse gas emissions. Our lawns and gardens only absorb a portion of the nitrogen applied to them through fertilizers. Some of the remaining nitrogen washes away, polluting nearby water resources, while some is converted into nitrous oxide. Nitrous oxide is a heat-trapping gas 320 times more harmful than carbon dioxide. In 2010, nitrous oxide emissions from urban soils were equal to 1,400,000 metric tons of carbon dioxide equivalent. To put this figure into perspective, this amount is equal to the annual greenhouse gas emissions of 250,000 passenger vehicles.

Increased flooding associated with climate change threatens the health of our water resources through the runoff of toxic chemicals and excess nutrients from our managed landscapes. One such nutrient, phosphorous, is of particular concern.

DON'T "P" ON YOUR LAWN

Many of our water bodies are negatively impacted by excess phosphorus, which is an essential plant nutrient found naturally in soil, fertilizers, and human and animal waste. Where human activities do not dominate the land, phosphorus is normally in short supply. Its absence or low levels in the environment limit the growth of algae and aquatic plants. When additional phosphorus becomes available to an aquatic system, it stimulates the growth of algae and other plants. Nutrient enrichment and excess plant growth or productivity is referred to as eutrophication.

Under eutrophic conditions, recreational activities in lakes and streams may be impaired. At first, fishing may improve as plant growth increases the food supply. However, when algae and aquatic plants die, their decomposition consumes oxygen, causing fish kills and other unhealthy conditions. Initially, it is difficult to see changes in water quality when excess phosphorus has been reduced or stopped; previous additions of phosphorus can be stored in the sediments and biota. It is therefore important to take preventative steps to limit phosphorus movement from the surrounding lands to our various water bodies.

In 2011, Illinois instituted the Agriculture Fertilizer Act, prohibiting commercial landscape-care industry applicators from applying fertilizer containing phosphorous unless a soil test shows the soil is phosphorous-deficient.

Fertilizer

- Only if a soil test confirms the need to add extra nutrients. Use organic fertilizer or compost. Fertilize only once a year in the spring.
- If you don't do a soil test and want to apply fertilizer, assume your lawn has enough phosphorus—most soils in Illinois and Indiana have enough. Apply a phosphorus-free fertilizer.

Look for the Middle Number

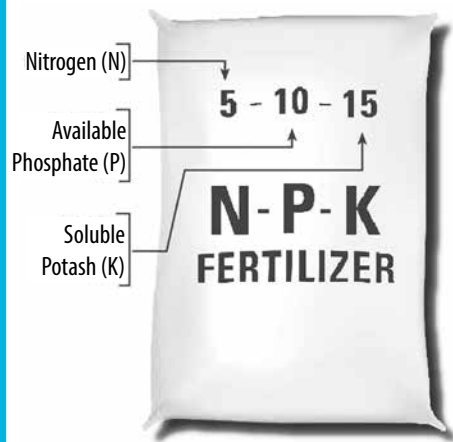
- A string of three numbers on a fertilizer bag shows its nutrient analysis—the middle number is the phosphate (phosphorus) content. A "zero" in the middle means it contains no phosphorus.
- The best time to fertilize is spring and fall.
- Use a drop spreader, sweep up fertilizer from sidewalks and driveways, and don't fertilize before a rainstorm.

SOURCE: THE ILLINOIS-INDIANA SEA GRANT LAWN TO LAKE PROGRAM

The first step to Growing Green is to switch to an organic fertilizer. The nitrogen sources in organic fertilizers are derived from plant or animal materials instead of natural gas. These days, organic fertilizers are widely available in stores; just ask a store employee if you are unsure about what product to buy. When shopping look for words like “natural organic” or “slow release.”

Organic fertilizers are a crucial component to building healthy soil that will help you maintain a lawn and garden that, in addition to being green and beautiful, is environmentally friendly. Our soils are alive; a teaspoon of healthy soil contains approximately five billion organisms. These organisms create a soil structure that is loose, supporting plant growth by allowing for the transport of air, water, and nutrients to plant roots. Healthy soil also helps increase the amount of water the soil is able to hold, preventing flooding from the heavy rain storms associated with climate change. As an added benefit, organic fertilizers are less than 10% water-soluble in comparison to conventional synthetic fertilizers that are at least 80% water-soluble. As a result, they are less likely to wash away into local water bodies where they contaminate water resources and contribute to algal blooms.

Follow these two simple tricks to identify an organic from a synthetic fertilizer. First, on an organic fertilizer bag, none of the three nutrient analysis numbers (the N-P-K ratio) will be higher than eight. Second, if you add all three numbers of the nutrient analysis together they will be less than 15.



MULCH

Mulch is organic matter used to cover soil in gardens in order to prevent weed growth and promote healthy soils. Mulch retains nutrients and moisture, which helps the soil keep plants healthy and increases the soil’s biological activity—especially among worms and beneficial microbes. Mulch also reduces soil erosion and compaction, keeps plant roots warm in the winter, reduces the need for pesticides and fertilizers, reduces the amount of watering needed, and provides additional nutrients to the soil. Here are two easy-to-find sources of mulch:

1. Store-Bought Mulches. Most home and garden centers will have pre-made mulches on hand. Look for straw, hay, wood, or bark chips. Stay away from peat moss, a plant that releases greenhouse gas emissions when it is removed from its natural habitat.
2. Grass Clippings. Keep grass clippings on the lawn or spread them around annual flower and vegetable plants as mulch. Make sure to leave space between the bark or stem and the mulch to prevent conditions that cause plant disease.

COMPOST

According to the U.S. Environmental Protection Agency, yard waste and food scraps account for over one quarter of this country's municipal solid waste (see Figure 6). Once this waste is taken to a landfill it begins to breakdown and release methane, a greenhouse gas 23 times more potent than carbon dioxide. Oxygen aids in the decomposition process. In landfills, however, there is not enough oxygen for waste materials to break down so bacteria release harmful methane gas as they break down waste. The methane produced from landfills represents 3% to 4% of all human-generated greenhouse gases. It also takes considerable energy to transport the waste to a landfill. Instead of throwing away your yard and food waste, consider composting your leaves, grass, woody garden clippings, dead garden plants, and food scraps. This will help you to reduce greenhouse gas emissions. The compost you create also serves as an inexpensive, nutrient-rich soil amendment that can replace or supplement fertilizer use, with the potential to further limit the runoff from your lawn.



The simplest recipe for making your own compost at home involves blending roughly equal parts “green” materials with “brown” materials. This mix will help you to achieve the balance of the carbon and nitrogen your plants need to survive and flourish. Green materials, such as fresh grass clippings and food waste, serve as a source of nitrogen, whereas brown materials, such as leaves, straw, and wood chips, serve as a source of carbon. To ensure your compost pile is successful, follow these tips:

- Chop or shred all materials that are larger than one foot in length.
- Cover the compost pile to protect it from excess moisture.
- Turn over the compost every 10 to 14 days with a pitchfork or rake to add the oxygen that is necessary for decomposition.
- Locate your compost pile where it will be used and where it won't interfere with activities in the yard or offend neighbors. The pile will work best where it is somewhat protected from winds, yet receives partial sunlight to provide some heat.
- Use a store-bought composter as an alternative to building your own pile.

When your compost is finished and ready for use, it will be a dark, brown color, crumble when touched, feel cool to the touch, and smell earthy. If your compost is still warm, smells like ammonia, or if you can recognize materials that initially went into the pile, it is not ready for use just yet. This process will take three to eight months.

This method for creating compost is simple and great for beginners. However, the compost created through this recipe decomposes very slowly and is prone to odor problems that may attract pests. This problem can be addressed by purchasing a composter at your local lawn and garden center. You can also purchase compost directly from most home and garden centers. In addition, this simple compost recipe creates compost that is less rich in nutrients and organic matter than some of the more complex, managed compost recipes. For a more complex compost recipe, contact your local County Extension Office.



How to Buy Compost

If you are interested in buying compost, follow these simple steps.

- Use the “Touch, Look, Lift, and Sniff” method. Choose compost that has a loose, fluffy texture, is dark brown or black, and has an earthy or musty smell.
- Avoid buying compost that lists biosolids as an ingredient. Some biosolids manufacturers use human sewage sludge. This sludge can be laced with virtually anything that homeowners, hospitals, or industrial plants put down their sinks, including endocrine-disrupting pharmaceuticals, shampoo chemicals, industrial solvents, and heavy metals. Also, avoid buying any product that lists “inert ingredients” on the label, as you will have no idea what those may be.
- Avoid compost that lists nothing but bark and sawdust as main ingredients. This compost doesn’t contain much nutrition for soil organisms and plants to thrive. You want to buy compost that contains leaves, grass clippings, plants, food scraps, and manure. As a rule of thumb, the more diverse the materials contained in the compost, the healthier the compost.
- Some herbicides that are used on lawns and grain crops don’t break down in the compost process, and can harm everything in your garden if they are introduced. To determine if the compost you bought contains these harmful chemicals, there is a cheap and easy test. Try starting a few lettuce seeds in the compost you bought. If the germination is poor or nonexistent, herbicides may be present. Alternatively, the pH of the soil may be off. In either case, this compost is not fit for use on your lawn or garden.

Use compost to improve the quality of your soil at any time of the year. Either mix one to three inches of compost into the soil or spread it in a thick layer around your plants. To use compost on your lawn, simply spread a quarter to half an inch of compost in the spring and the fall. Be careful not to apply too much. Compost can burn your lawn, especially if it is applied during the summer. To make sure this doesn’t happen, the tips of the grass should be poking through the compost once you have finished. Use compost indoors as potting soil.

MATERIALS TO COMPOST

The following tables list those materials that can be easily composted, whether they are a source of “green” nitrogen or “brown” carbon materials, and those that need a bit of work to be composted.

TABLE 1. MATERIALS THAT CAN BE COMPOSTED

Material(s)	Carbon/Nitrogen	Material	Carbon/Nitrogen
Bedding, Herbivorous	C & N	Hair	N
Blood Meal	N	Hay	C
Bone Meal	N	Lake Weeds	N
Coffee Grounds	N	Leaves	C
Crushed Egg Shells	-	Lint	N
Feathers	N	Manure	N
Fruit	N	Paper	C
Fruit Peels and Rinds	N	Peanut Shells	C
Dried Garden Debris	C	Straw	C
Fresh Garden Debris	C & N	Pumpkins	N
Dried Grass Clippings	C	Vegetable Scraps	N
Fresh Grass Clippings	N	Tea Grounds and Leaves	N



TABLE 2. MATERIALS THAT CAN BE COMPOSTED WITH A LITTLE WORK

Material(s)	Carbon/Nitrogen	Comments
Cardboard	C	Slow to decompose. Shred into small pieces to speed up the breakdown process.
Corn Cobs & Stalks	C	Slow to decompose. Run through shredder or chop into very small pieces, mix with nitrogen-rich material.
Diseased Plants	C	Diseases may be hard to eliminate. Sun-bake plants in plastic bag until they are thoroughly dried, or leave in hot pile (131°-140°F) at least one week.
Grass Clippings With Chemicals	C	Pesticides and herbicides are a concern, as degradability ranges from 1 to 12 months. Leave grass clippings on the lawn for best results.
Hedge Trimmings	C or N	Slow to decompose. Thin layers of hedge trimmings can be used but just make sure to chop twigs and branches into small pieces.
Nut Shells Walnut, Pecan	C	Slow to decompose. Pulverize with shredder.
Pine Cones	C	Slow to decompose. Shred or chop into very small pieces.
Pine Needles	C	Slow to decompose. Mix thoroughly with other materials and only add in small quantities.
Rhubarb Leaves	N	Contains oxalic acid, which lowers pH and inhibits microbial activity. Add in very small quantities, mix thoroughly with other materials, or omit from pile altogether.
Sawdust	C	Slow to decompose and can negatively affect aeration. Work into pile in thin sprinklings and mix with nitrogen-rich material.
Sod	N	Slow to decompose. Break into small clumps, mix thoroughly with other materials or cover top of the pile with roots up, grass down (better in fall), or compost separately with roots side up, water thoroughly, and cover with a dark tarp.
Soil	-	Can make finished compost heavy. Add small quantities in thin layers as soil activator or omit from pile.
Walnut Leaves	C	These contain an organic compound that can be toxic to plants. Add in small quantities, and mix thoroughly.
Weeds, Pernicious	C	Rhizomatous root systems are hard to kill. Sun-bake in plastic bag until thoroughly dried or omit from pile.
Weeds, Other	N	Weed seeds are hard to kill. Best to use when green and no seed heads are present or leave in a hot pile (131-140°F) at least one week.
Wood Ashes	-	These can change pile chemistry, causing nutrient imbalance. Use very sparingly in thin layers; do not use on top of pile or omit from pile.
Wood Chips	C	Slow to decompose. Shred or chop into very small pieces; mix with nitrogen-rich material.

SOIL TESTING

Although switching to organic fertilizers is a great first step to Growing Green, even organic fertilizers can result in the creation of greenhouse gas emissions through their production and use, and in impaired water quality in nearby rivers and lakes if your lawn does not need all of the applied nutrients. To limit your overall fertilizer use, consider soil testing. Applying fertilization has become routine, two applications a year in the spring and the fall is typical. However, without understanding the unique needs of your soil you may be applying too much or too little of the nutrients that are needed for your lawn and garden. A soil test should be completed every three to five years to help you add exactly the right amount to maintain the health of your soil, which is the critical building block to supporting plant life. These tests measure the phosphorus, potassium, calcium, magnesium levels, pH, and other indicators of your soil, all key elements in supporting healthy plant life. Soil testing is not only inexpensive but it can result in savings by reducing unnecessary fertilizer applications. Check with your local County Extension Office to see where testing services are available.



GROW A HEALTHY, SUSTAINABLE LAWN

If you want to transition your lawn off conventional fertilizer and pesticides, try implementing a natural lawn care program. Natural lawn care practices rely on naturally occurring processes and organic amendments to create a sustainable lawn. By cultivating healthy soil without synthetic chemicals, you can grow and maintain a healthy landscape with less impact on the environment and the health of your family. A natural lawn can also be beautiful even by conventional standards. In fact, well-established natural lawns are healthier and stronger than conventionally maintained ones, especially in times of stress like drought. Furthermore, as sustainable landscapes require less water, fertilizer, and pesticides, they are more cost effective in addition to being beneficial for the climate and the water quality of local streams and lakes.

Basics of Natural Lawn Care

Take a Soil Test

Healthy lawns require healthy soil. Grass thrives with properly balanced nutrients. Perform a soil test every three to five years to help determine exactly what you need to maintain your soil's health. Testing is inexpensive and reduces unnecessary fertilizer applications.

Fertilize Organically

Switch to an organic fertilizer made from plant or animal materials. Most commercial fertilizers have too much "fast release" nitrogen. Fast release nitrogen is like junk food for plants, creating a cycle of dependency between your yard and synthetic chemicals. Grass can't use all those nutrients at once, so a portion of them washes away, polluting nearby water resources. Organic fertilizers, on the other hand, allow the grass to absorb nutrients as needed as the excess nutrients bind to soil. Grass cycling, or leaving grass clippings on the lawn, is another great natural alternative to synthetic fertilizers.

Reseed and Top Dress Annually

Reseed at least once a year, in the spring or fall, with a mix of grass seed and compost. Select a variety of grass that is well suited to your region. Use hardy grasses such as fescues and ryes when possible. To establish the seed, water slightly each day for at least two weeks. Top dressing with compost will naturally replenish your lawn, providing nutrients and microbes that keep your soil healthy.

Get Rid of Weeds Naturally

Stop using synthetic pesticides on your lawn and garden. Consider using corn gluten (an organic, corn by-product that is a natural preventative weed control) to reduce weeds. Apply it early in the spring, usually before the forsythia bloom. Over the course of a few growing seasons, you will see how it reduces weeds naturally. Invest in a sturdy weeding tool and go after weeds as they appear, rather than all at once. Remember that a thick, healthy, dense turf is your best defense against weeds.

Water Correctly

Watering correctly is not about watering your lawn a fixed number of times each week. Instead, you want to water deeply and infrequently early in the morning to minimize evaporation and safeguard against fungus. Ideally, you want one inch of water delivered once a week. Use a tuna can to measure when you have reached one inch. Daily, brief watering discourages deep root growth, one of the essentials of healthy turf grass.



Mow Properly

Mow your lawn to at least three inches high. Correct mowing will increase the strength of the root system and naturally shade out weeds. Don't mow your lawn every week out of habit if it doesn't need it. Mow with sharp blades that make a clean cut. Dull blades will rip the grass and weaken your lawn's defenses.

Diversify your Yard

The reason turf grass takes so much work to maintain is that it is not native to our region. We recommend that you diversify your yard to include native grasses, trees, bushes, and perennials. These plants will enhance the beauty of your home, attract birds and beneficial insects, and give you more time to get out and enjoy the summer!

To make the switch, there are some great resources available for you. Specifically, Midwest Pesticide Action Center has information on [natural lawn care for homeowners](#), [utilizing eco-friendly landscaping](#), [growing bee-friendly gardens](#), [purchasing compost tea](#), [purchasing natural lawn care products](#), and [following a natural lawn care calendar](#). You may also want to read Midwest Pesticide Action Center's [Tale of Two Families](#), a factsheet highlighting the differences between organic and conventional lawns.

Choose a lawn care company that provides natural lawn care services. Be sure to choose carefully by doing your research. For Illinois residents, Midwest Pesticide Action Center has a [Midwest Natural Lawn Care Companies](#) list. Beyond Pesticides also offers a directory, the [Safety Source for Pest Management](#), which may have providers listed in your area. Recognize "greenwashing"—making products sound more environmentally friendly than they really are—and don't fall for it! Make sure you know what services the company provides, what products they use, and whether they are willing to work with you to address any concerns. For more information on the products used on your lawn, Portland's Metro regional government has a great guide, [Grow Smart Grow Safe](#), which examines the environmental and health hazards of commonly used lawn and landscape products.



More Resources

For more information on organic fertilizer options, check out these resources.

1. [University of Illinois Extension: Composting for the Homeowner](#)
3. [US Composting Council](#)
4. [Seattle Public Utilities: Ecologically Sound Lawn Care for the Pacific Northwest](#)
5. [Mike Nowak: The Mike Nowak Show](#)

GROW CHEMICAL FREE

Pesticides, which include insecticides, herbicides, and fungicides, are chemicals designed to eliminate or repel insects, plants, and animals. In the U.S., we use large quantities of pesticides on our lawns and gardens. According to the U.S. National Wildlife Federation, the average American household uses ten times more pesticides per acre than farmers use growing crops. This equates to the use of 70 million pounds of active pesticide ingredients each year. Similar to conventional, synthetic fertilizers, the process of manufacturing, packaging, and transporting pesticides is an energy-intensive process resulting in the release of greenhouse gas emissions. Most pesticides used in the backyard are herbicides found in combined weed and feed products that eliminate both weeds and green lawns. It is these herbicides, however, that generate more emissions than any other kind of pesticide. For example, the production of glyphosate, the active ingredient of commonly used weed killer Roundup, is one of the biggest generators of greenhouse gas emissions.

Your lawn and garden will face increased weed and pest pressures because of climate change. Many weeds are more likely to thrive in a changing climate than native varieties, giving them a competitive advantage. Additionally, many exotic pest insects will also likely benefit from climate change as warming temperatures expand the area in which they are able to live. The increase in pest and disease pressures will likely result in increased pressure to use harmful chemicals to treat their presence. The production of these chemicals results in the creation of more greenhouse gas emissions, reinforcing the negative relationship between pesticides and climate change.

At the same time, the excessive use of pesticides poses a threat to water quality. In the same way that excess fertilizer washes off gardens during rainstorms, pesticides also runoff from lawns and seep through the soil, contaminating local streams, lakes, rivers, and groundwater. The U.S. Geological Survey's National Water-Quality Assessment Program found concentrations of pesticides in most streams and in one-third of wells sampled across



Health Effects of Pesticide Use







According to the National Home and Garden Pesticide Use Survey, conducted by the U.S. Environmental Protection Agency, 82% of households use pesticides. In fact, on average, households use three to four types of pesticides. This high level of pesticide use is reflected by the amounts that can be found in our bodies. Twenty-nine out of forty-four commonly used pesticides were found in most people sampled according to the Center for Disease Control's National Report on Human Exposure to Environmental Chemicals. Pesticides found at the highest rates included those that are commonly used on lawns. Research has linked pesticides to cancer, asthma, and birth defects as well as neurological, behavioral, reproductive, hormonal, and immune system disorders. For children, exposure to pesticides has been linked with childhood diseases such as leukemia and brain cancer in addition to autism, asthma, ADHD, and even obesity. Considering the dangers that pesticides pose to us, our pets, and, most importantly, our children, these findings should greatly concern us.

the U.S. at levels high enough to pose a threat to the health of aquatic species and fish-eating wildlife. The good news is that there are ways to maintain a beautiful, green, and lush lawn and garden in the absence of these harmful chemicals.

The first step to Growing Green is to change your expectations about what your backyard should look like. Consider whether the health and environmental impacts of eliminating weeds or insects is worth the use of toxic chemicals. By following the basic principals in this guidebook, using organic fertilizers, planting native plants, and watering and mowing properly, your lawn and garden will naturally resist the pressures of weeds and pests. However, if a few weeds or pests do appear, there are additional steps that you can take to eliminate the problem.

Weeds are often a symptom of a larger problem with the health of the soil of your lawn and garden. The first step in eliminating their presence is to identify the type of weed. By knowing exactly what you're dealing with, you can determine the specific soil conditions, such as compaction, pH imbalance, or improper drainage that need to be addressed to prevent weeds from returning. The following table highlights common weeds and the conditions that cause them.

TABLE 3. COMMON WEEDS AND WHAT CONTRIBUTES TO THEM

Common Name	Compacted Soil	Mowing Height Too Low	Low pH	Excessive Watering	Poor Drainage
Annual Bluegrass					
Clover					
Crabgrass					
Dandelion					
Ivy					
Knotweed					
Plantains					

In instances where weeds are sparse, hand picking with a sturdy weeding tool is always the climate-friendly solution. You can also use such natural products such as soaps, horticultural oils, plant-based insecticides, vinegar, or rock salt. Many home and garden stores now sell products for naturally eradicating weeds. The production of these products is less energy intensive, resulting in the generation of fewer greenhouse gas emissions. Moreover, because these products do not contain highly toxic chemicals and break down quickly, they pose a lower risk to water quality. For the long-term, preventative protection of your lawn the use of corn gluten can help prevent weeds from ever appearing. Apply the corn gluten early in the spring, usually before the forsythia bloom. Over the course of a few growing seasons, you will see its impact.



Beneficial Insects

Not all insects found in your backyard are a problem. In fact, according to the U.S. Environmental Protection Agency only 5% to 15% of the bugs found in the lawn and garden are considered pests. Furthermore, some insects are “good bugs” and actually benefit your lawn and garden. For example, ladybugs and hover flies feed on harmful insects while bees serve to pollinate many plant species. Pesticides, however, do not distinguish between the “good” and “bad” bugs. Knowing this, try to identify the insect that you are dealing with before you turn to toxic chemicals. The easiest way to do this is to examine the damage done to your plants. The way insects feed results in damage to leaves, bark, and flowers that are unique to that insect. Use these signs as a guide in identifying exactly what insect you are dealing with. This information is crucial in identifying ways to treat the problem and, more important, deciding whether or not a problem truly exists. For more information, see your [local County Extension Office’s](#) website. In Illinois, the [University of Illinois Extension’s Bug Review](#) is a great resource for those in the Chicago area interested in insect identification and finding a sustainable, non-chemical form of treatment. For climate-friendly insecticide alternatives that are also safer for children, pets, wildlife, and our water quality, try organic options like beer bait, insecticidal soaps, neem oil, and powders and sprays derived from Bt bacterial toxin.

More Resources

For more information on safely controlling pests and weeds in your lawn and garden, check out these resources.

1. [University of Illinois Extension: The Bug Review](#)
2. [SafeLawns](#)
3. [National Wildlife Federation: Garden For Wildlife](#)
4. [Chicago Botanic Garden: Plant Information](#)
5. [Metro regional government: Grow Smart Grow Safe](#)

WATER SMARTLY

Each day, 7.8 billion gallons of water are used to water lawns. A typical lawn requires 10,000 gallons of water each year. Depending on the city, this number can make up anywhere from 30% to 60% of all residential water use, placing a heavy strain on the world's supply of freshwater. The use of water conservation measures in your garden can go a long way in protecting our water resources.

Besides changing the way we maintain our lawns and gardens, we must also change how we cope with the availability of water associated with climate change. In the Midwest, the expectation is that the amount of rain during the summer will decrease, whereas the frequency of large rainstorms will increase. This will mean less water overall and an increase in flooding associated with large rainstorms. Although these problems can seem too large for one person to address, following a few simple tips can make a big difference.



The following suggestions will help you to Grow Green by conserving water:

1. Water Properly. Using less water, the easiest form of water conservation, is a great way to grow a healthier lawn and garden. Most lawns and gardens are over-watered because of habitual daily watering or the use of timed sprinkler systems. Lawns that receive too much water are more prone to disease, weed growth, and fungus. In addition, they are less likely to develop the deep root structure that is necessary for a resilient, healthy lawn.

Water only when your lawn looks like it needs it. Lawns that appear blue-green in color or that show footprints when you have walked across them are in need of water. As a simple rule of thumb, your lawn needs one inch of water each week (including rainfall). When watering, it is best to do a deep soaking early in the morning to minimize the amount that would evaporate in the midday sun. To gauge when your lawn has received enough water, place a tuna can in the grass. When the can has been filled, you're done!

2. Install a Rain Barrel. To prevent the flooding associated with large rainstorms and to save water for use during drier periods, consider installing a rain barrel. Rain barrels are specially designed containers that connect to downspouts on your home to collect the rain that runs off your roof. Rain barrels protect our waterways by reducing stormwater runoff, help to fight climate change by reducing greenhouse gas emissions associated with water use, and help you save money through reduced water bills. Purchase rain barrels at your local lawn and garden center or hardware store for around \$100. If you live in Chicago, the [Chicago Sustainable Backyards](#) Program provides rebates of up to 50% on not only the purchase of rain barrels but also on trees, native plants, and compost bins. To maximize the benefits, make sure to empty the rain barrel frequently and plant water-friendly plants near the rain barrel to absorb any overflow.



3. Plant a Rain Garden. A rain garden is a bowl-shaped area planted with water-tolerant native plants and grasses. Rain gardens help rainwater slowly soak into the ground, and in the process, filter contaminants such as pesticides and fertilizers. They also provide water sources for backyard wildlife, recharge groundwater supplies, and reduce the quantity of water entering local waterways through the sewer system. Rain gardens are up to 40% more effective than lawns at absorbing pollutants associated with lawn and garden care. Plant rain gardens in areas near runoff sources such as downspouts, driveways, or sump pumps to maximize their impact.

More Resources

For more information on water conservation, check out these resources.

1. [Rain Garden Network](#)
2. [Wisconsin Department of Natural Resources: Rain Gardens – A How-to Manual for Homeowners](#)
3. [U.S. Environmental Protect Agency: Green Landscaping](#)
4. [City of Chicago: Sustainable Backyard Program](#)
5. [Metropolitan Planning Council and Openlands: What Our Water's Worth](#)

CHOOSE NATIVE PLANTS

Diversifying your lawn with native tree and shrub species is the easiest way to conserve water, improve soil health, and combat unwanted pests. In addition, trees and shrubs remove carbon dioxide, a greenhouse gas, from the atmosphere. All plants absorb carbon dioxide and store it in their stems, leaves, and branches. Trees and shrubs, however, are particularly effective because they can store larger amounts of it for longer periods. In fact, 90% of a plant's dry weight comes from carbon dioxide pulled from the atmosphere.

When choosing the types of plants to grow in your own yard, consider selecting native plants. Native plants have evolved to the unique characteristics of a region and require less mowing, watering, and fertilizing. As an added benefit, by reducing the amount of space dedicated to just lawn, your use of lawn maintenance equipment, water, and fertilizers will be reduced, which will save you money. Native plants are characterized by their long lives and complex root systems. After establishing themselves in the first or second growing season, native plants are able to absorb more carbon dioxide and hold onto it longer than their short-rooted counterparts like lawn grasses and annuals.

The long, complex root systems of native plants also make them better able to positively influence the quality of local waterways and withstand some of the negative effects of climate change. Their root structures reach deep into the soil, creating a place for rainwater to go during storms and increasing the capacity of the garden to hold rainwater. This reduces both the amount of stormwater runoff and lawn and garden pesticides and fertilizers entering local waterways. These root systems are also excellent at holding onto water, making native plants better able to survive drought.

Native plants are also naturally resistant to pest problems, eliminating the need for harmful synthetic pesticides. In conventional landscaping, the excessive and inappropriate use of pesticides often results in the death of beneficial insects, including pollinators and wildlife. By selecting native plants, you are working to preserve the delicate relationship between insects, wildlife, and plant species.

Many nurseries and garden centers carry native plants specific to your area. Before you make a purchase, make sure to talk to the expert at your local garden center to ensure that you are selecting a species that will thrive in your particular yard and garden. Come prepared, having noted your garden's exposure to sunlight, drainage, and soil type in addition to the plants you are already growing. The [Sustainable Lawn & Landscape Practices for Communities Guidebook by the Illinois-Indiana Sea Grant](#) is a great resource for more information on determining the specific characteristics of your yard and garden.



Grow Green and Save Energy

Well-placed trees in urban and suburban neighborhoods can also reduce energy costs in nearby homes and buildings. Deciduous trees and shrubs placed on the south and west sides of a home or building will keep it cool in the summer while letting the sun warm it in the winter. This can significantly reduce energy used to heat and cool your home. In fact, just three well-placed trees around a home can result in a 30% reduction in home energy use.

ILLINOIS REGIONAL NATIVE PLANT SPECIES LIST

Plants for Full Sun

- Leadplant (*Amorpha canescens*)
- Big Bluestem (*Andropogon gerardi*)
- Little Bluestem (*Andropogon scoparius*)
- Marsh Milkweed (*Asclepias incarnata*)
- Butterfly Milkweed (*Asclepias tuberosa*)
(Pictured Below)



- Smooth Blue Aster (*Aster laevis*)
- New England Aster (*Aster novae-angliae*)
- Side-Oats Grama (*Bouteloua curtipendula*)
- New Jersey Tea (*Ceanothus americanus*)
- Prairie Coreopsis (*Coreopsis palmata*)
- Pale Purple Coneflower (*Echinacea pallida*)
- Purple Lovegrass (*Eragrostis spectabilis*)
- Rattlesnake Master (*Eryngium yuccifolium*)
- Prairie Smoke (*Geum triflorum*)
- Path Rush (*Juncus tenuis*)

- Prairie Blazing Star (*Liatris pycnostachya*)
- Wild Bergamot (*Monarda fistulosa*)
- Switch Grass (*Panicum virgatum*)
- Wild Quinine (*Parthenium integrifolium*)
- Purple Prairie Clover (*Petalostemum (Dalea) purpureum*)
- Prairie Phlox (*Phlox pilosa*)
- False Dragonhead/Obedient Plant (*Physostegia virginiana*)
- Shrubby Cinquefoil (*Potentilla fruticosa*)
- Yellow (Gray-headed) Coneflower (*Ratibida pinnata*)
- Compass Plant (*Silphium laciniatum*)
- Showy Goldenrod (*Solidago speciosa*)
- Indiangrass (*Sorghastrum nutans*)
- Prairie Dropseed (*Sporobolus heterolepis*)
- Spiderwort (*Tradescantia ohiensis*)
- Ironweed (*Vernonia fasciculata*)
- Culver's Root (*Veronicastrum virginicum*)
(Pictured Below)



ILLINOIS REGIONAL NATIVE PLANT SPECIES LIST

Plants for Partial Shade

- Nodding Wild Onion (*Allium cernuum*)
- Wild Columbine (*Aquilegia Canadensis*)
(Pictured Below)



- Short's Aster (*Aster shortii*)
- Tall Bellflower (*Campanula americana*)
- Purple-Sheathed Graceful Sedge (*Carex gracillima*)
- (Midland) Shooting Star (*Dodecatheon meadia*)
- Sweet Joe Pyeweed (*Eupatorium purpureum*)
- Wild Geranium (*Geranium maculatum*)
- Alumroot (*Heuchera richardsonii*)
- Sweet (Vanilla) Grass (*Hierochloe odorata*)
- Kalm's St. Johns Wort (*Hypericum Kalmianum*)
- Bottlebrush Grass (*Hystrix patula* (*Elymus hystrix*))
- Blue Flag Iris (*Iris shrevei*)
- Cardinal Flower (*Lobelia cardinalis*)
- Great Blue Lobelia (*Lobelia siphilitica*)
- Foxglove Beardtongue (*Penstemon digitalis*)
- Jacob's Ladder (*Polemonium reptans*)
- Heartleaf Golden Alexander (*Zizia aptera*)

Plants for Shady Areas

- Maidenhair Fern (*Adiantum pedatum*)
- Jack-in-the-Pulpit (*Arisaema triphyllum*)
- Side-Flowering Aster (*Aster lateriflorus*)
- Lady Fern (*Athyrium filix-femina*)
- Black Cohosh (*Cimicifuga racemosa*)
- Virgin's Bower (*Clematis virginiana*)
- Marginal Shield Fern (Leatherwood) (*Dryopteris marginalis*)
- Virginia Waterleaf (*Hydrophyllum virginica*)
- Virginia Bluebells (*Mertensia virginica*)
(Pictured Below)



- Cinnamon Fern (*Osmunda cinnamomea*)
- Blue Phlox (*Phlox divaricata*)
- May Apple (*Podophyllum peltatum*)
- Blood Root (*Sanguinaria canadensis*)
- False Solomons Seal (*Smilacina racemosa*)
- Elm-leaved Goldenrod (*Solidago ulmifolia*)
- Great White Trillium (*Trillium grandiflorum*)
- Prairie Trillium (*Trillium recurvatum*)



More Resources

For more information on native plants check out these resources.

1. [Illinois – Indiana Sea Grant: Sustainable lawn & Landscape Practices for Communities](#)
2. [Chicago Wilderness: Native Plants for your Garden](#)
3. [U.S. Environmental Protection Agency: Green Acres – Landscaping with Native Plants](#)
4. [University of Illinois Extension: Illinois Master Gardener Program](#)
5. [Ladybird Johnson Wildflower Center - Illinois Recommended](#)
7. [Department of Energy: Landscaping for Energy Efficiency](#)

USE WATER AND CLIMATE-FRIENDLY TOOLS

The kind of tools you use to maintain your lawn and garden can significantly affect the amount of greenhouse gas emissions your yard emits. Garden equipment is responsible for the production of up to 5% of the nation's air pollution and a good deal more in metropolitan areas. By avoiding the use of gasoline-powered tools such as lawn mowers, weed eaters, and leaf blowers you can prevent the release of significant amounts of greenhouse gases and smog-forming chemicals. In fact, the emissions associated with the use of one gasoline-powered lawnmower for an hour are equal to the emissions of 40 late-model cars; weed eaters and leaf blowers pollute even more. Instead, choose electric or, better yet, human-powered tools such as push mowers, hand clippers, weeding tools, and rakes.

More Resources

For more information on climate friendly tools, check out these resources.

1. [U.S. Environmental Protection Agency: Your Yard and Clear Air](#)
2. [U.S. Environmental Protection Agency: Lawn Equipment](#)
3. [Union of Concerned Scientists: The Climate-Friendly Gardener](#)
4. [National Wildlife Federation: The Gardener's Guide to Global Warming Challenges and Solutions](#)

Mow Smartly

Mow your lawn at least three inches high. By mowing high, you will increase the strength of the root systems, increase the amounts of water infiltration, and naturally shade out weeds. Also, leave your grass clippings on the lawn. Grass clippings can increase the amount of carbon stored by your lawn by as much as 59% while decreasing your need for fertilizer by 25% to 50%.







CULTIVATING CHANGE: FROM THE BACKYARD TO THE COMMUNITY

Changing the ways we maintain our lawns and gardens is a great first step in improving our relationship with the natural world. Although using sustainable lawn and garden practices alone won't solve climate change or fully protect our water quality, together, the 81 million U.S. households that own at least a small piece of the outdoors can make a difference. Through Midwest Grows Green, you have the power to initiate this change starting in your own backyard.

However, protecting our water quality and reducing the impacts of climate change are tasks too large for one person to address. Unless we take significant action to reduce greenhouse gas emissions and non-point source pollution, the problems affecting our communities, including drought, flooding, and water use advisories, will only get worse. Take action by advocating for the use of sustainable lawn and landscape-care practices in your parks, schools, hospitals, and government buildings. Midwest Pesticide Action Center provides the tools necessary to initiate this community level of change in the [Activist's Toolkit: A Guide to Promoting Sustainable Lawn & Landscape Care in your Community](#). The Midwest Grows Green program works directly with home and garden retailers to provide information and training on Growing Green for store staff. Consider reaching out to your local store to encourage them to participate in the program and to increase the number and types of sustainable products offered. Finally, contact your public officials at the local, state, and federal levels and urge them to act now to protect our water and address climate change. These actions could be as comprehensive as placing mandatory limits of greenhouse gas emissions, requiring utilities to generate a specific percentage of their energy from renewable energy sources, or as local as moving a park district to change district lawn care policies to embrace natural lawn care practices. For more information on reaching out to officials, visit the [Union of Concerned Scientists Action Center](#).

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