

PRFCT
EARTH
PRJCT



Nature-Based Gardening

Creating Beautiful and
Healthy Earth-Friendly
Landscapes



PHOTO: EDWINA VON GAL

What is PRFCT?

We're redefining what it means to be perfect in the garden. To be PRFCT is to work with nature toward an ideal that's toxic-free, biodiverse, and beautiful.

We are no longer trying to control nature, forcing it into an outdated idea of perfection that has been pruned, mowed, and sprayed into submission.

Instead, we envision gardens that are vibrant ecosystems, teeming with native plants and humming with wildlife. In other words, PRFCT.



What Does Nature-Based Gardening Mean?

WE ARE GARDENERS. We have the Earth in our hands: We nurture plants, coax flowers to bloom, and revel when butterflies flutter and birds sing. A beautiful garden is a feast for the senses. It thrums with activity, hosting a healthy and vibrant ecosystem that's safe for us, our kids, and our pets. And it makes us feel good. Studies show that gardening reduces stress and increases our overall well-being¹.

But for much of the last century, we have not been treating our gardens well. We spend a lot of time in attack mode—mowing, clipping, chopping, chipping, blowing, smothering, and spraying—to force our landscapes into the shapes we want. This is tough on plants and tough on us. We expose ourselves—and our children, pets, and neighbors—to loud equipment, toxic fumes, and harmful chemicals. The more we force landscapes to look neat and tidy, the more tidiness we expect, and the more damage we do. This approach to land care is ethically questionable and not caring. It is harmful—to plants, waterways, soils, wildlife, and to ourselves. Gardeners and landowners have the power to create beautiful, healthy, biodiverse environments necessary to save the planet. Why don't we try something different?

WHY IT'S VITAL TO ACT NOW

3 billion
There are three billion fewer birds in North America today than in 1970².

>40%
of our insects, including our beloved butterflies, bumblebees, and fireflies, are facing extinction³.

>90%
The Western monarch butterfly, for example, is in dire straits. Between the 1980s and 2020, their population declined by more than 90%⁴.

>200
More than 200 native plants species in the U.S. have been lost since the early 19th century⁵.

¹ <https://www.sciencefocus.com/news/gardening-just-twice-a-week-improveswellbeing-and-relieves-stress/>

² <https://www.science.org/doi/10.1126/science.aaw1313>

³ [https://www.sciencedirect.com/science/article/abs/pii/S0006320718313636 ???](https://www.sciencedirect.com/science/article/abs/pii/S0006320718313636???)

⁴ <https://xerces.org/western-monarch-call-to-action>

⁵ <https://www.blm.gov/sites/default/files/documents/files/media-center-public-room-national-native-plant-discovery.pdf>



WHAT ARE NEONICOTINOIDES?

Neonicotinoides (neonics) are a class of insecticide highly toxic to insects, including pollinators and aquatic invertebrates. They also pose a risk to young children and pregnant people.



They are absorbed by the entire plant, rendering every part poisonous. While banned in Europe, they are commonly used on ornamental plants found at nurseries in the U.S. For a list of commonly sold ones, scan this QR code with your phone.



Human life depends on functional, biodiverse ecosystems. But biodiversity, the complex mixture of plant and animal species that make up life on earth, is in decline, and it is decreasing at an alarming rate. Some of the leading causes contributing to this decline include habitat loss and pesticide use (including insecticides, herbicides, fungicides, and rodenticides). Birds, butterflies, bees, and other insects need an appropriate habitat that provides food, shelter, and water in order for them to survive and thrive. Plants need a healthy soil biome to proliferate. Our gardens can be those habitat sanctuaries, but we are not yet creating the necessary conditions—and then we spray with toxic pesticides or buy plants treated with them, like neonicotinoides. We are destroying the soil by relying on synthetic fertilizers to maintain beauty, and in the process making our neighborhoods uninhabitable for the plants, songbirds, and butterflies we love. As we continue to take over nature's places, where will nature live?

To create functional ecosystems, we need to work with nature. The hardest part of nature-based gardening is learning to change our long-held beliefs and habits. But if we get to know more about the lives of plants and insects and stop attacking them, we can live peacefully with them in landscapes that are stunningly beautiful and healthy. We can become a community of people who are caring for the land, protecting life by enhancing biodiversity, and earning respect for doing so. We can help save our environment—and ourselves. It is not difficult. It's a promise we make to ourselves to let nature lead the way, to look to the soil, place, and plants to tell us what we need and to strive to make our properties safe for birds, bees, butterflies, and us. This practice is called nature-based gardening. Let us work together to make a sustainable future for ourselves, our pets, and the planet.

PHOTO: EDWINA VON GAL; ILLUSTRATIONS BY BROWN BIRD DESIGN



The Basics of Nature-Based Gardening



“NATURE-BASED” MEANS working with nature and its beauty, not against it. It is about practices, not products. How does that actually work? Well, how does nature work?

For millions of years, plants have evolved along with wildlife to thrive in the places they were born, creating extensive food webs and symbiotic relationships. They did this without irrigation, synthetic fertilizers, mulch, or pruning. In other words, they did just fine without us.

Our modern landscapes have upended this elegant natural system. Residential and recreational landscapes are filled with non-native plants, sculpted into strict geometric shapes that rely on fossil fuel-powered equipment, chemicals, irrigation, and pruning to meet an ideal more like the inside of a house than the outside. That’s not natural. But then what is? Here are some guiding principles.

Principles of Nature-Based Land Care

- 1. Grow Native Plants in Your Garden.**
They need so little, and they give so much. Aim for at least two-thirds in your yard.
- 2. Remove Invasives.**
Get rid of the non-native plants that are taking over our landscapes and outcompeting native plants.
- 3. Say NO to Toxic Chemicals.**
Nature-based landscapes don’t need synthetic fertilizers and pesticides to thrive.
- 4. Nurture your Soil.**
Your garden is only as healthy as the soil in which it grows.
- 5. Maintain Biomass, and Mind the Mulch.**
Leave the leaves and all organic matter, make compost, and grow a living mulch.
- 6. Reduce your carbon footprint. Less noise, less pollution.**
Tend to your garden manually or go electric. Your neighbors (and your ears) will thank you.
- 7. Prune Prudently.**
Stop chopping with abandon! Every cut is a wound.
- 8. Plant Trees Properly.**
Do right by roots and don’t bury the crown when planting trees.
- 9. Water Your Lawn Deeply.**
At least 30 minutes and only as needed.
- 10. Reduce Your Lawn.**
Return part of your yard to the birds, bees, and butterflies. Maintain the lawn you do keep by following toxic-free practices.
- 11. Plant a Habitat Garden.**
And watch the pollinators and wildlife flock to it.
- 12. Have Faith, Have Fun.** Change from a fussy and restrictive landscaping style to something more comfortable, loose, and personal. Let your landscape surprise you.

How to Get Started

1. Grow Native Plants

Native plants have evolved naturally over millennia to be happy right where they are, so, of course, they are right at home in our soils and climates. They were here, doing fine, long before humans showed up. These super plants are pretty self-sufficient, thriving without extra watering, feeding, or pruning. They feed and shelter the birds, bees, and butterflies that evolved with them. And their beauty gives us joy.

If native plants make up at least 70%—or around two-thirds—of the plants on a property, they should provide enough habitat for healthy populations of birds, butterflies, and bees. The greater the variety of native plants you grow in your landscape, the greater the variety of pollinators and birds you'll host. Any landscape can go from being an ecological minus to a fabulous plus. Start small, then go large. But first, get to know your natives.

To learn more about native plants in your locale or ecoregion, check out public gardens specializing in them, like Mt. Cuba Center, Native Plant Trust, Lady Bird Johnson Wildflower Center, Theodore Payne Foundation, trusted native plant nurseries, and your cooperative extension. **Avoid any grown with pesticides (especially neonicotinoids) by always asking before you buy.**



WHAT'S AN ECOREGION?

We all live in ecoregions: humans, plants, and wildlife. An ecoregion is an area with a distinctive ecosystem, including geology, climate, water and soil conditions, and plant and animal communities. Knowing your ecoregion is important for the plants and wildlife living there. To find yours, scan this QR code with your phone.



2. Remove Invasives

Invasives are non-native plants that are so aggressive they outcompete native species, which reduces the food and habitat available to native animals and insects.

Many invasive plants were introduced as ornamentals because they were pretty and easy to grow. Too easy. They have done so well that they have moved out of our gardens and into our roadsides, meadows, and forests. Some have become such a problem that they are now illegal to sell in many states. There are more that are just beginning to move out into the wild and should be banned from sale. Please don't buy or plant them.

Many invasives can be very difficult to eradicate. Resist the temptation to use herbicides. Instead, opt for non-chemical methods such as smothering with cardboard and a deep layer of wood chips, or cutting them back regularly (once a month is a good rule of thumb). Do not let them get large or go to seed!

3. Say NO to Toxic Chemicals: Control Insects and Noxious Weeds Naturally

The conventional landscape business model promotes a cycle of dependency. First, it calls for synthetic fertilizers. These inorganic amendments cause plants to push rapid, weak growth, which makes them more susceptible to insects and fungal infections. They also destroy the soil biome (including the beneficial fungi, bacteria, and arthropods that live in soil). To treat the inevitable infestations and infections caused by weak, fertilizer-stimulated growth, the business model calls for toxic insecticides and fungicides. Then, to add insult to injury, the new growth is often pruned out or entirely cut back to maintain the idealized (non-natural) shape.



For more information on invasives in your area, contact your local cooperative extension and scan this QR code with your phone.



SMOTHER METHOD

①

Cut back invasive plants. Lay down a thick layer of cardboard on top.

②

Cover with wood chips or weigh down with wood planks or rocks. Wait a year.

③

While this method may temporarily destroy the soil biome, once the cardboard breaks down, the microbes will eventually return to support new growth.

Discarded twigs and leaves are sent to the landfill where they produce methane—the worst of climate-warming gasses. Finally, plants are given more fertilizer to compensate for the now-degraded soil and to stimulate the plant to push more growth, which then requires even more pesticides and pruning. And around it goes.

While this may be a good business model for conventional landscape companies, it's a bad one for us and our local ecosystems. Pesticides that are known to cause numerous life-threatening health problems are being applied in large doses to the places where we live, where our children and pets play⁶ ⁷.

Toxic chemicals harm us, our pets, and the planet, yet we continue to expose ourselves to them in pursuit of an artificial landscape ideal. Pesticides (even organic ones) kill. Most don't discriminate. Beneficial organisms are often killed along with targeted pests. A nature-based approach harnesses natural processes to address problems without toxic chemicals. Why not step back and give natural systems a bit of time, and a bit of trust? Allow those caterpillars to eat some leaves to provide for a healthy new batch of chickadees. If you understand what is happening and why, you will feel more comfortable waiting and trusting nature to take its course. Get to know the native plants in your area. Make new friends with the wildlife in your yard, and soon you'll have a whole new relationship with your garden and nature.

10x

The typical U.S. home landscape uses up ten times more pesticides per acre on their lawns than a conventional farm⁸.



⁶ <https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/>

⁷ <https://www.scientificamerican.com/article/pesticides-are-spreading-toxic-forever-chemicals-scientists-warn/?amp=true>

⁸ <https://www.fws.gov/media/service-homeowners-guide-protecting-frogs>

6,000
to

9,000

When you see caterpillars on a plant, rejoice! One chickadee needs 6,000 to 9,000 caterpillars each year to raise enough chicks to maintain a healthy population*. Cheer them on!



INSECTS: Insects are vital to our ecosystem. They pollinate plants—including the fruits, vegetables, and grains we eat—and provide food for birds and other insects. Many feed on leaves, the salad bar of the food web. Plants have evolved to share their leaves with insects, but we often spray at the first sign of insect-nibbling. This not only kills the insects that are eating the leaves but also the insects that would have eaten them (green lacewings and ladybugs, for example, feast on aphids), which breaks the food web cycle. Instead of spraying, wait for insect predator populations to arrive and consume any insects that are getting out-of-hand. The plants can handle it; the birds have a banquet; and the environment (and you) have been spared exposure to dangerous toxics.

NOXIOUS WEEDS: One gardener's weed may be another gardener's wildflower. But we can all agree to rid our gardens of highly aggressive ones (like bindweed, ground ivy, Japanese honeysuckle, and lesser celandine), which outcompete native plants. Chemicals used for managing them—like glyphosate, pre-emergents, and broadleaf killers—are dangerous for you to handle, and bad for the soil and nature. When you grow an abundance of super-healthy plants, there simply isn't any room for weeds to move in. You also won't need a blanket of mulch if you cover the soil with plants, just like nature does. Some hand-weeding will be required at first while the plants grow in, but over time you will do less and less.



To find out about the noxious weeds in your region, contact your cooperative extension or scan this QR code with your phone.

* <https://www.nytimes.com/2015/03/11/opinion/in-your-garden-choose-plants-that-help-the-environment.html>

FUNGUS PROBLEMS: Fungal infestations can be caused by chemical fertilizers, overwatering, and unsuitable plant choices. The right plants, grown with nature-based practices, naturally resist fungal problems. If a plant can't, don't keep it. Fungicides kill the soil fungal network, a critical component of plant health. And they are bad for your health¹⁰.

4. Nurture your Soil

Soil is alive. It contains billions of microscopic organisms, as well as clay, loam, sand, and organic matter. One teaspoon of soil contains more life than there are people in the world¹¹. These organisms—bacteria, fungi, beneficial nematodes (microscopic roundworms), arthropods (like spiders), and protozoa—are called the **soil biome**. Without this soil ecosystem there would be no land-based life on earth. The soil biome decomposes organic matter and then releases nutrients, which feeds the roots of plants. When we apply fungicides, bactericide, or insecticides, we destroy the soil biome by killing its essential organisms (fungus, bacteria, and insects).

For the soil biome to stay alive and be healthy, it needs water, air, and food. Disposing of biomass, like leaves and twigs, removes organic matter, which starves the biome of its food. Compacting soil removes oxygen and suffocates it, overwatering drowns it, and underwatering dehydrates it. To have a healthy soil biome, simply leave the biomass, and be careful not to compact it with excessive foot traffic or heavy machinery.

TO TEST OR NOT TO TEST

If you're unsure what kind of soil you have or if you need to feed it with organic fertilizer or compost, consider having it tested by your local cooperative extension. A basic soil test will tell you if you have clay, loamy, or sandy soil, which can help guide your plant selection. It will also tell you about your soil's NPK (nitrogen, phosphorous, and potassium values—the main nutrients needed for plant health. To find your local cooperative extension, scan this QR code with your phone.



¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3955666/>

¹⁰ https://www.epa.gov/sites/default/files/documents/rmpp_6thed_ch16_fungicides.pdf

¹¹ <https://www.openaccessgovernment.org/article/deteriorating-soil-health-a-teaspoon-of-soil-contains-more-life-than-there-are-humans-on-earth/145512/>



5. Maintain Biomass, and Mind the Mulch

Biomass is organic matter produced by your garden: all the leaves, stems, and wood that come from plants. When biomass decomposes, it becomes food for your plants. This is the perfect closed loop system: decaying plant matter feeds the soil, which in turn feeds plants. Instead of paying a landscaper to send grass clippings, leaves, and woody matter to the landfill, keep them, compost them, and feed them back to the plants that made them. Instead of buying synthetic fertilizers and mulch products, use what you have, for free, right on your property. Use mulching blades on your mower to finely chop grass and leaves. Spread chopped leaves over bare soil, build walls with logs, or make habitat piles with twigs, paths with wood chips. Be creative! And compost the rest.

To make compost, mix green materials (nitrogen) like kitchen scraps and garden cuttings with brown matter (carbon) like leaves, twigs, wood chips, and leftover soil. Start a pile of these materials, opting for a ratio of roughly 1 (green) to 3 (brown). To help it break down faster, chop up the material that you add, keep the pile moist (not wet), and aerate it by turning it with a shovel or fork about once every couple of weeks. Since most home compost piles never get hot enough to kill weed seeds and plant matter, maintain a separate bin for weeds, or look for a commercial processing facility that will get hot enough to kill them.

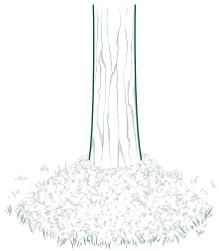
You'll know your compost is ready when it looks dark and crumbly and there are few woody bits left. Compost is organic matter (not soil), so do not use it alone for filling raised beds or planters. Instead, use it to cover bare patches, mix into new beds to enrich the soil—it's especially good for vegetable gardens—or spread a thin layer on the lawn to feed it.

Mulching started out as a pretty good idea: A layer of organic matter that keeps the soil cool and moist, enriches it, and suppresses weeds. But it can be overused. Today, mulch is often spread with a growth-suppressing blanket of processed wood products, often colored with toxic dyes, that are shipped in plastic bags and thickly heaped on garden beds and under trees. People have been told it gives a garden a "finished" look. But it's not that simple. *(continued)*



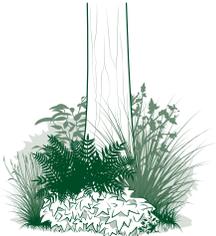
HOW TO MAKE COMPOST TEA

Compost tea is an easy way to add microbes to your soil. Fill a cloth "tea" bag with **2 cups compost** (use a blend of 2-3 different kinds), **¼ cup simple sugar** (cane sugar, honey, molasses, or agave), **1 Tbsp sea kelp** or hydrolyzed fish, and **1 Tbsp of Humate/Humic acid**. Add the tea bag to a bucket filled with **5 gallons of rainwater** (or tap water that has been left out overnight to dechlorinate). Use an aquarium air pump to aerate. Brew for about 24-36 hours. Your tea is ready to use when you see a ring of bioslime around the edge of your container and a brownish foam on top. (It should smell earthy, not foul.) Use the liquid to water plants and as a foliar spray.



STOP TREE VOLCANOS

Volcano mulching starves roots of oxygen and weakens trees.



CREATE A SOFT LANDING

Many insects continue or complete their life cycles by dropping from trees. Create a soft landing for them by planting native plants beneath the drip line of trees. These plants will also provide food for wildlife, build healthy soil, sequester carbon, and reduce mowing time.

Mulches do suppress weed growth, but they suppress good growth, too. Used improperly, they smother roots and lock up nitrogen. The volcano-shaped piles (see left) at the base of trees, rot the trunk and deprive the roots of oxygen, which will lead to long-term decline. (Read on for what to do around trees.) The way nature mulches is with plants, leaves, and other biomass. When you grow a mix of native plants beneath keystone trees, like oaks, you provide a “soft landing” (see below left) for insects to find shelter and make their habitat.

6. Reduce Your Carbon Footprint. Less Noise, Less Pollution

If you haven't already, think about replacing your gas-powered machines with electric ones. There are now many great lawn mowers, weed wackers, and hedge trimmers available, and some states offer rebates to reduce the cost. Gas-powered two-stroke leaf blowers make life easier—and miserable. They blow stuff away, including soil and leaves, which damages the soil biome and the insects who live there. They also produce high levels of noise and air pollution. A recent study shows that using a consumer two-stroke blower for 30 minutes produces the same number of hydrocarbon emissions as driving a pickup truck from Texas to Alaska¹². While a commercial gas-powered blower for one hour produces the same amount of emissions as driving a sedan 11,000 miles¹³. Electric blowers are better. Rakes and brooms are best.



To learn more about soft landings, scan this QR code with your phone.

¹² <https://www.edmunds.com/about/press/leaf-blowers-emissions-dirtier-than-high-performance-pick-up-trucks-says-edmunds-insidelinecom.html>

¹³ https://ww2.arb.ca.gov/new-vehicle-and-engine-certification-executive-orders?_ga=2.163834751.1501820160.1620662335-1313390687.1516737414

¹³ <https://ww2.arb.ca.gov/our-work/topics/lawn-garden-landscape-equipment>

7. Prune Prudently: Every Cut is a Wound

Every time you shear a hedge, chop back a shrub, or strip a tree of its interior growth, you are creating wounds. Each wound opens the plant to the possibility of pest invasion and fungal infection. Each wound needs to heal, which drains a plant's energy. Yes, it is okay to remove crossing or rubbing branches and odd, straggly growth, but overall, it's best to give plants, trees, and shrubs enough room to grow to their full sizes and natural shapes, and then let them be.

It's also okay to leave some of the dead wood in your trees. Dead wood provides a unique habitat for insects to hibernate and breed, which in turn supports birds. Standing dead trees, known as snags, provide homes for cavity-nesting birds, convenient insect meals, and year-round entertainment for humans. If a dead tree is too close to a house or if it poses a safety hazard, cut off most of the limbs and leave the trunk for the birds and other wildlife.



8. Plant Trees Properly. It Pays.

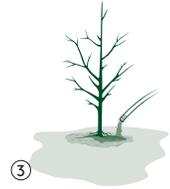
HOW TO PLANT A TREE



① **Dig a Hole**
After giving the roots a thorough soak, dig a wide hole (wider than you need to loosen the soil) that's deep enough for the root flare to sit slightly above the ground level.



② **Place the Tree**
Position the tree and begin back filling with the soil you dug out for the hole. Tamp down lightly to remove air pockets. Do not add any fertilizers or compost.



③ **Water**
Give your tree a thorough drink.

When possible, opt first for bare root or container-grown trees. They still have their roots intact, unlike balled-and-burlapped ones, which lose a good portion of their roots when they're dug up from the ground. To plant a tree properly, locate the root flare, or the spot where the trunk widens at the base and roots begin. If you can't see it, remove the soil to uncover it. In general, it's a good idea to gently remove any excess soil or potting mix from the roots of a container-grown tree before putting it into the ground so the tree will acclimate to its new environment. Dig a hole that is approximately the depth of the roots or container. It's always better to plant a bit high than too low.

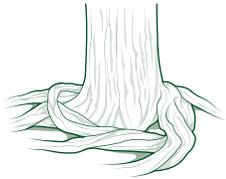
When you cover the base of the tree with an excess of soil or mulch, you start to deprive the tree of oxygen, which causes stress. Discard any container, wire basket, treated burlap, and plastic twine. Look at the roots. If they look tightly wound or are girdling (encircling) the trunk or root ball, open them up gently by spreading them with your hands or cutting tightly wound roots with a sharp blade (like a pruner) when necessary, being careful not to damage the trunk or other roots. This helps release the roots so that they can spread out into the surrounding soil. Place the tree in the planting hole so that the root flare is visible above the soil level. Backfill with soil up to the root flare and tamp down gently with the handle of a shovel to remove large pockets of air. Continue back filling. (You can also water as you fill in soil to prevent air pockets from forming.) Water until it starts to pool around the



For more information on how to water trees, scan this QR code with your phone.

PHOTO: NGOC MINH NGO





AVOID GIRDLED ROOTS

Before planting, make sure there are no girdled roots. Any roots that are circling should be teased out so they radiate outward like spokes on a bicycle wheel. If you can't tease them out, they should be cut as far back as possible in order to prevent the girdling action, shown here.

tree. Then wait, let it settle, before starting to water again. You can also use a reusable, slow-release watering bag after you plant, which will irrigate the tree slowly over time. During that first year after planting or in times of drought, it's helpful to water your new tree. Not every tree has the same needs. Before you turn on the hose, know your tree variety, the size of your tree, the type of soil you have, and your weather conditions.

Mulch (like composted leaves or wood chips from your property) can help retain moisture. Spread a two-inch layer to the tree's canopy line, taking care not to pile it up around the trunk or root flare, which will harm it. Or better yet, grow a living mulch (aka a soft landing) around the tree by planting native seeds or plugs beneath the tree's drip line. It is easy to spot trees that are planted too deep: the trunk goes straight into the ground like a post, instead of flaring gently. Also, trees that are planted too deep often show signs of stress, such as vertical cracking in the bark and excessive suckers or tangled, upright growth on trunks and limbs. Some of these trees will never grow well; others will grow at first, but may eventually decline from girdling root damage and blow over in storms.

9. Water Your Lawn Deeply.

When watering your lawn, think like rain and like the roots, too. As with all plants, turfgrass wants to develop a vigorous root system to support its health. When a lawn is allowed to develop a vigorous root system, it usually doesn't need supplemental water. It will simply go dormant, and then bounce back at the next rainfall. But if you do plan to irrigate, do it wisely. Here is some general advice: **Watering long (at least 30 min) and deep (6 to 8 inches) encourages deep root growth.** Watering for short periods of time (less than 20 minutes) just wets the top few inches, which forces the roots to stay close to the surface, where they get too much sun, dry out faster, and become susceptible to drought, foot and mechanical compaction, and grubs. When you

water too often (more than twice a week) you're not giving grass a chance to dry out, which causes fungus problems (think: wearing wet socks all summer long). It is standard practice for irrigation companies to operate on a "set it and forget it" plan. They turn on the irrigation systems in early spring, setting the timer for 20 minutes per zone every other day, and leave it this way until the fall when they return to turn off the system for the season. Everything about this practice is wrong. It's too early, too often, too short, and too out of tune with the weather.

Wait until the ground is dry (to at least 6 inches deep) or when the lawn shows early signs of wilting (footprints show in lawns when they need a drink) before starting to irrigate in the spring. Watering (and fertilizing) too early in the spring (the typical "lawn wake up" treatment) can cause fungal problems in June.

When it is time to water, do it deeply (6 to 8 inches). Use a moisture meter with a foot-long (or longer) probe to gauge how thirsty your lawn is, a rain gauge (if you get about an inch a week, you don't need to water), or install a smart watering system (look for the EPA's WaterSense label), which holds off watering if it has recently rained. Set the amount of watering time according to what you're growing, the soil, the slope, and the light conditions (sun/shade).

9 billion gallons

The Environmental Protection Agency (EPA) estimates that nearly one-third of all residential water use, totaling nearly nine billion gallons per day, is used to irrigate landscapes, and as much as 50% of it is wasted due to inefficient watering methods and systems¹⁴.



10. Reduce Your Lawn: Make it PRFCT

The U.S. has around 40 million acres of lawn, which use more chemicals and water than any agricultural crop¹⁵. Lawns are monocultures; they are not native and have little diversity. With an outdated goal of aesthetic “perfection,” we push them to perform at a level that causes constant stress. All this makes them highly vulnerable and needy; the more “perfect” they are asked to be, the more they ask of you.

For the biggest impact, replace your lawn with a habitat garden (see section 11). But if you want a patch of lawn for play and lounging, make it toxic-free (no synthetic fertilizers or pesticides), and plant the rest of your yard with native species. You’ll increase biodiversity (butterflies! bees! birds!) by keeping more biomass and reduce your carbon footprint and your exposure to harmful chemicals and pollution. Plus, you’ll make something beautiful. What’s not good about that?

PHOTO: ALLAN POLLOK-MORRIS

¹⁵ <https://scienceline.org/2011/07/lawns-vs-crops-in-the-continental-u-s/>

¹⁵ <https://earthobservatory.nasa.gov/images/6019/lawn-surface-area-in-the-united-states>

How to Maintain a Lush Lawn Without Chemicals

MOW HIGH. Grow to 4 inches, cut to 3.5 inches. Tall grass shades and cools the soil, which helps retain moisture and prevents any invasive weeds from taking root. Think of each grass blade as a solar panel; the longer the blade, the more energy the plant will absorb. Since longer leaf blades have more surface to gather energy from the sun, it will help the lawn grow deeper roots that provide more nutrients to the blades and will improve drought tolerance.

KEEP YOUR MOWER BLADES SHARP.

Sharp blades allow you to make clean cuts on your lawn, which allows healing. When blades are dull, they tear at the leaves, stressing the plant and its root

system. Ask your landscapers to sharpen their blades regularly.

MULCH MOW, LEAVE CLIPPINGS AND LEAVES.

Grass clippings are free food for your lawn, returning nitrogen to the soil to feed the plant. Use a mulching blade or mulching attachment on your mower (or ask your landscapers to use one) to chop grass finely so that it will decompose quickly. In the fall, don't blow leaves from your lawn. Instead, mulch mow them—they provide more food for the soil biome.

DON'T WORRY ABOUT THATCH. It doesn't happen on a toxic-free lawn. If you aren't using synthetic chemicals, the microbes will be hard at work breaking down thatch.

MOW ONLY WHEN GRASS IS DRY.

Don't irrigate on mow days, and leave the clippings!

LOVE DIVERSITY IN YOUR LAWN.

Violets, clover, bluets, moss, and pussytoes are just a few types of plants that support diversity. Clover adds nitrogen to the soil, fills in bare patches, and stays green in hot, dry weather. The more tolerant you are of diversity in your lawn, the healthier it will be. Get to know your low, lawn-growing natives.

OUTCOMPETE WEEDS. Weeds move in where there are open, sunny spots. Shade and crowd them out by mowing high and overseeding bare patches in fall or early spring. Areas that are always weedy are telling you they need attention.

Try another turfgrass mix or opt for a different kind of ground cover.

SEED-GROWN LAWNS ARE GENERALLY HEALTHIER.

But have patience. They often have open, sunny patches until they get established so can be more vulnerable to weeds until the grass grows in. Spread topsoil or compost on any bare patches, overseed immediately to prevent weeds from moving in, and don't do your first mow until it's about 4.5 to 5 inches in height. Then mow to about 3.5 inches.

TIMING IS EVERYTHING.

Turfgrass seeds germinate in cool weather. Overseed lawns when it's cool, in the fall or early spring, so the grass seed is established before new weeds

arrive. Overseeding established lawns keeps the turfgrass population young and vigorous.

CHOOSE WELL.

Find the best turfgrass mix for your eco-region. A good lawn blend for the Northeast is a mix of tall turf-type fescues, which is drought—and disease-resistant. Add to that about 20% Bluegrass and/or perennial rye, which will knit it all together.

AERATE. All lawns benefit from occasional aeration to help incorporate oxygen and organic matter into the soil. Aerate in fall with an aerator attachment on your riding mower or try a broad fork for aerating by hand. These tools will open space for air without making space for weed seeds.

COMPOST CAN HELP. Sandy (fast draining) or clay (slow draining) soils are typically low in organic matter. Spread a very thin layer of compost on your lawn. **Compost + clover + grass clippings + mulch-mowed leaves = all the food a PRFCT lawn needs.**

WATER SMART.

Most lawns need to be watered in hot, dry weather to reduce stress and stay healthy (see section 9). To water effectively, do it infrequently. The grass and soil surface should dry out well between waterings to avoid fungal problems and reduce weed seed germination. When you do irrigate, water deeply to encourage deep roots that take up nutrients and support strong, disease-resistant leaf blades.



PHOTO: TOSHI YANO

11. Plant a Habitat Garden. Size Doesn't Matter.

First, decide what kind of habitat you want to create. Look around: What thrives in the natural areas where you live? What native species do you want to support? One inexpensive and beautiful way to reduce the size of your lawn is to convert a section into a habitat garden, an area dedicated to native trees, shrubs, grasses, and wildflowers. A habitat garden provides food (nectar, pollen, fruits, berries, insects), water, and shelter to wildlife. Trees and shrubs are vital for birds, supplying them with food and shelter. Flowering pollinator plants produce food for insects (which then become food for birds). When planning for pollinators, aim to have at least three different types of plants (nine is best) blooming during each of the growing seasons to provide a continuous supply of food¹⁶.

It's best to start small. Remove an area of existing lawn, and plant directly into the soil with as little disturbance as possible. You can use seed (least expensive), plugs (the best for filling in spaces fast with minimal cost), container-grown plants (most expensive but the best for immediate effect), or a combination of the three. Annual seeds are great for filling in the spaces between plugs or plants and will help suppress weeds while the plants fill out and mature.

The composition of the habitat garden will influence how you maintain it. Different plants have different needs. Ideally, after it is established, your native plant garden will require less maintenance than a mixed border. If you have even more space, plant areas with native fruiting shrubs and trees to create even more food sources. The birds will have a feast in winter.



For a list of pollinator-friendly native plants and a list of trees, shrubs, and plants for birds, scan this QR code with your phone.

¹⁶ <https://xerces.org/blog/planning-your-plantings-for-climate-resiliency>

NATURE-BASED HABITAT GARDENS ARE DESIGNED SO THAT...

- ① Trees and shrubs can grow as large as they like in their natural shapes.
- ② Plants fill every space, reducing the need for mulch.
- ③ Plantings are a mixture of many different native species.
- ④ Plants provide year-round food and shelter for wildlife.
- ⑤ There is a source of clean water that completes the habitat requirements.
- ⑥ Plants can grow together as communities and support each other, reducing the need for deadheading, staking, and tying.



Do you want to plant a...MEADOW?

Grassy Meadow

is mostly grass with some wildflowers interspersed. This prairie-style meadow can be slow to establish, but is generally easy to maintain.

or

Wildflower Meadow

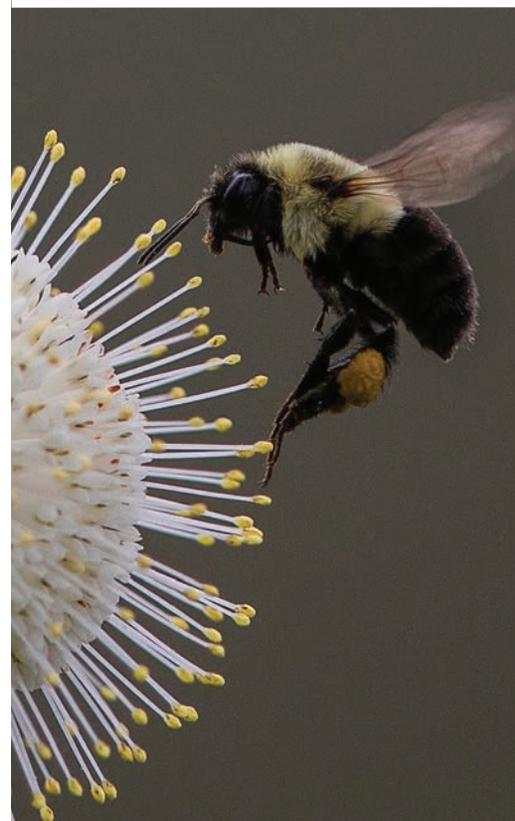
consists mainly of wildflowers with a few grasses. It is faster to establish, but requires more upkeep.

Grassy (prairie-style) meadows do better in nutrient-poor soil. Water them when they're establishing, and then leave them alone, which helps to keep weeds from moving in (weeds love fertility and water).

Wildflower (pollinator) meadows generally do better in nutrient-rich soil. They may need to be watered occasionally to keep them thriving. But don't water too often, or the weeds will take advantage.

Choose plants based on your soil type and location: sandy and dry, clay and wet, and sun or shade. Both grasses and flowers attract pollinators and birds. Get to know what each plant attracts. During the winter, the garden will still provide seeds for birds, shelter for insects and other animals, and visual interest for us, so don't cut anything back until the late spring when new growth starts to appear. Then cut high, 8 to 24 inches, and vary the height to protect the plants' crowns and any remaining insects (use hedge shears, a scythe, or an electric weed wacker). Leave the cuttings (they'll soon be hidden by new growth and will eventually decompose) or carefully remove them to add them to your compost pile. Keep an eye out for invasive plants; be sure to remove them before they go to seed.

For more information on creating a pollinator garden, scan this QR code with your phone.



PHOTOS: TOSHI YANO (MEADOW); LARRY DEES (BEE AND EASTERN KINGBIRD)

12. Have Faith, Have Fun.

The hardest part when changing to nature-based gardening might be learning to appreciate letting go and trusting the system. Much of what we have been taught about “good” gardening is based on treating a landscape as something to be controlled, like our home interiors. Since our idea of neat and tidy is not what nature does, it takes a great deal of time and effort to keep an outdoor space looking like an indoor space. Nature-based gardening encourages us to step back and let plants be plants and nature be nature. This means trees and shrubs can grow to their natural sizes and shapes, leaves get to return to the soil, and caterpillars are allowed to eat leaves and be eaten by birds. When we learn about plants and habitat, we can participate in the process in a positive way. If we come to a landscape with the intent to do no harm, and we know which plants will be happy there, then it is easy and fun to make a refuge, a place that is full of health and beauty and joy.

To do all this, we need to accept a different aesthetic. The nature-based landscape is not clipped, uniform, or frozen in place. It looks like... you guessed it: Nature! It is abundant, flowing, and ever-changing. Each day, month, season, and year, nature-based landscapes are different. And that’s what makes them so exciting; each moment is a new source of interest and delight.

For more information, visit perfectearthproject.org.

PHOTO: EDWINA VON GAL





Founded in 2013 by Edwina von Gal, Perfect Earth Project is a non-profit organization dedicated to educating, engaging, and inspiring individuals, land care professionals, and decision makers to adopt toxic-free, nature-based, and climate-responsible landscaping practices necessary for a healthier, more sustainable—and beautiful—environment for all.

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PHOTO: ALLAN POLLOK-MORRIS

Edwina von Gal and Abby Lawless designed this garden, which features mostly native plants and is maintained using nature-based practices.