



The Seed

Top Challenges in Landscape Management

Nebraska Statewide Arboretum, Inc.
Sustainable Landscapes for Healthy Homes & Communities

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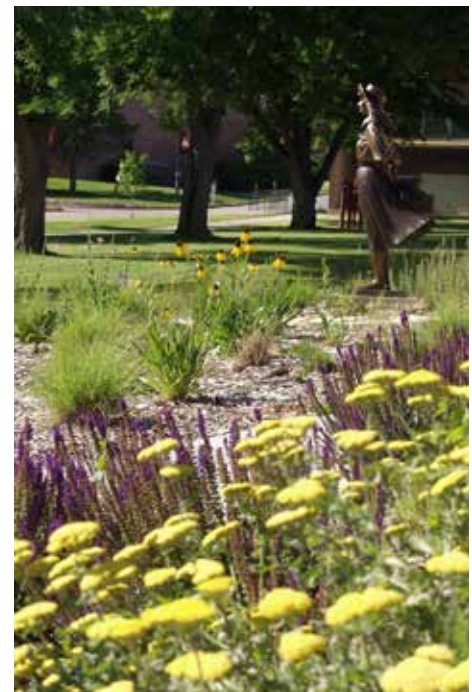
A Practical Look at Landscape Challenges

Justin Evertson

When it comes to managing our planted landscapes, we humans seem to prefer working against Mother Nature. Where she would provide a diverse mix of flora and fauna, we prefer trying to carpet the ground with a monoculture of lawn and then sprinkle a few colorful (and often foreign) trees, shrubs and other plants here and there as accents. We like to think that we're in control, that we've created something static and beautiful, but in reality we are regularly doing battle against natural processes and in many ways against our own best interests. We've come to accept near-constant mowing and trimming, regular use of pesticides to kill unintended plants and insects, lots of irrigation to keep things green, leaf blowing and sidewalk edging for even more tidiness and the regular removal of grass clippings, leaves and other plant residue to the landfill—necessitating a regular use of fertilizers to maintain soil fertility.

As a species, we seem programmed to prefer pattern and order wherever we can find it. This has allowed us to create incredible civilizations with amazing cities and complex infrastructure around the globe. Embracing this part of order is what makes us a remarkable species. And although our planted landscapes also need at least some order to function well, more and more people are figuring out that our landscapes can still reflect order while also embracing greater biodiversity and better conservation of resources—what we commonly refer to as sustainability.

This issue of *The Seed* takes a closer look at the way we manage landscapes with an eye toward sustainability. We focus on the “Big Four” chores that most people deal with: weeding, watering, mulching and mowing. Our hope is to convey that by changing our perspectives just a little bit here and there, we can save important resources while making our landscapes more dynamic, beneficial and enjoyable.



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Weed Management—Setting Priorities

Justin Evertson

What is a weed? On the surface it seems fairly straightforward. Most people agree that a weed is just about any plant that is out of place, growing where it is not intended or wanted. It can be an ugly dandelion or a clump of grass or a tree or even a pretty flower. However at a time when more and more people are thinking sustainably and embracing concepts of biodiversity, the whole concept of weeds and their management in the landscape is not nearly as black and white as it used to be and is now more a matter of perspective. If the perspective is that a landscape must reflect the highest order, with nothing out of place, then weeds won't be tolerated and great measures will be employed to work against natural processes in an effort to eradicate them. On the other hand, if a landscape is intended to better reflect the natural world, then some benign or beneficial weeds will not only be tolerated but possibly even welcomed. The purpose of this article is to suggest more of the latter—that we should all relax a bit about weeds in the planted landscape.

Perhaps no other weed symbolizes our need to relax more than the dandelion. Many people, especially those who own or manage lawns, just seem to hate it. We aren't born that way. As kids we enjoy playing with dandelions—"popping their heads off" and gathering them as bouquets for our moms. But by the time we're adults, our attitudes have changed and we're ready to do battle in trying to eradicate them from the landscape, which wouldn't be such a bad thing except for the collateral damage we cause in the effort. The most common weapon of choice in battling dandelions is 2,4-dichlorophenoxyacetic acid (2,4-D). As the all-too-common smell of this chemical wafts through the air each spring, the fresh new leaves of many trees and shrubs are being damaged. Oaks and legumes such as redbud and coffeetree seem to be especially sensitive to this herbicide drift and show the damage in severe distortion of their leaves. Such tree damage happens every spring in every community and can't be good for the long-term health of our trees.

Ironically, despite our best efforts to eradicate it, the dandelion keeps right on going. It can grow just about anywhere in any kind of weather and any kind of soil. It almost seems to be mocking us. And yet it's mostly a benign



Our Most Troublesome Weeds

A survey of some Nebraska gardeners and landscape managers revealed the following plants to be some of the most common or troublesome weeds in the landscape: dandelions, henbit, pennycress, lambsquarters, bindweed, purslane, spotted spurge, sowthistle, prickly lettuce, bedstraw, honeyvine milkweed, black medic, curly dock, black nightshade, groundcherry, ground ivy, crabgrass, foxtail, smooth brome, nutsedge, plantain, pokeweed, puncture vine, sandbur, buffalobur, bursage, burdock, wild cucumber, trumpetvine, mulberry, redcedar, hackberry, silver maple, Siberian elm.

Weed species vary from place to place and perceptions of weeds can vary greatly from person to person.

What are your most troublesome weeds? Share your opinions online at: www.facebook.com/NeArb

weed, causing no harm other than looking ugly (although beauty is in the eye of the beholder here). Another common lawn weed that we work hard to eliminate is white clover. Not only is it benign, it's actually beneficial in aiding soil fertility. In fact, before the advent of broadleaf herbicides, white clover was included in many lawn seed mixes as an effective natural fertilizer. Do we really need to harm our trees or other non-target plants in a grand effort to try to eradicate clover and dandelions from the lawn?

Many plants commonly considered weeds are ecologically beneficial and deserve a second look at how we perceive and manage them in the landscape. Common milkweed, for example, is vitally important to the monarch butterfly and other beneficial insects. It's actually difficult to grow as a garden plant, but thankfully makes itself at home here and there without any effort on our part. Other "good" weeds that help build soil, assist pollinators





Photos of dandelion, white clover, common milkweed and eastern redcedar. All photos are from Nebraska Statewide Arboretum unless otherwise noted.

and/or aid biodiversity include things like pink smartweed, plantain, lambsquarters, pigweed, fleabane, goldenrod and aster, among others. Letting some of these plants grow here and there, even unintended, is not a bad thing. And it's a good excuse for being a bit lazy with the landscape. When the neighbors ask why you're not battling some of your weeds, just tell them you're doing your part for the environment. It's true!

Although the point of this discussion is a more relaxed view of most weeds, we don't want to gloss over the concern about invasive plants that are causing, or have potential to cause, great economic or environmental harm. Plants that should never be planted and that deserve to be eliminated from all landscapes include such things as purple loosestrife, Japanese fleecflower, buckthorn, Chinese bushclover, garlic mustard, leafy spurge, phragmites, musk thistle, Canada thistle and most honeysuckles. There is little doubt that additional plants commonly used as landscape ornamentals will end up on the invasive list in the future. A complete list of Nebraska's noxious and invasive weeds, including a list of potential invasives, can be found online at: snr.unl.edu/invasives/invasiveplants.html.

For many landscapes, weedy trees and other woody plants are the cause of consternation: mulberry, Siberian elm, silver maple, hackberry, green ash, redcedar or just about any nearby tree producing lots of seed. Our bird friends are especially helpful in spreading trees with fleshy fruits. It's amazing how quickly some of these trees make their presence felt. Many planted landscapes, abandoned from regular care, would quickly be overrun by aggressive woody plants.

Weed Management

When weeds are problematic enough to be removed from the landscape, there are two basic control options: mechanical or chemical. Mechanical refers to pulling, hoeing,

digging or using some sort of equipment to physically remove the weed from the landscape. Chemical refers to the use of herbicides that chemically disrupt a plant's growth process, thereby killing it. Prior to the mid-20th century, most weed control was done mechanically. It's only in the past few decades that the spraying of herbicides has become synonymous with weed control.

For those thinking sustainably about landscape management, the use of chemical herbicides for weed control should be considered carefully. Herbicides are poisons and their misuse often results in unintended harm to non-target plants. A few of these chemicals are also potentially harmful to humans and wildlife. This concern is not meant to completely negate the value of herbicides. When properly used, some herbicides can be effective and time-saving tools for landscape care. The trick is to know how to use them, when to use them and, probably more importantly, when not to use them. Glyphosate (active ingredient in RoundUp™), for example, is one of the most commonly used herbicides but it has no effect on dandelions and is ineffective on woody plants. Other products such as 2,4-D, dicamba and picloram that are commonly used to kill broadleaf lawn weeds frequently injure trees and other non-target plants.

Ultimately, chemical herbicides should be used sparingly and only when necessary, which of course is open to interpretation. Their mode of action, the types of weeds they kill and their potential for environmental harm should be well understood before they are put to use. Our opinion is they shouldn't be used when simpler and safer methods will do

Weeds continued on page 14

Top 4 Tips for Weed Management

1. Relax more about weeds. Except for noxious weeds, there is no law that requires weeds to be killed or controlled. Some plants commonly considered weeds are actually very beneficial!
2. Be a good neighbor. Don't ignore weeds or embrace a weedy style that is grossly out of step with the neighborhood. Conversely, don't hesitate to enlighten your neighbors about the benefits of a more relaxed weed outlook.
3. Embrace weed-pulling. When trying to control weeds, think mechanical control first: hoeing, digging, mowing and pulling. Herbicide spraying should be seen as a last resort.
4. Think about our trees. If herbicide spraying is deemed necessary to control lawn weeds, plan to spray in the fall. Fall spraying typically kills weeds better than in the spring and there is much less potential harm to trees and other non-target plants.

Effective Watering

Christina Hoyt

There is no precise formula for watering landscape plants. A wide range of variables can influence when, how much and how to water: plant type, plant age (newly planted or not), soil type, microclimate, type of watering method used, etc. The suggestions for effective watering below are not all-inclusive, but hopefully it's a start down the right path.

- Always check to see if plants actually need water. To see if the soil is moist, dig down a few inches with a long screw driver, survey stake or something similar. If resistance is felt several inches down, it's time to water.
- Water in the morning or evening to conserve water (that said, watering when you have time is better than not watering at all).
- Water DEEPLY. Most people make the mistake of seeing the top of the soil become moist and assuming they have watered enough. In general, a hose (not a sprinkler) running normally for 2 minutes will apply 10 gallons of water. If you are hand-watering 10 seconds per shrub, you're applying less than a gallon of water. To make sure water is being absorbed and not just sitting on the surface, water everything and then start over and do it all again. Deep, infrequent watering is much better for the health and establishment of plants.
- If you are using a sprinkler, spend some time calibrating it at the start of the season so you know how long it will need to run to apply an inch of water. (Directions at: www.mwcog.org/environment/water/watersupply/downloads/landscape%20guide.PDF)
- You can test how deep you have watered by using a soil probe (long screw driver works well) an hour after watering. When you push the probe into the soil, it will go through moist soil easily and begin to give resistance when it hits dry soil.
- Soil type does have an impact on watering. Sandy soil will need to be watered more frequently than clay soil.
- Trees are best watered by putting a hose on trickle or a sprinkler on low volume and leaving it there for several hours. Tree gators or five gallon buckets with holes also work as they slowly release water over a period of time.
- Add mulch, but not too much (there's a tendency to over-apply). Applying 2-3" of shredded hardwood mulch conserves moisture, slows evaporation, cools the soil and adds organic matter as the mulch decomposes.
- Group plants with similar water needs together.



- Don't assume that because a plant is native or drought-tolerant it doesn't need to be watered the first year or two of establishment. Planted in the landscape, it takes awhile for the roots to extend beyond the potting soil into existing soils.
- Don't OVERwater. Automatic turf irrigation systems are most problematic in this regard. When soil is waterlogged, plant roots are starved of oxygen. Finding the balance between under-watering and over-watering can be tricky and, unfortunately, their symptoms are similar: leaves turn light green or yellow; leaves wilt; young shoots wilt. But using a soil probe (first bullet) should help determine soil moisture and you can also pay attention to "indicator plants" like gooseneck loosestrife, *Heliopsis*, bee balm and *Rudbeckia*. When they're wilting, it's time to water.
- Use a rain gauge and adjust watering accordingly. If you get 1" of rain in a week, you won't need to water.
- Most importantly, plant things that can survive long-term with minimal watering.

Top 4 Tips for Lawn Irrigation

- Water deeply and infrequently to encourage deeper-rooting and resiliency. Lawns should feel firm when you walk across them. If your lawn is squishy you may be overwatering.
- Water early in the day to avoid loss from wind and evaporation and limit potential fungal problems.
- Water efficiently (don't water pavement, make sure automatic systems are working properly, use rain sensor to avoid watering after rain, etc.).
- Allow summer dormancy of cool season grasses. Fescue cannot go dormant so some watering is required to keep it alive.

Nature [fills] a Vacuum— The Value of Mulch

Karma Larsen

Nature abhors a vacuum, so one of the best things we can do is fill bare patches in the landscape with mulch. Mulch helps conserve moisture; allows air and water to reach plant roots; encourages worm activity; and buffers weather extremes.

Natural mulches decompose and over time become soil. Inorganic mulches, such as rock, plastic or rubber, don't provide these benefits and can be difficult to work with in the long-term.

The use of mulch to cover bare ground around landscape plants is a common practice. It is one of the best things to do around young trees to improve establishment and prevent mower/trimmer damage. However, when mulching large, open areas, keep in mind that all organic mulches eventually break down and need to be replaced—typically on a 2-3 year cycle. Over time, weeds can take over these areas, often resulting in the use of both pre-emergent and post-emergent herbicides to keep the spaces “clean.” The more sustainable solution for large open areas is to gradually fill them with groundcovers or other desirable plants that will out-compete the weeds.

Organic mulches are available in a wide range of sizes and colors, and experienced gardeners tend to have their favorites. Below is a brief list of pros and cons of various mulches, but often it comes down to using what is readily available and affordable:

- ❖ Wood and bark mulches come in a wide variety of sizes and colors. Depending on their size, they are fairly slow to break down but will slowly enrich the soil.
- ❖ Grass clippings, if used, should be spread 1” thin or less as they can pack tightly together and create a mat that will block moisture and air. Avoid piling fresh clippings as they can ferment, releasing heat and ammonia that can damage surrounding plants.
- ❖ Leaves can pack tightly, too, so use thin layers. They will decompose more quickly if they're shredded or decomposed before spreading. Wetting them down will also help them break down more quickly. Maple leaves are among the quickest to break down and most nutrient-rich.
- ❖ If you have access to aged or rotted hay with a minimum of weed seeds, it will improve soil texture and also enrich it (it's the mulch-of-choice for many of the staff, though that may be more revealing of our farm backgrounds than its merit as a mulch!).
- ❖ If they're available, chopped corncobs can be used.
- ❖ Pine needles create an attractive woodland mulch. They're slow to decompose and will make soil more acidic so they're best used around acid-loving plants.

❖ Sawdust is not recommended. It tends to cake together and shed water; it can also remove nitrogen from the soil.

❖ Compost. Some communities recycle yard waste to create free or inexpensive compost. Better yet, do it in your own backyard, where waste in the form of kitchen scraps, grass clippings and leaves can be watered and turned to quickly enrich planting beds. Though it is basically just enriched soil, the composts I've used are far less likely to encourage weed growth than normal garden soil.



Top 4 Tips for Mulching

1. For long-term soil improvement, use organic mulches like wood chips, leaves, decayed grass clippings or compost.
2. Apply mulch only 2-3” deep; deep enough to reduce weeds but not limit transfer of soil and water.
3. If weeds have already begun to take over, it's best to get rid of them before mulching. Large weedy areas can be covered with clear plastic for several weeks to eliminate existing weeds and seeds. Smaller patches can be hand-weeded or hoed.
4. Mulches more quickly enrich the soil if they are partially decomposed or shredded, and wetting them down will further encourage decomposition.

More on mulches at:
www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=187.

Keeping Turf [environmentally] Green

Kendall Weyers

The current standards of the American lawn were developed during a time when we lacked awareness of the dangers of heavy reliance on fuel, supplemental water and chemical fertilizers and pesticides. We didn't see our methods as unsustainable or our expectations as unreasonable. We no longer have that excuse. The good news is that a lawn can be attractive—and sustainable—by taking a more thoughtful, common sense approach.

When it comes to management of turfgrass lawns, there are many more options than most of us consider. With little thought, basically by default, many of us fall into the rut of standard management approaches. These include mowing weekly, fertilizing several times each season, frequent watering and weed spraying to eliminate every plant that dares to interfere with our (unrealistic) goal of a “perfect” monoculture lawn. We may even apply preventive fungicides and insecticides “just in case.” All of these approaches can be altered to greatly reduce time, money and hassles spent on maintenance and become more sustainable, while still having a beautiful lawn.

An essential first step to save time, money and headaches achieving an attractive, effective and efficient landscape and turf, is thoughtful design. The typical approach is starting with a wall-to-wall carpet of grass and then dropping a couple of undersized planting beds here and there. A better strategy is to decide where turf serves a purpose, then fill remaining spaces with planting beds, rain garden, vegetable garden, orchard, groundcovers, prairie, etc. Since turf is the highest maintenance component of any landscape and provides the least benefit, less turf is a good thing.

Design can help in other ways too. Beds can be designed with gently sweeping curves rather than tight arcs and hard angle corners so that mowing is much easier and more efficient. This design approach eliminates the need for frequent stops and starts and greatly reduces the need for trimming.

Mulch beds around trees eliminate the potential for trunk damage from mowing and trimming—and make the job easier and faster. Better yet, trees can be included in larger planting beds. Since trees and turf have differing needs and compete for resources, they will both be healthier if not in direct competition.

There are seemingly endless edging options, but one of the best is simply to dig a shallow v-shape trench along the edge. It's the least expensive and allows for easy changes in bed size and shape. Plus you can mow right over the edge with no concerns for damage to the mower or edging. It



A simple v-edge cut into the lawn can separate lawn from perennial beds and allows for easy mowing (photo courtesy of Eric Berg).

only temporarily deters grass spreading into beds, but that is also the case with jointed stone or brick. Even continuous plastic or metal edging fails to stop grass if it's not properly installed. If you do choose an installed edging material, make sure it is low enough to mow over, eliminating the need for trimming along the edge.

The following common turfgrass management chores can be made easier, more efficient and more sustainable by following the suggestions in each category. Keep in mind that choices made in one category usually affect all the others.

Mowing

- 🍃 Mow as needed, rather than on a preset schedule. That means more in the spring and less in the heat of summer. Try to follow the rule of limiting removal of 1/3 or less of the grass blade length.
- 🍃 Mow high to keep the grass crown cooler, conserve moisture and reduce weed germination.
- 🍃 Leave the clippings on to return organic matter and nutrients to the soil as well as eliminate time and effort spent in bagging.

- Keep mower blade sharp to make mowing easier for you and the mower.

Watering

- Water as needed, rather than on a preset schedule. If you have an automatic sprinkler, know how to adjust it to accommodate the drastically differing water needs throughout the season. A rain sensor is a great investment.
- Water less frequently but deeply to encourage a deeper, more resilient root system. If your soil is compacted clay and runoff occurs quickly, cycle the system through twice to allow the water more time to soak in.
- Monitor whatever method you are using to make sure sprinklers are operating properly with good coverage.
- Consider allowing summer dormancy (although in a summer like 2012, turf will still need occasional water to survive).
- Use grasses with lower water requirements, such as fescue or drought-tolerant buffalograss.

Weed Control

- Control as needed, spraying individual weeds or patches rather than the entire lawn. Granule weed-and-feed products are safer but less effective.
- Focus on fall weed control, the most effective time to treat most common perennial weeds.
- Allow some good weeds for their beneficial characteristics. Clover stays low and adds nitrogen. Plantain and dandelions attract butterflies. Diversity encourages more beneficial insects. Many weeds tolerate adverse conditions such as drought and soil compaction.
- If weeds are all that will grow in certain areas, repeatedly spraying is a waste of time. Instead find the source of the problem, such as compacted soil or too much shade, and correct or encourage plants tolerant of those conditions.

Fertilizing

- Fertilize LESS! Unless you found a market to sell your grass clippings, there's no need to push growth and production of clippings. Over-fertilizing also increases water requirements and potential for disease, while sacrificing healthy root development, making the turf less drought-tolerant. Fertilize late April-early May and September for a healthy and attractive lawn.
- Use a slow release fertilizer and consider organic options like alfalfa meal and compost, which also contribute to a more diverse and beneficial soil ecosystem.



Which landscape do you prefer? Landscape at top offers year-round beauty, shade, interest, habitat, privacy, separation from the street, etc. (Before and after photos courtesy of Eric Berg.)

Top 4 Tips for Managing Turf

1. Start with good design; delete the default setting of turf as first option.
2. Practice "as needed" approach: avoid the typical mistakes of applying unnecessary amounts of water, fertilizer and pesticides.
3. Lighten up: allow a weed here and there, consider summer dormancy, trim less, etc.
4. Break the trends: consider alternatives, knowing the standard approach isn't necessarily the most beneficial to you and your environment.

Garden Blunders

(confessions from arboretum staff)

Justin Evertson

There's not enough room here to list all my landscape blunders. But my most embarrassing outdoor blunder would have to be the time a whole pickup full of deck lumber slid out onto Highway 6 as I took off from a red light. Nothing like backing up traffic for half a mile to get the juices flowing.

One other mistake I recently made involved trying to use swimming pool water in Waverly to water the landscape as it was drained at the end of the season. I ended up flooding the adjacent playground with a bunch of slimy-green, bug-encrusted water. The kids loved it, but the parents were much less enthused.

Others include:

- ❖ Not controlling bedstraw weed in a spot or two in the park. It has ended up everywhere!
- ❖ Mulching with wood chips that had *Ailanthus* seed in it—we've been fighting tree-of-heaven ever since.
- ❖ Burning native grasses in the school garden—and getting the principal quite excited.
- ❖ I've moved some landscape plants five or six times before they find their final resting place.



Bob Henrickson

I always knew the milky juice of *Euphorbia* was toxic and could cause skin irritations. So there I was cutting back donkeytail spurge, *Euphorbia myrsinites*, to encourage a flush of new growth and to prevent seed set. The milky juice was running down my pruner blades and onto the back of my hand. My skin is like leather so I didn't experience any discomfort or blistering, so I forgot about washing my hands. By the end of a long, hot day my eyes started to burn and the whites of my eyes were red. The more I sweated, the more intense the burn in my eyes. By the time my wife saw me I was in serious pain and she asked if I was working with a poisonous plant. Uh, yes I was, and then realized I had wiped my forehead with the back of my hand earlier in the day and the juice of *Euphorbia* was still there and now on my forehead. As the sweat came down into my eyes, the juice came along with it. Needless to say I ended up in the emergency room with an IV to flush my eyes with saline solution. Yes, sweat can sting the eyes, but when it's combined with toxic *Euphorbia* juice, it's an inferno.



Eric Berg

Spraying roundup in mulched areas, walking across it accidentally, then walking across my yard and wondering why there is "brown patch." Planting *Miscanthus* ornamental grasses. Ugh, spreads everywhere. Northern sea oats—even worse! That stuff should be banned.



Ryan Armbrust

I've planted trees too close to the house, switchgrass in too much shade and hostas in the sun. Heck, I've even limbed up a spruce! But the worst mistakes I've made were letting weeds get ahead of me when planting a new area. It's very hard to catch up when you let a seed base get established and out-compete the "good" plants.



Laura Armbrust

My parents and I dug up this cool-looking small tree from an old farmstead and planted it at the farm. After a few years and some plant ID classes, I realized it was a tree-of-heaven. We cut it out, but now its rather extensive root system is sending up suckers EVERYWHERE.



Kendall Weyers

- ❖ Too often allowing clients' suggestions to over-ride my better judgment.
- ❖ Placing shoreline boulders in winter on snowdrifts (see previous)—several ended up submerged.
- ❖ Building a patio and fence under the drip line of a silver maple (endless roots!).



Some of Our Favorite [problem-solving] Landscape Plants

More at: pinterest.com/nearboretum/favorite-landscape-plants/



Blue false indigo—effective as a medium-size shrub



Gayfeather—tough as nails & long-lived; don't overwater



Pagoda dogwood—multi-season interest...flower, fruit, fall color, winter form



Viburnum—multi-season interest; love the fall color combinations of leaf & berry



Little bluestem—great winter interest, drought-tolerant; can be cut back midsummer



Yarrow—many to choose from; easy to grow



Chenault coralberry—great filler plant and wonderful for part-shade; easy to use in & around trees



Geranium sanguineum—for part-shade



Bur oak—statuesque, hardy, long-lived tree



Joe-pye weed (for wetter areas)—easy, easy, easy; good as a filler plant



Coneflower—it grows; it flowers; looks great with grasses & fine without



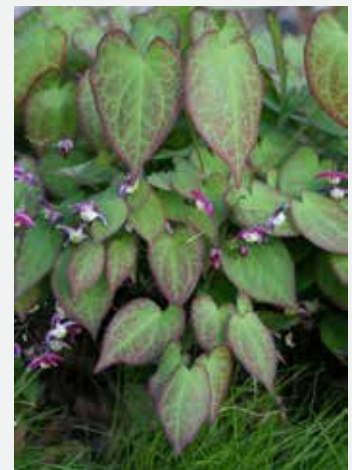
Indiangrass—for back of the border



Plumbago—tolerates shade & sun; fills in without being a “thug”; doesn't require cutting back or dividing



Sideoats grama—drought-tolerant; requires no maintenance & stays put



Epimedium—good replacement for hostas; perform well in dry shade; spread but not aggressively

Bob's Top 10 Tips for Prairie Gardens

1. Weeds are best eradicated before planting or sowing, because they out-compete slow-growing prairie seedlings and even shade them.
2. Pick your battles! Spend your efforts on the worst weed problems. It is helpful to know what prairie plants look like when they first emerge in spring, but it is far easier to memorize the life cycle of a dozen invasive weeds so they can be eliminated early on.
3. If possible, enrich the soil for your tallgrass prairie garden by incorporating a few inches of compost or good topsoil. Prairie plants will benefit from the enriched soil and from being raised above grade to improve drainage.
4. Once established, water your garden only during periods of extended drought. Otherwise the ones that can survive on rainfall will rot and you'll be left with plants that require extra water.

5. Design your prairie style landscape to include 50-75 percent grasses. By competing with the prairie wildflowers, grasses help keep them from growing too tall or becoming aggressive. They also frame the flowers, adding a refined texture to some of the coarser-looking prairie plants, and hiding the legs of seasonal wildflowers that go dormant.



With competition you can control aggressive seeders like ironweed, *Ratibida* or pitcher sage, but plants with underground runners like maximillian and sawtooth sunflower, Jerusalem artichoke, late Canada goldenrod and prairie cordgrass are more difficult to control and are best planted in a confined space.

6. Most prairie grasses take awhile to green up in the spring so include early season wildflowers and native sedges that will grow as soon as temperatures rise above freezing and compete with aggressive forbs and spring weeds like henbit and dandelions. There are native sedges for both wet or dry soils.
7. In a prairie garden, it helps to make root competition so fierce that grasses and forbs don't get leggy and nothing is allowed to be aggressive.



8. It is best to plant in a random pattern so that when a particular species is most eye-catching, it won't look lined up or artificial. Prairie plants will seed around the garden and show up in random locations (free plants for the frugal gardener!). Most only become a nuisance on open ground.
9. If a prairie garden appears too informal, you can soften the wild look by providing a distinct border or edge between the prairie garden and other areas to show that this is a planned landscape.
10. Smaller plantings are easier to establish by planting wildflowers and grasses that were grown in small plug containers rather than from seed. Later on you can broadcast seeds of pioneer forbs—like upright prairie coneflower, wild larkspur and plains coreopsis—to compete with weeds and add more interest.

Bob Henrickson



Grasses are the mainstay of prairie plantings (photo opposite), helping to keep aggressive wildflowers upright and in check. A mowed pathway makes prairie gardens more accessible and attractive.

Landscapes in Transition

Christina Hoyt

To manage landscapes well, whether we're overseeing the green infrastructure for an entire community or just our own backyard, we have to embrace that these landscapes are living systems and, as such, change is inevitable. In *American Woodland Garden*, Rick Darke writes, "The regimented aesthetic of traditional formal gardens is usually in conflict with the necessary plasticity of native forests. A garden that seeks to capture the spirit of the forest must welcome change as an inevitable or even desirable part of the aesthetic, as an essential element in ecological stewardship, and as an endearing part of the story of the woodland landscape."

In all of our natural ecosystems, whether they're forests, prairies or wetlands, change is constant. Fire, floods and drought are catastrophic events that have long-lasting consequences. Smaller changes—like fallen trees, changes in shade patterns, variation in microclimate and seed dispersal patterns—occur constantly, though more subtly. At the edge of any wooded area, there is a constant give-and-take between woody and herbaceous materials depending on light, moisture, soil and disturbance. The diversity and flexibility of a natural landscape is essential to its perpetuation.

Perhaps, as Darke said, we need to begin to see change "as an essential element in ecological stewardship." How does this play out practically as we manage our landscapes?

Sun to Shade

In design class those big tree circles on the page with shade plants underneath seemed like such a great idea—until you realize that the small trees that are planted may not cast shade to their outlying edges for another 10 to 20 years. In the meantime, it would be more appropriate to plant sun-loving grasses, perennials or shrubs nearby. I've learned to adjust plant selections to accommodate change; now when I plan those areas I don't assume every plant will survive for the next 10 years and I purposely include plants that are adaptable and can take sun to part-shade as the trees grow.

Shade to Sun

This is harder to plan for because often this happens rapidly with the loss of a tree, and shade-loving plants can easily get fried by the sun. In this case, the best thing you can do is plan for the future right from the beginning by planting multi-generations of trees and being willing to move and transplant things that aren't thriving. Some sun-loving plants can take more shade than we give them credit for and vice versa, so experiment with different plants.

Diversity

Nothing is more striking than the enormous void left when large American elms, which graced many of our city streets for decades, succumbed to Dutch elm disease. Imagine if those streets had been planted with a mixture of other species. Many beautiful windbreaks have similarly



This woodland (top) and prairie garden were designed to encourage naturalization and allow for continual change.

been lost due to monoculture and disease. Large expanses of the same species may be beautiful but that simply does not make sense long-term. A diverse landscape is more resilient to pests, diseases and other environmental factors.

Naturalization

There is something in us that equates gardening and management with keeping things in their place. But if we relax a little, we can let nature do much of the adjusting after the initial planting and allow plants to battle it out for where they are happiest. We can allow plants to reseed and purposely plant things that tend to move around a little. Our job, then, is simply to edit as needed. My mother's shade garden is a great example of this; trillium, jack-in-the-pulpit, sweet woodruff and ferns move around (unlike many gardeners, she "weeds" hosta and trillium out of her woodland site). For the most part, managing this area simply involves adding or moving plants a little bit here and there.

Another great example of flexibility is some of the rain gardens we've installed in Lincoln. They are made up of mostly native prairie species, and are far from static. While originally planted in groupings, they are designed and managed in a way that allows for continual change.

Conclusion

The idea of allowing a landscape to take on a life of its own may seem daunting. However, as we push for beneficial and sustainable landscapes we need to look hard at how we design and manage landscapes to support, and even encourage, change. Done correctly, these dynamic, living and ever-changing landscapes will be with us long into the future.

A Tale of Two Landscapes

Justin Evertson

Compare these two home landscapes and decide for yourself which is more beneficial. Both landscapes include about 6,000 square feet of green space on a typical suburban lot.

Landscape A

Traditional turf-dominated landscape developed by a homeowner who doesn't know much about landscaping and desires mostly to blend into the neighborhood.



- ❖ Area of lawn (tall fescue): 5,700 sq. ft. kept lush and weed-free.
- ❖ Other landscaping: one shade tree, two ornamental trees and a few foundation shrubs.
- ❖ Automatic irrigation system covers most of the lawn.
- ❖ Estimated annual hours of lawn care including mowing (using a riding mower and push mower), string trimming, weed spraying, fertilizing, aerating, raking: 160
- ❖ Estimated annual hours of other landscape care including watering, tree/shrub care, mulching, herbaceous plant cleanup, deadheading, weed control: 15
- ❖ Estimated annual cost of landscape care including amortized cost of mowing and irrigation equipment, other equipment, fertilizer, pesticides, refuse collection, 4-step-lawn-care: \$1,150
- ❖ Estimated municipal water used for irrigation: 30,000 gallons - \$1,250/yr
- ❖ Stormwater capture: None. Two downspouts drain directly to pavement and street gutter.
- ❖ Other benefits: barefoot-friendly grass and lots of open space to play sports and host parties.

Landscape B

Reflects a homeowner who values biodiversity and who is striving for better sustainability. A primary goal is the reduction of lawn maintenance.



- ❖ Area of lawn (tall fescue and clover mix): 1,750 sq. ft. – not fussed over, but mostly green.
- ❖ Other landscaping: 15 large-maturing trees, several understory trees, numerous fruiting/ornamental shrubs, native prairie border, shade gardens, perennial gardens, rain gardens at downspouts.
- ❖ No automatic irrigation system.
- ❖ Estimated annual hours of lawn care including mowing (push mower), fall fertilizer (Milorganite), some weed digging, overseeding, fall leaf raking/chopping: 30
- ❖ Estimated annual hours of other landscape care including watering, weed pulling/spraying, tree/shrub care, mulching, herbaceous plant cleanup, deadheading, vegetable gardening: 215
- ❖ Estimated annual cost of landscape care including mowing and other equipment, tree trimming, landscape/vegetable plants/seed, mulch, fertilizer: \$550
- ❖ Estimated municipal water used for irrigation: 8,000 gallons - \$350/yr
- ❖ Stormwater capture: all downspouts connected to rain barrels and rain gardens.
- ❖ Other benefits: year-round interest and color; lots of birds, butterflies, bees, snakes, toads and other beneficials; soil is highly organic, full of life and easy to dig; shade trees reduce utility costs; less smog and CO² from gas-powered equipment; no refuse costs (all plant materials recycled via mulching and composting).

Groundcovers

One of the best ways to avoid weeding is to crowd them out with groundcovers. *Asterisk denotes very aggressive.

Low Groundcovers for Sunny Areas

Cerastium tomentosum, snow-in-summer
Euphorbia, cushion spurge
Geranium sanguineum, cranesbill
Juniperus, spreading juniper
Stachys, lambs ear*
Symphoricarpos, coralberry
Thymus, thyme
Veronica prostrata, speedwell

Groundcovers more than 6-8" in height

Achillea, yarrow
Aurinia saxatilis, basket-of-gold
Nepeta, catmint
Salvia
Sedum, stonecrop

Grasses for Sunny Areas

Bouteloua curtipendula, side oats grama
Bouteloua dactyloides, bufflograss
Bouteloua gracilis, blue grama
Carex brevior, *C. bicknellii*, sedge
Muehlenbergii cuspidata, plains muhly
Schizachyrium scoparium, little bluestem

Groundcovers for Part Shade

Aegopodium podagraria, bishop's weed
Ajuga, bugleweed
Alchemilla mollis, lady's mantle
Bergenia cordifolia, heartleaf bergenia
Brunnera macrophylla (Jack Frost is a variegated cultivar)
Carex plantaginea, plantain sedge
Ceratostigma plumbaginoides, plumbago
Convallaria majalis, lily-of-the-valley
Epimedium, barrenwort
Euonymus fortunei, wintercreeper*
Fragaria virginiana, barren strawberry
Galium odoratum, sweet woodruff
Geranium sanguineum, cranesbill
Hedera helix, English ivy*
Lamium maculatum, spotted dead nettle
Lysimachia nummularia, moneywort
Pachysandra terminalis, Japanese spurge
Vinca minor, periwinkle*

Native Plants for Shady Areas

Asarum canadense, wild ginger
Carex muskingumensis, *C. albicans*, *C. sprengei*, *C. eburnea*
Heuchera richardsonii, coralbells
Packera aurea, golden ragwort
Polemonium reptans, creeping Jacob's ladder
Polygonatum biflorum, Solomon's seal
Smilacina racemosa, false Solomon's seal



From top: variegated Solomon's seal; basket-of-gold; creeping Jacob's ladder; *Carex muskingumensis*.

the trick. In other words, they shouldn't be "the first crayon out of the box." If it's just as easy to pull or dig the weeds, then why use chemicals? Keep in mind that the more we use herbicides, the more weeds will develop resistance to them.

For tree and biodiversity advocates the sobering reality is that significant herbicide use, especially in lawn care, is here to stay. We love our labor-saving shortcuts and it's estimated that Americans spray more than 90 million pounds of herbicides each year to try to keep the lawn "weed" free. However, just one simple practice can greatly reduce the damage to trees and other non-target plants: spray herbicides, especially 2,4-D, in the fall when woody plants are going dormant. The kill-rate on weeds is better at that time and the risk to non-target plants is greatly reduced.

Mechanical Weed Control

Let's face it, there is a reason chemical herbicides have become so popular: pulling, hoeing and digging weeds can be hot, tiresome and back-breaking work. Many of us have bad memories of forced childhood labor pulling weeds. And yet for many people, weed pulling can actually be quite cathartic. There can be real satisfaction in completely plucking a weed from the ground. Before the advent of chemical herbicides, almost everyone spent at least some time pulling or hoeing weeds from the garden and landscape. It was just a fact of life. To a certain extent, we need to return to that mindset. Regularly scouting the landscape and pulling/digging the weeds encountered is a great way to stay close to the land and thus better understand the rhythms and nuances of the green world around us. It is also a good way to get physical activity!

When it comes to pulling weeds, here are a few thoughts to consider:

- 🍷 For most weeds, it's important to pull or dig up most of the root system to prevent the weed from re-sprouting. This is especially true for tap-rooted species such as dandelion, pigweed, mallow, pokeweed, etc. A good soil knife or dandelion digger is important in this endeavor. A sharp tile spade works well on larger weeds.
- 🍷 Because of deeply-reaching root systems, weedy trees can be especially difficult to pull cleanly after they are more than a few inches tall. Hackberry is especially tenacious. The good thing is that most woody weeds can be easily killed when young with a sharp spade jabbed through the root system a couple of inches below the soil surface.
- 🍷 Weeds pull best when the ground is moist. Very few weeds pull cleanly when the soil is dry, especially if there is clay in the soil.
- 🍷 Plants that spread by root rhizomes such as smooth brome, bindweed, common milkweed, ground ivy and nutsedge are nearly impossible to kill completely by pulling or digging. These are the types of plants for which careful chemical control makes more sense.



Identifying young woody plants like mulberry and tree-of-heaven is an important part of control.

Weed Prevention and the Weed Cycle

One of the best ways to manage weeds is to prevent their arrival in the first place. Weeds are opportunistic and Mother Nature has insured that wherever there is bare soil, there are plant species looking for an opportunity to get started. Annual weeds such as henbit, lambsquarters, bedstraw, prickly lettuce, purslane, crabgrass, etc., are especially capable of filling open ground quickly.

Preventing weeds in these open spaces comes down to three basic options: mulching, using pre-emergent herbicides, or filling the open spaces with more desirable plants including groundcovers. Larger commercial and institutional landscapes often practice a mix of all three. At the homeowner scale, it is our opinion is that wherever the ground can be covered with desirable groundcovers or other plants, the better it is for long-term sustainability. In such landscapes, mulch becomes more of an accent and less of a permanent groundcover (see pages 5 and 13 on mulching and groundcovers).

Finally, be aware that weeds come in cycles. What is a problematic weed right now might fade over time as natural processes play out. Changing sun and shade patterns, moisture conditions and temperatures all play a role in the germination, health and spread of weeds. Weeds that may seem like an impossible problem one year may be less so the next. Conversely, weeds never seen or anticipated before might suddenly show up and be the next annoyance.

Conclusion

In our effort to try to control what's growing in the managed landscape around us, Mother Nature regularly interjects by placing unintended plants ("weeds") here and there. We may think we are in control, but that control is always fleeting and temporary. As we work to be more sustainable in the way we live and the way we conduct our human affairs, it's smart to realize that many plants we consider weeds are of no major concern and don't warrant an expensive and potentially problematic chemical assault for their eradication. Let's learn to recognize which weeds are the real problems and let's learn to live with as many beneficial plants as possible, whether they are there by design or not. The benefits of a more relaxed view of weeds are ecological, economic and social. Ignoring some weeds gives a good excuse to be a bit lazy and to pursue more enjoyable endeavors.

Insects and Wildlife

[most aren't pests]

Justin Evertson

Anyone who has to deal with deer in their landscape can vouch for the damage that wildlife can inflict on trees and other landscape plants. A variety of other animals, such as rabbits, squirrels and voles, also cause problems. And of course there are problematic insects like bagworms, Japanese beetles, sawflies, spider mites, pine moth, lilac borer, etc. One of the worst pests has been the pinewood nematode that has killed hundreds of thousands of pines in eastern Nebraska in recent years. Some serious new threats are also emerging: mountain pine beetle is a serious problem in western Nebraska and emerald ash borer is in nearby states. Insect and wildlife pests are most definitely a concern.

And yet, any strategy for handling potential pests should start first with an attitude check. If insects and wildlife are seen generally as a scary proposition, then one might be tempted to spray pesticides to keep them at bay. On the other hand, if one realizes that any landscape is mostly full of beneficial and/or benign creatures, then an acceptance of most creatures can be realized. As described in Doug Tallamy's book *Bringing Nature Home*, biodiverse landscapes that include many native plants better enable a balance in the insect world where very few pest species are capable of gaining an upper hand—there are just too many predators helping to keep things in check.

Part of a more sustainable attitude is realizing that our landscape plants should not exist just for our visual pleasure but should also benefit wildlife. In this sense, it's a good thing to accept that insects are feeding on many of our plants. Most of the time any damage from feeding is cosmetic and rarely kills plants outright. A good example is the bur oak. This majestic native tree that can live a few centuries provides food and shelter for hundreds of insect and bird species. Just try to find a perfect, intact leaf in summer that's devoid of insect chewing or sucking. You won't find one. And yet the tree tolerates this feeding just fine. Conversely, the callery pear, a foreign species that has become extremely popular, feeds almost nothing. It's almost impossible to find a leaf that is being chewed on in mid-summer. They are few and far between. Which species is the better choice for longevity, biodiversity and sustainability?

For highly valued landscape plants, there are times when spraying pesticides is warranted. It's important to keep in mind, however, that there are no pesticides that can be sprayed that won't also kill many non-target creatures. Even naturally derived insecticides like Bt (*Bacillus thuringiensis*), a bacteria that attacks caterpillars, will kill moths and butterflies that are not causing harm. Many landscape managers have come to accept that the general use of insecticides is

not worth the cost or collateral damage. They let natural processes play out whenever possible and are even willing to let some plants go that aren't able to resist being fed upon. This not to say that certain insecticides may never be warranted, but their use should be carefully considered before spraying and every effort should be made to limit any harm to non-target creatures.

Beneficial Arthropods

Recommendations and photos below from Jim Kalisch and the University of Nebraska-Lincoln Department of Entomology



Assassin bug



Damsel bug



Ground beetle



Lacewing



Lady beetle



Mantid



Spider



Tachinid fly

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University of Nebraska-Lincoln
102 Keim Hall
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