



PLAINS-PROVEN PLANTS TO KNOW AND GROW

Water and the Landscape

Justin Evertson, Nebraska Statewide Arboretum

Water—the giver of life, so preciously scarce and yet sometimes so abundant. As I write this in August 2008, much of Nebraska has seen above average rainfall for the year. At my home in Waverly, over 24” of rain has fallen since April 1st. That is nearly 6” above average. After several years of below average precipitation, that is a nice change of pace! Things are lush and green like we haven’t seen in years (although for the last several weeks we have been in a typical late-summer dry pattern). When it rains it pours and in some places of the Midwest, there was way too much rain. Just ask our neighbors to the east in Iowa who suffered devastating flooding from the spring and early summer rains.

And, yet while much of the state is relatively moist and green, parts of western Nebraska continue to be gripped by serious (some might say devastating) drought. In the same time period that more than 2’ of rain has fallen on my house in Waverly, less than 4” worth has descended on my hometown of Kimball in the southwest Panhandle, bringing back memories of 2002 when much of the region ended up with less than 7” of precipitation for the year. That is desert-like dryness. So even during a wet year,

the reality of drought and the value of water conservation should not be far from our minds.

Another aspect of water cycle and its relationship to the landscape that has become very important in recent years is that of stormwater management. Any community is made up of lots of hard surfaces (roofs and pavement) that reduce the amount of open ground that can absorb rainwater. In addition, much of the open ground is covered by shortly-cropped turfgrass that is a poor water absorber and which is typically graded to speed up stormwater runoff. Thus most towns or neighborhoods end up with more free-flowing water in storm events than do natural areas (woodlands or grasslands). This water has to go somewhere.

In designing and developing our communities and personal properties, we have up until now thought of stormwater as something we need to shed as quickly as possible. Thus our streets, storm sewers and drainage-ways have been designed to move stormwater at a fast flow out of the community and to the nearest streams or rivers. This “pushing” of the water, combined with less absorbability in the landscape, increases urban erosion and often increases the

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Drainage swale and naturalistic front yard landscape in residential development near Chicago. (Photo courtesy Steve Rodie)

Plants for Rain Gardens

Bob Henrickson, Nebraska Statewide Arboretum

A rain garden is a man-made depression in a yard planted with native or adapted plants designed to hold rainwater temporarily and allow it to soak in. Rain gardens are not the same as wetlands, drainage ditches or swales. Any part of a garden that remains soggy or marshy most of the year is a bog or wetland. Swales slope to a destination, such as a creek, while rain gardens do not (though a swale may end with a rain garden). If most of the water flowing into the garden flows out again it is **not** a rain garden.

Native plants are recommended for rain gardens because they are deep-rooted and more tolerant of local conditions, but many non-native plants are equally adaptable and easy-to-grow. What’s important for most rain gardens is to include plants that tolerate extremes since there will be periods of standing water when the soil is saturated and also very dry periods. Most plant species that grow naturally on the bank of a river or stream will do well in rain gardens because they are used to growing under these varying conditions. The plants help absorb excess water as well as filter out excess nutrients before entering the groundwater system.

When designing a rain garden, plan on at least 50-75 percent of the plant material being made up of prairie grasses, sedges and rushes. If prairie wildflowers are allowed to grow on their own without competing for space, sunlight and moisture with grasses, they soon take advantage by growing too large and flopping, or by spreading to take over the bed. In a rain garden you need to make root competition

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Reclaiming the Rain—Nebraskans Address Water Issues

Except for a twinge of guilt when we’re rinsing dishes or a feeling of dismay as we pay the monthly bill, most of us don’t give a lot of thought to water—even as we’re drinking it bottled and adjusting our sprinklers. But if you’re a landscape architect, geologist or horticulturist, or if you work with city utilities, you’re paying attention. They’re encouraging us to pay attention too.

Not a Waste Product

John Royster
Landscape Architect
Big Muddy Workshop

Right now we treat rain water—this wonderful, clean, free resource—as a nuisance that we’re trying to get rid of. And then we take water out of our streams and lakes,

treat it, and put it on our plants. It’s a bad analogy, but it’s a bit like pouring gasoline out on the ground.

Our perspective is really skewed, and it is definitely not the perspective of our forefathers. When I was growing up, everyone’s grandparents had a cistern and rain barrels. Your drinking water came from one and you watered your garden with the other. Both fell out of fashion for awhile but we’re seeing more and more rain barrels as time goes on. In New Mexico, they’re ubiquitous.

Does every yard need to have a rain garden? Probably not, but everybody ought to do something to conserve rain water, whether it’s careful plant selection and placement, putting rain barrels at the end of their downspouts, or creating bio-swales 10-15’ adjacent to parking lots for

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commercial buildings. This won't solve all our water problems, but each small effort gets part of the way in addressing city-wide stormwater problems at the source. That approach means that every property owner can make a difference.

In selecting plants for a rain garden, regardless of whether they're native or introduced, the most important factor is selecting deeply-rooted plants. That's especially true in new developments where the land has been graded and re-shaped. Over time, deeply-rooted plants will break through the upper several feet of compacted soil, creating channels that will almost act like big straws drawing the water down deeper into the soil.

Though some rain garden guides recommend using expensive replacement soil with various amendments, observation of how rain gardens perform over

time tends to indicate that this may not be necessary... if plants survive for one or two years, their root systems alone will increase soil percolation as much as a modified soil mix.

To avoid insect problems and excessively wet soils, rain gardens need to percolate all water collected in them within 48 hours after a rain. Since soil percolation will increase over time, one technique for highly compacted soils is to begin with an out-

let spillway that is lower which you can gradually increase the height of over time to increase the depth of water retained after a rain. You may start out with the lip of the spillway only 2-3" high and then, over time as the percolation improves, you build up the height of the spillway with additional soil to create a basin possibly 8-9" deep.



This rain garden absorbs parking lot runoff at the NRCS Service Center site in Council Bluffs, Iowa.

Vegetated drainage swale between parking lots at Bass Pro Shops in Council Bluffs, Iowa. (Photos courtesy Steve Rodie)



Another simple concept we're using is to grind down a section of street curb and then dig out the ground surface between the curb and sidewalk to create a small basin. This area is then planted with native rain garden species. Water running down the gutter flows into this area rather than into the storm drain. By placing the curb cut on the uphill side of the storm drain inlet, the first flush of water from a rain goes into the green space rather than into the drain inlet. Since 93 percent of rainstorms produce less than 1" of precipitation, that's the most important water to capture and clean. Just as important is that it captures the majority of pollutants carried in rainwater. This is referred to as the "first flush" or "5-minute flush," and it contains the highest percentage of pollutants like metals, petroleum and chemicals. Most rain gardens deal with the first 1" of rain or less, but that's the most frequent and most polluted runoff and plants are good at capturing and treating those pollutants.

Conserving Rain Water

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Protection of water quality and quantity is an important issue we all face. Changing the way we look at rainfall is one step towards doing our part to address water

issues. Runoff water from rainfall is a beneficial natural resource. While it should be directed away from building foundations, and not be allowed to collect into stagnant pools, it can and should be retained in the landscape for short periods to reuse for irrigation or to infiltrate into soil.

When it rains, water runs across and off properties. In urban areas, runoff water is referred to as stormwater. As stormwater flows across surfaces, it picks up pollutants such as sediment, nutrients, bacteria and heavy metals from many sources and deposits them into surface water. This is called nonpoint source pollution and is considered to be one of the leading sources of water pollution today.

To help address stormwater issues, a new trend in property development and landscaping is to capture and reuse or infiltrate rainwater rather than directing all of it off of a property. Such practices help conserve water, reduce water pollution and restore natural hydrology which benefits ground water supplies and protects rivers and streams. On a large scale, one of the ways we can conserve water is by preserving and restoring natural landscape features such as natural drainageways, forests, floodplains and wetlands with Low Impact Development or L.I.D. (www.lowimpactdevelopment.org).

Small scale approaches include:

- Reducing the amount of impermeable surfaces on a property by using porous pavement or other permeable surfaces, such as for driveways and patios; and by retaining or increasing planted areas.
- Installing properly designed rain gardens.
- Redirecting downspouts away from pavement and onto planted areas.
- Using rain barrels.
- Installing underground tanks to collect rainwater, often from rooftops; and then using this water for drip irrigation.

Because nonpoint source pollution is considered one of the leading causes of water pollution today, the Clean Water Act, through the Phase I and II Rules, now requires urban communities with populations of 10,000 or greater to reduce nonpoint source pollution in stormwater and reduce the amount of stormwater discharged into surface water. Everyone can do their part to protect and conserve water resources. One way is to capture and infiltrate or reuse rainwater runoff.

Rain gardens are becoming more popular as the need to conserve and protect water resources becomes increasingly important. If you are considering installing a rain garden, here are some key considerations from what has been learned to date:

- Rain gardens are slightly shallow gardens located where they will catch rainwater, or where rainwater can be directed to them, usually from a roof, lawn or paved area.
- Rain gardens are not ponds. A properly located and installed rain garden will drain all rainwater in 24 to 48 hours, with 24 hours being ideal.
- Rain gardens are best NOT located where water already tends to pool and stand for longer than 24 to 48 hours after a rainfall. Such locations may have poorly drained or compacted soils.

With proper site and soil preparation, along with good plant selection, it can be possible to use such sites for rain gardens.

• Soil preparation is important for any garden, but may be even more critical for rain gardens. Double digging or using a back hoe and incorporating compost is often recommended.

• Native, herbaceous perennials are considered the best types of plants for rain gardens because they are deep rooted and their roots naturally die and re-grow, creating small tunnels in soil to improve water infiltration and percolation in the rain garden over time.

• Rain gardens are best located 10' away from the foundation. If the basement is finished, 20' is a better rule of thumb.

• Rain gardens should not be located beneath trees, over septic systems, within 25' of wells, or in very sandy soils where the water table is shallow.

Everyone Has a Part

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One of the most common misconceptions about rain gardens is that they should be placed where there is the most runoff, like areas along property lines where small creeks are often formed during and after

rainstorms. Many homeowners want to place it in back of their property where all the runoff from that property and often from several other properties pass through, but rain gardens are really meant to handle just the runoff from one home and not the 10 homes uphill from it. That means everyone has to take part for it to be truly effective.

In the first year or two, it's all about the soil. Once plants are established, their root mass will improve water infiltration, but the first several years you have to depend on the soil. Good plant selection is essential in all areas of the garden, as all plants need to tolerate both wet and dry times of the year.



Residential rain garden in Lincoln. (Photo courtesy Amanda Meder)

I do soil testing for the City of Lincoln Rain Garden project, which is grant-funded from the Nebraska Environmental Trust. It's surprising how much soils can vary from one side of the street to another and even within a 6' area on some properties. In areas of new development, it's not unusual to have 1" of good topsoil with compacted clay hardpan underneath.

We've found that a plant that does well in one rain garden may do poorly in another. There are so many variables—sunlight, amount of runoff, soil type, etc.

Most of our rain garden plans don't use trees since they tend to absorb all the water and give too much shade, but we have placed rain gardens near existing trees with good success. Shrubs can work well as long as they don't limit sight lines near streets and driveways.

Learn More!

Web Resources

water.unl.edu
www.bluethumb.org/raingardens
rainkc.com
www.sustainablesites.org
www.ianrpubs.unl.edu/epublic—
UNL Extension NebGuide Stormwater
Management series:
Rain Garden Design for Homeowners
Installing Rain Gardens in Your Yard
Plant Selection for Rain Gardens in Nebraska

Statistics

Rain gardens are best suited to absorb rains of less than 1", which accounts for about 93 percent of rains in Nebraska. (National Weather Service)

More than 50 percent of outdoor water usage goes into watering lawns and gardens. (Environmental Protection Agency—EPA)

About 50 percent of commercial and residential irrigation water goes to waste through evaporation, wind, improper system design or overwatering. (EPA)

Stormwater runoff is the primary water quality problem in America. (EPA)

Drip irrigation is 90 percent efficient; traditional in-ground irrigation systems 50-70 percent efficient. (NebGuide G1859)

Roots make up about 70 percent of most prairie plants; some have roots 20' in length. Most prairie species replace a third of their roots annually, enriching the soil and improving water-retention. (Prairie Nursery)

In cities, about 50 percent of rain water goes into storm sewers. (www.gardengatemagazine.com)

Runoff from a 1" rain may exceed 5,000 gallons—even from a 1,500 square foot house on a small lot. (*Blue Thumb Guide to Rain Gardens*)

Rain gardens can trap and retain as much as 99 percent of common pollutants. (University of Connecticut)

"Everyone can do something"

Besides using rain gardens, bioretention cells, swales, vegetated filter strips, permeable surfaces, green roofs, underground tanks or rain barrels, you can:

Plant native or adapted plants resistant to drought, disease and pest damage.

Avoid using turfgrass on slopes, in deep shade or in other difficult areas.

Protect slopes with groundcover plants and aerate to improve water infiltration.

Minimize the use of fertilizers and pesticides and clean well after usage.

Mow turf at proper heights (shorter in summer months).

Keep in mind that frequent, shallow watering makes plants susceptible to wind, drought and temperature extremes.

Mulch rain gardens with shredded hardwood or shredded bark mulch (they are less likely to wash away than lighter weight mulches).



Rain barrels at Zuhrmuhlen residence in Bellevue. (Photo courtesy Justin Evertson)

There's More to Stormwater Management than Rain Gardens

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Rain gardens are currently the best-known stormwater management landscape feature, but there are a wide variety of additional green design elements that are becoming better understood and successfully implemented. Many of these

features can be implemented on residential properties. These specific features address on-lot treatment for stormwater in one of three categories: practices that infiltrate rooftop runoff, such as a rain garden; practices that divert runoff to a pervious area; and practices that store runoff for later use, such as rain barrels and cisterns. They include:

Rain gardens and bioretention cells. Surface or roof runoff is directed into shallow (4-8"), landscaped depressions planted with deep-rooted, native/well-adapted plant species where water infiltrates within 12-48 hours. Rain gardens designed with an underdrain system to enhance infiltration are classified as bioretention cells.

Grassed swales, bioswales. A swale is a vegetated, open-channel management practice designed specifically to filter, infiltrate and accommodate stormwater runoff for a specified water quality volume.

Vegetated filter strips treat sheet flow from adjacent non-porous surfaces. Filter strips function by slowing runoff velocities and filtering out sediment and other pollutants, and by providing some infiltration into underlying soils.

Porous pavement is a permeable pavement surface, often built with an underlying stone reservoir that temporarily stores surface runoff before it infiltrates into the subsoil. Types include porous asphalt, pervious concrete, permeable pavers and structurally-enhanced turf (grass pavers).

Green roofs absorb, store, and later evapotranspire initial precipitation, thereby acting as a stormwater management system and reducing overall peak flow discharge to a storm sewer system. Additional benefits include reduction of urban heat island effects, increased thermal insulation and energy efficiency, increased acoustic insulation and increased durability and lifespan compared to conventional roofs.

The overarching umbrella for the technologies and practices noted above is referred to as Low Impact Development (LID). The goal of LID is to restore the natural, pre-developed ability of an urban site to absorb stormwater. LID integrates small-scale measures scattered throughout the development site. Constructed green spaces, native landscaping and a variety of innovative bioretention and infiltration techniques capture and manage stormwater on-site.

LID reduces peak runoff by allowing rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation and other beneficial uses. In areas with slow drainage or infiltration, LID captures the first flush before excess stormwater is diverted into traditional storm conveyance systems. The result is development that more closely maintains pre-development hydrology. Furthermore, LID has been shown to be cost effective or, in some cases, cheaper than using traditional stormwater management techniques.



Rain garden at Iowa School for the Deaf in Council Bluffs, Iowa.

Sustainable landscape at Omaha's National Park Service headquarters.

Drainage swale in a residential area. (Photos courtesy Steve Rodie)

Everything is Connected

Jim Goeke

Research
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Water is the great equalizer. We're all connected by our need for it; we can't survive more than a few days without it.

One of my favorite

quotes, and especially in the context of water conservation, is John Muir's "When one tugs at a single thing in nature, he finds it attached to the rest of the world."

The most obvious waters are surface waters—rivers, lakes and streams—but most of us in Nebraska depend on groundwater. That's the water we can't see so it's really an act of faith to depend on it. Groundwater and surface water are connected. Lots of people want to believe that they're not, but they are. Our surface water streams flow at the rate of miles per hour but groundwater travels at the rate of only 100-300 feet per year. When we irrigate and consumptively use water from this barely-moving resource, the impact of what we do today may not be recognized for years to come. But once it does occur, there's no way to restore what has been lost.

Up until the last few years, we have had almost unlimited access to water. But now we're at a point very similar to the 1880s when windmills and barbed wire closed the open range. We have had free access to water to this point. Now that we are aware of the connection between surface water and groundwater and we realize how vulnerable our water resources are, we can never again take water for granted as we have in the past. That knowledge makes us responsible to use water as responsibly and effectively as possible.

so fierce that all the grasses and forbs are shortened and nothing is allowed to be aggressive. Grasses will keep aggressive wildflowers in check through competition and prevent annual weed seeds from taking over any open areas. The leaves and flowering stems of grasses will also help slow down fast-flowing stormwater as it enters a swale or rain garden. Moreover, many spring and early summer wildflowers look great early in the season but can look tired and unattractive by mid-summer. Grasses hide the dormant stems of these spring-bloomers through summer and into fall, while offering their own colorful, showy seedheads.

Prairie grasses, sedges, spike-rushes and bulrushes are a must for creating a wet prairie meadow, offering a more natural look. These plants grow well in low-lying areas that can experience flooding during heavy spring rains. The surface of the soil might dry out in the heat of summer, but the subsoil usually remains moist. They may need supplemental irrigation during severe drought conditions to stay lush and attractive. Sedges tolerate periodic mowing to maintain a tidy appearance. They will survive dry periods well and are an excellent natural water filter.

Don't confuse the many garden-worthy types of sedge with the weedy thug, yellow nutsedge. Yellow nutsedge is in the sedge family of plants but is not a true *Carex*; it was an introduced weed from Europe. Most of the *Carex* plants for the garden are native and form clumps, while others spread slowly as part of a managed turfgrass alternative. The following list of plants includes sedges, rushes and native prairie grasses that are very adaptable and suitable for most rain garden plantings.

Regional Native Grasses, Sedges & Rushes for Wet Soil

Andropogon gerardii, big bluestem

5-6' h, 2' w. Impressive native of the tall grass prairie. Rich, green leaves to 2' by late June. Seedheads resemble turkey's foot. Reliable copper, burnt orange and maroon fall color. Full sun, wide condition range, drought-tolerant; rain garden, swales, wet meadows.

Carex bebbii, Bebb's sedge 1-3' h, 18" w

A tufted plant with a dense mass of bright green grass-like leaves emerging early in the spring; the spike-like seedheads are not showy but will add variety to any planting; rain garden, swales, wet meadows.

Carex comosa, bristly sedge 1-2' h, 18" w

This wet-loving plant is noted for its arching habit and drooping bottle brush seedheads in late spring; easy-to-grow bunch-type plant; rain garden, swales, wet meadows, wetland.

Carex grayi, gray's sedge 2-3' h, 2' w

A favorite sedge with arching, fountain-like habit; the unusual seedheads resemble spiked clubs; leaves remain dark green late into fall and emerge in very early spring; rain garden, swales, wet meadows, wetland.

Carex hystericina, bottle brush sedge

1-2' h, 2' w. The spikelets of this sedge look like "spiny cocktail weiners" and will do a great job of adding interest to any rain garden planting; rain garden, swales, wet meadows, wetland.



(Plant photos courtesy Kristina Jensen, Nebraska Statewide Arboretum)

Carex muskingumensis, palm sedge (above)

2-3' h, 2' w. Grass-like leaves radiate out from the stem. Light green foliage turns yellow with frost. Full to part sun, very adaptable; tolerates dry conditions; a must for rain garden, swales, wet meadows, wetland.

Carex plantaginea, plantain-leaved sedge

1' h, 1' w. Attractive clump-forming sedge with broad, 1" shiny evergreen leaves that are crinkled like seersucker ribbon. Best in moist soils and part shade, but tolerates dry soils in shade; rain garden, swales, wet meadows, wetland.

Carex scoparia, pointed broom sedge

1-2' h, 18" w. Attractive bunch-type species for wet soils; spikelets are pointed and mature to a nice brown color in early fall; rain garden, swales, wet meadows, wetland.

Carex stricta, tussock sedge 1-3' h, 2' w

Noted for its fine texture and rich green color; very adaptable; it works well in swales, ponds or streams or in moist soil massed as a groundcover.

Carex vulpinoidea, foxtail sedge 2' h, 2' w

This graceful sedge forms a fountain-like clump of bright green foliage early in the season; yellow-brown seedheads reminiscent of a foxtail add to fountain effect; easy-to-grow, not aggressive and very adaptable; rain garden, swales, wet meadows, wetland.

Chasmanthium latifolium, northern sea oats

3-4' h, 2' w. Noted for its flat, oat-like seedheads that turn from a translucent green to rich brown in fall. Aggressive reseeding plant is more manageable in shady situations and woodland edges.

Eleocharis acicularis, needle spike rush

6-12" h. Very dark green, needle-like foliage; fine stems are topped with narrow spikelet; forms dense mats and is a great addition for the edges of wet meadow gardens, moist soils and shallow water; very attractive allowed to spread between landscape boulders in soggy soil.

Elymus canadensis, Canada wildrye

4-5' h, 2' w. Attractive nodding seedheads remain attractive well into winter, but often flops; with its coarse habit it's best used only in large, naturalized areas; blue-green foliage emerges early in spring and turns tan in fall.

Equisetum hymale, scouring rush

Classic wetland plant noted for hollow segmented stems, each marked with a gray band; bamboo-like plant remains evergreen in the winter; very aggressive spreader and will need containment.

Juncus effusus 'Spiralis', corkscrew rush

1' h, 1' w. A common rush with needle-like dark green foliage. Distinctly strong spirals form a corkscrew effect; easy and effective; wet meadows, wetland.

Juncus interior, inland rush 2-3' h, 2' w

The rushes are important components to the ecology of wet prairie meadows, but they also offer stiff, forest green stems that create strong vertical lines in the garden; rich brown flower clusters top each stem.

Juncus torreyi, Torrey's rush 1-2' h, 1' w

Distinctive clump-forming rush with dark green, stiff leaves and dense, rounded seedheads that turn reddish-brown in fall; wet meadows, wetland.

Panicum virgatum, switchgrass 5-7' h, 2' w

This versatile grass will grow in about any soil and should be in every rain garden planting; lush foliage, stiff stems and fine, airy seedheads all turn an attractive golden brown in fall; rain garden, swales, wet meadows.

Scirpus atrovirens, dark green bulrush

3-5' h, 2' w. Refined clump-forming species with dark blue-green basal foliage and slender flower stems topped with dark brown flower clusters; wet meadows, wetland.

Spartina pectinata, prairie cordgrass 5-6' h

King of wet prairies with graceful arching foliage that turns a bright yellow in fall; very aggressive and best planted in confined areas or surrounded by a mowed turfgrass; for bank stabilization, swale plantings or wet prairie meadows.

Sorghastrum nutans, Indiangrass 4-6' h, 2' w

Wider light green leaf turns reddish-yellow in fall and persists through winter. Golden seedheads are another attractive characteristic of this warm-season grass. Full sun, moist to dry soils.

Introduced Grasses & Sedges

Calamagrostis x acutiflora, feather reed grass

Deep green, lustrous foliage with loosely feathered flowering stalks in early summer; they constrict to narrow buff-colored plumes by fall and remain attractive all winter; easy-to-grow in most soils, but best in well-drained fertile soils; native to Europe; very well-behaved grass. Moderately drought tolerant; rain garden, swales.

'Karl Foerster' is deservedly popular 'Overdam' has white-edged leaves 'Avalanche' has a white center stripe 'Stricta' is earliest to bloom, very upright

Calamagrostis brachytricha, Korean

feather reedgrass 3.5' 2.5'. Native; glossy foliage with feathery pink flowerheads in September. Prefers consistent moisture; easy-to-grow in most soils and tolerates some shade.

Miscanthus, maidengrass

Showy grasses of many shapes and sizes, ranging from 3-12' tall; feathery plumes top plants in fall with new cultivars providing colorful foliage and better flowers; cut back to ground in spring; prefers full sun and will topple in shady conditions; rain garden, swales.

'Autumn Red'—3-4' early bloomer with reddish-purple fall color

'Gold Bar'—heavy gold striping; compact, upright habit 3-5' high

'Morning Light'—white and green variegation; fine, narrow leaves; upright arching habit to 5' high

'Strictus'—yellow bands on foliage 'Gracillimus'—reddish-pink seedheads; graceful arching habit

'Giganteus'—grows to 12' high

'Variegata'—white and green variegation; strong arching habit; tolerates part-shade; grows to 6'

'Zebrinus'—bright yellow bands on foliage



Calamagrostis brachytricha, Korean feather reedgrass

Plants for Wet or Dry Areas

Mesic plants are plants for moderately moist habitats. They tend to grow well in areas that are excessively wet in winter, spring and after heavy rains, but often dry out in summer. They do best around natural springs and in low areas that may have standing water for a few days after a hard rain. Most of these plants do very well in damp soils, but can tolerate dry periods. The following wet mesic plants are perfectly suited for rain gardens, wet prairie meadows, detention basins and most swales.

Regional Native Wildflowers for Wet Soils

Acorus calamus, sweetflag 2-4' h

Classic wetland species with bright green leaves reminiscent of flag iris; bruised foliage releases a pleasant scent; spreads by rhizomes to form colonies; very adaptable in wet or dry conditions.

Allium cernuum, nodding pink onion

18" h, 18" w. Clumps of grasslike leaves; blooms late summer; nodding flowers atop naked stalks in shades of pink to white; rain garden, swales.

Asclepias incarnata, swamp milkweed

3-5' h, 2' w. Clusters of pretty magenta flowers in early summer; one of the best butterfly plants and should be included in every rain garden planting; easy-to-grow and can tolerate wetland conditions to dry soils; 'Ice Ballet' has classy white flowers; rain garden, swales, wet meadows, wetland.

Aster novae-angliae, New England aster

2-6' h, 2' w. Popular wildflower has a showy display of violet to pink daisy-like flowers in fall; many outstanding rain garden worthy selections available; reseeding can become a problem if not given competition.

Aster umbellatus, flat-topped aster

4-6' h, 2' w. Strongly upright aster with stiff stems and dark green foliage that remains clean all season; in fall a cloud of small creamy-white flowers top plants; a bee and butterfly magnet.

Baptisia lactea, white wild indigo

5-6' h, 2-3' w. Mature plants emerge like asparagus in spring; grows to an impressive 5-6' high by summer; milky white flower spikes in late spring are followed by black seedpods; blue-green foliage forms an umbrella-like canopy; slow to reach maturity but well worth the wait; looks great with grasses.

Cacalia suaveolens, sweet Indian

plantain 4-5' h, 2' w. Robust plant with large, triangular leaves; spreading plant best planted among grasses to contain; it prefers moist soils and can tolerate standing water; small white flowers are not impressive, top plants in July.

Cassia hebecarpa, wild senna 4-6' h, 2' w

Robust grower with attractive foliage reminiscent of honeylocust trees; topped with bunches of yellow pea-like flowers in July and August, followed by brown seedpods; very adaptable to wetland or mesic sites.

Chelone glabra, turtlehead 3-4' h, 2' w

A must for any rain garden planting with shiny, dark green foliage topped with clusters of creamy white flowers that resemble a turtle's head; best in moist soils if planted in full sun; will tolerate some shade or wetland soil conditions.

Echinacea purpurea, eastern purple coneflower 3' h, 18" w. Showy, pink/purple cone-shaped flowers in July-August; numerous cultivars developed for flower quality and plant form. Can take over a garden; needs competition.

Eupatorium coelestinum, mistflower 1-3' h, 2' w. Spreads by rhizomes to form nice groundcover; slow to emerge in the spring, plants are topped with dense clusters of blue/purple *Ageratum*-like flowers in late summer; wet or dry.

Eupatorium maculatum, Joe-Pye plant 5-7' h, 2-3' w. Impressive plant with flat-topped clusters of mauve pink flowers up to 1' across in late summer; a butterfly favorite; handsome toothed foliage with red-purple stems.

Filipendula rubra, Queen of the Prairie 4-5' h, 2' w. One of the best wet soil plants with large pink plumes atop upright stems and a basal clump of handsome dark green, serrated leaves; sweet cotton candy scent; very easy-to-grow.



Filipendula ulmaria, Queen of the Meadow 3-5' h, 2' w. Elegant plant with creamy white, astilbe-like flowers blooming in early summer atop a clump of dark green serrated leaves; ideal companion with bee balm; full to part sun.

Gentiana andrewsii, bottle gentian 18" h, 18" w. Beautiful plant with attractive glossy foliage; clusters of bright blue, bottle-like flowers in fall never fully open; easy-to-grow and long-lived in rich soils; sun to part shade.

Helenium autumnale, Helen's flower 4-5' h, 2' w. Robust grower has blemish-free foliage and masses of daisy-like, bright yellow flowers in late summer; best planted among prairie grasses to keep from flopping; easy-to-grow and dependable.

Iris virginica shrevei, blue flag iris 2-3' h, 2' w. Native iris forms attractive clumps of sword-like leaves; elegant blue-purple flowers are fleeting but develop into attractive seedheads by fall; wetland conditions or dry mesic soils.

Liatis pycnostachya, thickspike gayfeather 5-6' h, 2' w. Lance-shaped lower leaves form a grass-like clump; in summer thick violet-purple flower spikes rise above the foliage; the heavy spikes can fall over so best combined with grasses.

Liatis spicata, marsh gayfeather 3-4' h, 2' w

Showy plant with clumps of grass-like leaves and bold purple/pink flowers in summer; adaptable and easy-to-grow.

Lobelia siphilitica, great blue lobelia 3' h, 2' w. Dark blue tubular flowers top plants in late summer; light green, lance-shaped foliage; will grow in rich, moist woodlands, but best in part shade and very wet soils; short-lived but reseeds.

Monarda fistulosa, wild bergamot.

Fragrant lavender flowers bloom atop upright stems in mid to late summer; often loses its lower leaves mid-summer so best planted among tall grasses to hide bare legs.

Physostegia virginiana, obedient plant 3-4' h. Lovely wildflower with stiff, upright stems and very showy bright pink flower spikes in late summer; provide intense competition by surrounding with grasses to prevent flopping and keep from spreading aggressively.

Pycnanthemum virginianum, mountain mint 3' h, 2' w. Bushy plant with mint-scented dark green foliage and clusters of pale white flowers July-September; very adaptable; not a true mint and not aggressive like the common *Mentha*.

Ratibida pinnata, greyheaded coneflower 4-5' h, 2' w. Blooms are gray cones surrounded by bright yellow drooping petals up to 3" long. This native prefers full sun and tolerates wet to dry soils; can be an aggressive seeder so grass competition is a must.

Rudbeckia laciniata, sweet black-eyed susan 4-6' h, 2' w. Big robust plant with attractive deep green foliage that remains blemish-free all season; deep yellow flowers have red-brown centers; best planted among tall prairie grasses to keep in check.

Solidago riddellii, Riddell's goldenrod 3-4' h, 2' w. Interesting, attractive lowland species of goldenrod with long, narrow leaves and stiff stems topped with flat-topped clusters of yellow flowers in fall. This clump-forming goldenrod is ideal for wet areas of prairies, meadows and native or naturalized areas.

Spiranthes cernua var. *odorata*, nodding ladies tresses 12-15" h, 12" w. Basal rosette of shiny, dark green leaves up to 8" long with white flowers arranged on a wand in a twisting spiral; fragrance similar to vanilla or jasmine. Easy-to-grow in damp to moderately dry soils.

Teucrium canadensis, wild germander 1-3' h, 2' w. Member of the mint family with pale lavender flower spikes in summer reminiscent of *Veronica*; spreads by rhizomes to form attractive colonies, but can be aggressive.

Thalictrum dasycarpum, purple meadow rue 4-6' h, 2' w. Attractive columbine-like foliage in spring; purple stems are topped by a cloud of snowy white flowers in early summer. Can be cut back after flowering. Best in rich, moist soils.

Vernonia fasciculata, ironweed 4-6' h, 2' w. Showy late season bloomer topped with bright purple-red flower clusters; robust, upright stems and blemish-free foliage; this big thug will reseed if not kept in check among tall grasses.

Veronicastrum virginicum, culver's root 4-5' h, 2' w. Large, erect perennial with elegant white flower spikes in July; handsome deep green foliage in whorls along very stiff stems; native to open woods, thickets and moist meadows; easy-to-grow and long-lived.

Zizia aurea, golden alexander 2-3' h, 18" w. Brilliant yellow umbrella-like flower clusters in April-May are reminiscent of dill or parsley flowers; dark green foliage remains blemish-free all season; sun to part shade; food and nectar source for butterflies.



Zizia aurea, golden alexander

Introduced Perennials for Wet Soils

Actaea ramosa 'Brunette', brunette baneberry 5' h, 2' w. Beautiful bronze, deeply cut leaves and rosy-white flower spikes in mid-summer; best in part shade or full sun in rich, moist soils; slow to mature so be patient!

Hibiscus species 3'-8' h, 3-4' w. Many choice selections that are winter hardy and easy-to-grow; vigorous and robust, they are slow to emerge in spring, then grow quickly in the summer heat; plate-sized flowers by mid-summer.



Houttuynia cordata 'Chameleon' or 'Plena' 15" h. Bright pink, white and green leaves often revert to plain green in the heat of summer. Aggressive habit in wet soils and best used in confined areas or bordering mowed areas; I like 'Plena' for its dark green, heart-shaped leaves and complementary small white flowers.

Iris pseudoacorus, yellow flag iris 5' h, 3-4' w. Big, robust iris with long, sword-like leaves; bright yellow flowers in summer; use with caution because it often outgrows its space and wears out any welcome.

Iris ensata, Japanese iris 2-3' h, 18" w. Unique, flattened flowers and attractive, bright green foliage; adaptable and easy-to-grow in rich, moist soils; some cultivars have bright variegated foliage.

Ligularia dentata 'Othello', leopard plant 3-4' h, 2-3' w. Impressive plant with large, red/purple leaves and orange flowers in summer; plants often wilt in the heat of summer; best in part shade for relief from afternoon sun; can reseed aggressively so deadhead spent flowers.

Ligularia stenocephala 'The Rocket', leopard plant 3-5' h, 3' w. Large, jagged foliage and impressive bright yellow flower spikes in early summer. Will wilt in heat of summer unless given moist soils and afternoon shade.

Lysimachia punctata 'Alexander', garden loosestrife 3-4' h, 2-3' w. Bushy, upright plant with variegated foliage and bright yellow, star-shaped flowers set in leaf axils; adaptable but best in consistent moisture; confine with grasses.

Solidago rugosa 'Fireworks', fireworks goldenrod 3-4' h, 3-4' w. Lacy, radiating bloom spikes are reminiscent of a golden shower of fireworks, only this firecracker blooms in September. Fantastic selection for wet areas.

Shade-loving Plants for Wet Soils

Anemone canadensis, meadow anemone 12-18" h. Great groundcover with handsome, deep green foliage; delicate white flowers in mid-spring; very aggressive runner so best planted in wet ditches, swales or prairie meadow gardens among grasses and sedges.

Carex species, sedge. Many exciting yellow and white variegated forms and a wide variety in color, shape and size in these plants native to Japan and China. Best in wet or moderately dry soils and dappled shade. Combines nicely with hosta; great in containers too.

'Ice Dance'—cream leaf margins, to 12" h
'The Beatles'—deep green groundcover 6" h
'Evergold'—bright yellow variegation, 12" h

Elymus villosus, silky wildrye 2-3' h, 2' w. Graceful, shiny green foliage and refined rye-like seedheads early summer; very adaptable and will reseed readily; best in dappled shade and meadows.

Geranium maculatum, wild geranium 18" h, 18" w. Pink to lilac flowers in spring and early summer. Dark green foliage forms nice clumps and remains attractive all season; best in part sun and consistently moist soils but tolerates dry.

Hystrix patula, bottle brush grass 3-4' h, 1-2' w. Bristly flowerheads above loose tufts of foliage in summer that last until winter. Full to part sun, but prefers dappled shade and moist soils.



Polemonium reptans, creeping Jacob's ladder 1' h, 1' w. Light blue, bell-shaped flowers in loose clusters mid to late spring. Weak-stemmed. Prefers moist, rich, well-drained soil, part shade.

Solidago flexicaulis, zigzag goldenrod 2-3' h, 2' w. Attractive, serrated leaves that remain blemish-free all season; in fall, flower spikes top the stems zig-zag their way up to the top.

Plants for Rain Gardens continued on page 6

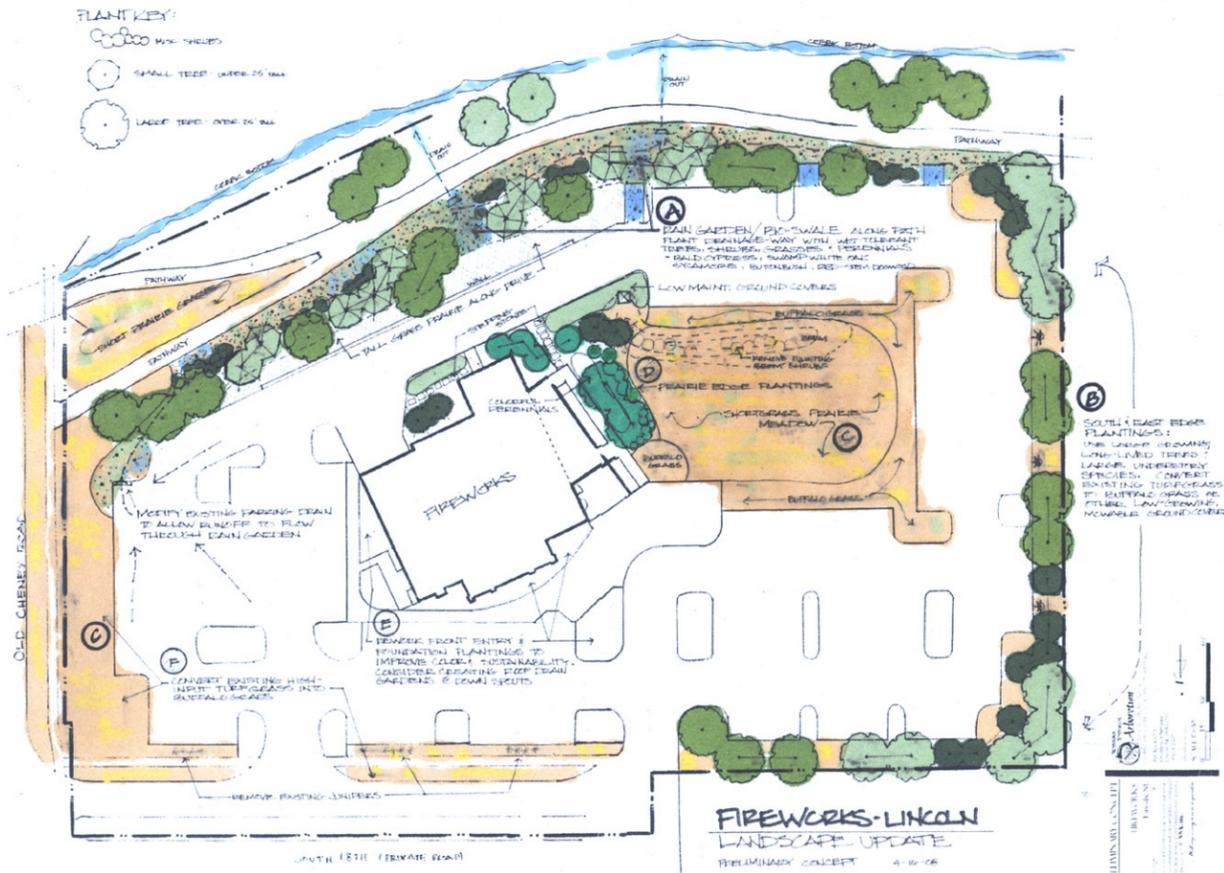
Fireworks Continues Green Efforts

Winner of 2008 Environmental Leadership Award

The founders of Telesis, Inc. of Lincoln, which owns Lazlo's Brewery, Fireworks Restaurant and Empyrean Brewing Co., have always been conservation-minded. They have been leaders in restaurant recycling and have worked hard to conserve energy in their operations. At Lincoln's new

The landscape concept that was created is shown below. It has three main components:

- Establishment of a rain/drain garden along the east edge of the site where much of the property drains. The site is currently drained directly to an adjacent stream so a rain garden will have a sig-



Top: Landscape design for Fireworks.

Middle: This parking drain will be plugged to divert storm water to the rain garden.

Bottom: A rain garden is proposed for the drainage-way on the east side of the property, adjacent to a public bike path. (Plan and photos courtesy Justin Everton)

Fireworks restaurant, they have installed an in-ground heat pump system that greatly reduces energy consumption. In 2008, the company won a prestigious Environmental Leadership Award from Lincoln and Lancaster county for their many environmental efforts.

Led by Reba Schafer, the company recently decided to convert the landscape around their Fireworks restaurant in southeast Lincoln into a model of sustainability. Presently, the landscape is typical for such a commercial site in Lincoln. It is dominated by high-input cool-season turfgrass over much of the site. A few trees and some flower and shrub plantings have been scattered here and there, especially in parking islands and near the buildings. The landscape is not ugly, but it is not special. Schafer says "the landscape and the plantings look like just about any other new commercial site around."

Not only is the landscape non-descript, it is wasteful. It is estimated that more than 100,000 gallons of water are pumped on the lawn each year, along with significant amounts of fertilizer and pesticides. The lawn is mowed and trimmed at least once a week, producing significant outputs of CO₂ emissions. So Schafer and company contacted the Nebraska Statewide Arboretum to help create a new landscape vision for the site. They had some broad goals in mind:

- Make the landscape as environmentally sustainable as possible.
- Significantly reduce the energy inputs and carbon emissions needed to maintain the site.
- Plant trees or other plants that would help sequester carbon.
- Reduce as much as possible the need for supplemental irrigation.
- Reduce the amounts of fertilizers and pesticides used on-site.
- Make the landscape more visually appealing and more fitting to Nebraska.

nificant impact on reducing stormwater flows and improving the quality of water flowing into the stream. As part of the plan, a storm sewer at the corner of the north parking lot will be plugged to divert even more of the stormwater away from the sewer and directly into the rain-garden. Because the rain garden sits directly adjacent to a public bike trail that runs along the east side of the property, it is anticipated that the garden will serve as a great educational resource for those utilizing the trail.

- Planting of as many trees as possible. Though the site is relatively small (about an acre), room has been found to plant more than 50 trees. The trees will significantly aid in reducing stormwater runoff and will be able to sequester up to 200,000 pounds of carbon per year as they mature. The trees will also add beauty to the site and help soften the parking and other hard surfaces.

- Conversion of turfgrass on the site to lower-input buffalograss. When the project is completed, more than 20,000 square feet of cool-season, high-input turfgrass will be converted to buffalograss. The conversion will help eliminate 90 percent of current irrigation needs, more than 200 pounds of fertilizer and greatly reduce pesticide usage. The conversion will also reduce mowing and trimming needs by up to 75 percent and thus reduce the amount of CO₂ output each year by up to 96,000 pounds.

Partners include Lincoln's Parks and Recreation Department and the Watershed Management Division of the Public Works & Utilities Department, Campbell's Nursery and the Nebraska Statewide Arboretum.

While they are still in the process of developing the full cost-benefit ratio, Schafer says being the first commercial property funded by Lincoln's rain garden project offers many possibilities for educating the public about what can be accomplished through careful planning.

Wetland Plants

Wetland species grow well in soggy soils and standing water. These wetland or emergent plants are best planted in soils that are continually wet most of the year.

Wetland Grasses, Sedges & Rushes (*plant description listed earlier)

- **Carex comosa*, bristly sedge
- **Carex grayi*, gray's sedge
- **Carex hystericina*, bottle brush sedge
- **Carex muskingumensis*, palm sedge
- **Carex plantaginea*, plantain-leaved sedge
- **Carex scoparia*, pointed broom sedge
- **Carex stricta*, tussock sedge
- **Carex vulpinoides*, foxtail sedge
- **Eleocharis acicularis*, needle spike rush
- **Equisetum hymale*, scouring rush
- **Juncus effusus* 'Spiralis', corkscrew rush
- **Juncus interior*, inland rush
- **Juncus torreyi*, Torrey's rush
- **Scirpus atrovirens*, dark green bulrush
- **Spartina pectinata*, prairie cordgrass

Wetland Wildflowers

- **Acorus calamus*, sweetflag
- **Asclepias incarnata*, swamp milkweed
- **Aster novae-angliae*, New England aster
- **Aster umbellatus*, flat-topped aster
- **Cacalia suaveolens*, sweet Indian plantain
- **Chelone glabra*, turtlehead
- **Eupatorium maculatum*, Joe-Pye plant
- **Filipendula ulmaria*, queen of the meadow



- **Gentiana andrewsii*, bottle gentian
- **Helenium autumnale*, Helen's flower
- **Iris virginica shrevei*, blue flag iris
- **Liatis pycnostachya*, thickspike gayfeather
- **Liatis spicata*, marsh gayfeather
- **Lobelia siphilitica*, great blue lobelia
- **Solidago riddellii*, Riddell's goldenrod

Lobelia cardinalis, cardinal flower
2-3' h, 18" w. Brilliant cardinal red flowers held on spikes in July and August; short-lived plant requires rich, organic soils, part-shade and consistent moisture to perpetuate in the garden.

Mimulus ringens, monkey flower 3' h, 18" w
Upright, bushy plant with shiny lance-shaped leaves; blue/violet snapdragon-like flowers in late summer; easy-to-grow; not aggressive but will reseed; one of the best wetland plants.

Pontederia cordata, pickerel rush 18" h, 18" w
One of my favorite wetland plants and one of the best for water filtration. Large, shiny leaves; blue flower spikes in summer are a favorite of bees and butterflies; grow in standing water or rich, wet soils.

Sagittaria latifolia, arrowhead 3-4' h
Shoreline perennial with distinctly arrowhead-shaped leaves. In summer small, three-petaled flowers bloom on long stalks; spreads by rhizomes to form colonies; best in wetlands and standing water; one of the best natural water filters.

Water and the Landscape continued from page 1 flood threat in heavier rains. In addition, shedding the stormwater rather than trying to absorb as much as possible pushes the flooding and erosion problems further downstream for others to deal with. How nice of us.

The amount of water is not our only concern. The quality of water available to us is also hugely important. In fact, it is no understatement to say that human survival depends on the availability of safe, clean drinking water. Unfortunately, the pollution of both surface and groundwater has become a serious problem throughout much of the country, including Nebraska where it impacts both rural and city folks alike. A significant cause of water pollution can be traced to what we collectively do in creating and managing our landscapes—the biggest problem being fertilizer and pesticide-laced stormwater runoff.

This issue of *The Seed* is devoted to water in the landscape. More specifically how the landscapes we create and manage impact one of our most precious resources. We focus on two relatively simple but effective solutions that nearly everyone can do to help conserve water and improve water quality. One is to rethink and relax about the lawn. The other is to establish rain gardens and other landscape enhancements that help slow and filter stormwater. The writing on the wall seems clear: clean water is a precious resource that will only become more limited and costly in the future. Thus it should be our obligation to better manage our landscapes to help insure affordable and clean water supplies for future generations.

The Turfgrass Dilemma

By now, most adults (and young people too) should know the importance of water conservation. The matter has been very prominent in the news (and our water bills) in recent years as much of the country has dealt with drought and a changing climate. Something has apparently been lost in translation, however, because many people continue to live their lives and manage their landscapes as though there is an endless supply of clean water. Nowhere is this more evident than on so many properties where the high-input lawn has come to dominate the landscape. For a real head scratcher, consider these amazing facts about the American lawn*:

☛ There are over 23 million acres of lawn (mostly turfgrass) in the US. That's an area larger than the state of Virginia!

☛ Estimates show that the average irrigated lawn receives over 40,000 gallons of water per year (more in our part of the world). On a dry summer day in Lincoln, more than 50 million gallons of water per day can be pumped from the Platte River to meet Lincoln's lawn thirst. That is more than four times the average amount used for all other purposes combined.

☛ The average lawn receives 80 to 100 pounds of fertilizer per year. Stormwater and irrigation runoff carry excess fertilizer which can seriously harm local wetlands, lakes and streams.

☛ Most lawns are regularly sprayed with pesticides to fight weeds and unwanted insects. These pesticides often directly injure important non-target plants and animals and each year we learn more about the negative health effects to people of long-term exposure to many of these chemicals.

☛ Lawn care is a significant contributor to increased greenhouse gases. Gas-powered lawn mowing equipment produces anywhere from 3 to 20 times more CO₂ and chemical air pollutants than most automobiles operated at highway speed for the same amount of time.

☛ Noise and air pollution from lawn mowers, trimmers and blowers is almost non-stop during the growing season and is a significant annoyance to many people.

☛ The health and life span of trees (perhaps the most important part of a community's green infrastructure), shrubs and other plants can be greatly reduced from lawn care activities.

☛ Over \$30 billion a year is spent on lawn care in the United States. The average cost of maintaining a typical lawn can be well over \$1,000/year.

*From *American Green: The Obsessive Quest for the Perfect Lawn* by Ted Steinberg, WW Norton, 2007; and *Turf War* by Elizabeth Kolbert, *The New Yorker*, July 21, 2008.

For purposes of this discussion, high-input lawns are considered to be those expanses of lush, cool-season turfgrass that are watered abundantly, regularly pumped with fertilizer, kept green all summer, often coated with pesticides and constantly being mowed and trimmed. This discussion is not about the many people who have already relaxed about their lawns or have converted to lower-input alternatives. Thankfully, more sustainable lawn development and care is a positive and growing trend across the country.

This article is not actually meant to be an attack on the lawn, but rather the wasteful way we often maintain it. I will be the first to admit that the lawn does serve an important purpose and in no way am I advocating that we do away with it completely. In fact the lawn (by lawn I mean the mowed landscape), is by necessity an important part of the landscape. There's just no way around it—much of the greenspace of any city or town has to be regularly shorn to aid in visibility, cleanliness and attractiveness, to help prevent wildfires and to create open space for activity and commerce (living). Could a city effectively function if all its open ground was tall grasses and weeds? Obviously not.

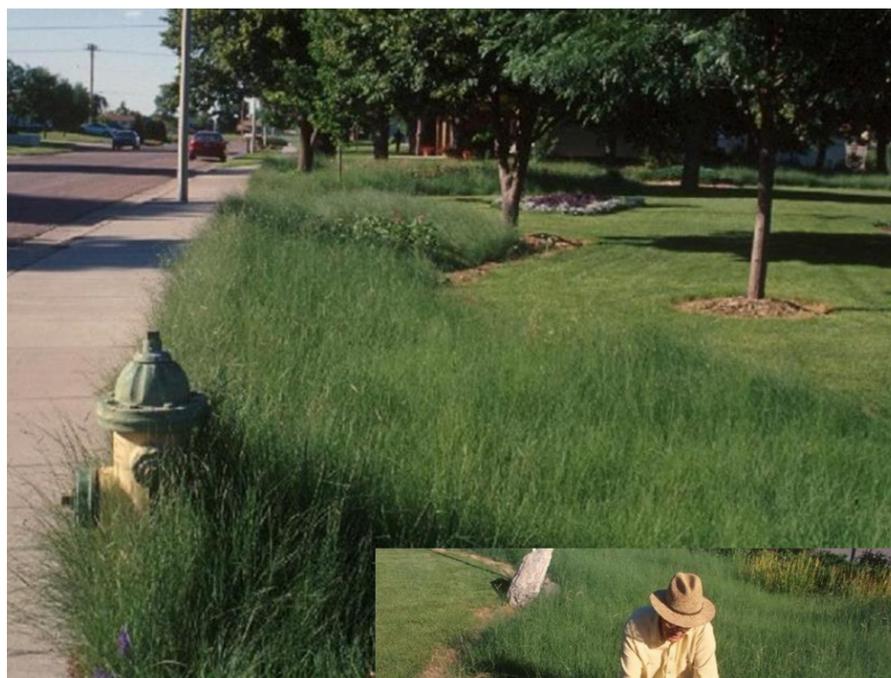
The lawn also has several utilitarian benefits. We very much enjoy its soothing greenness during the warmer months (anyone would have to admit that a lawn is much more comfortable on a hot day than the paved areas of the city). Also, there is no better place for outdoor activity—wrestling with the kids, chasing the dog, pitching a tent, having a picnic, tossing the football or whacking a golf ball. Without turf, would we have Tiger Woods or the grand game of baseball or the even better game of football? In addition, plants in the lawn provide oxygen, turf helps prevent erosion and a nice lawn can have a positive impact on property values. Above all, perhaps the biggest reason I maintain at least some turf is that my wife favors it, and since I favor my wife...

Relaxing the Lawn

So if the lawn is both important and necessary, can we have both attractive, functional lawns and more sustainable landscapes? The answer is an emphatic yes! By modifying our perspectives a bit and by changing a few of our management practices, we can have lawns and landscapes that not only help conserve water but which also help keep water cleaner, improve our property values, make our landscapes more beautiful and give us all something to cheer about. Here are a few suggestions:

☛ Limit turfgrass lawn (especially the high-input variety) to where it is truly needed for play and activity.

☛ Convert the lawn to more drought-tolerant species. In Waverly, I have a fescue lawn that I rarely water and which has served me well for over 15 years. In addition, some warm season



grass species such as buffalograss or blue grama (two native warm season varieties) are amazingly drought-tolerant and rarely need watering after establishment.

☛ Accepting some mid-summer dormancy or drabness would go a long way to helping curb our water lust. Just as the lawn goes dormant in the winter, we should also allow it to rest in the hottest and driest parts of the year—as it naturally wants to do. During the summer we should apply

only enough water to keep the lawn alive (not lush), realizing it will green up again in the fall.

☛ Reduce the use of fertilizers and consider using natural alternatives. Many turf professionals now recommend fertilizing only once a year—in the fall.

☛ Mow high. Mowing high helps limit weed competition and increases drought-tolerance during the summer.

☛ Consider using non-grass plants as turf where foot traffic is not anticipated. Yarrow, sedum, clover, sedges and many other plants have shown great potential.

☛ Use some of the lawn to plant trees, shrubs, flower beds, vegetable gardens, short-prairie meadows, rain gardens, etc.

☛ Put away the gas-powered leaf blowers and weed trimmers and consider using electric-powered alternatives. Our ears and lungs will greatly appreciate it.

☛ Modify weed management strategies. Try to spot spray or hand-pull as many weeds as possible. Broadcast spray for perennial weeds only in the fall when the kill rate is better and there is significantly less harm to the surrounding landscape. Never use ground sterilants or products containing dicamba that can move through the soil and harm non-target plants.

☛ Leave grass clippings on the lawn.

Perhaps the easiest thing to do is just relax and be happy with a less-than-perfect lawn. How liberating it can be! Sure, the lawn might have a bit of clover, a few dandelions, a rough spot or two. Who cares? In the grand scheme of things, does it really matter that a lawn doesn't look like the 18th fairway at Augusta? A diverse landscape with a "relaxed" lawn is alive and healthy. It is full of fascinating and beneficial creatures including birds, butterflies, lady beetles, mantids, garden spiders and earthworms, among many others. Such a landscape can be more inviting, more beautiful, more sustainable, water conserving, safer to play on and, when done right, can greatly increase property values and neighborhood viability.

Thankfully, many people are now seeking ways to live "greener" lives and to help better the natural environment.



Poor irrigation practices can waste significant amounts of water, especially in areas adjacent to streets and sidewalks.

Such efforts don't need to be reserved to parks and wildlands, but can take place right in our own back yards (and front yards). Relaxing with lawn care is one of the best ways to do just that! Just think about it: what other activity can help save millions of gallons of water, reduce our thirst for oil, eliminate significant amounts of pollution, greatly enhance the natural diversity in our communities, improve the health of our trees and help save significant amounts of time and money that could be spent on more rewarding pursuits? Sounds like a no-brainer to me.

Rain Garden Do's and Don'ts

Steven N. Rodie, ASLA, Associate Professor/
Landscape Horticulture Specialist, UNL
Department of Agronomy and Horticulture

Rain gardens are currently receiving a lot of attention from landscape lovers, green stormwater management advocates and native plant enthusiasts. They can effectively provide aesthetic benefits as well as fill an important small-scale role in run-off management *if they are designed, constructed and maintained properly.*

Rain gardens have a proven track record in many other areas of the country (from the east and west coast to Minnesota and Iowa), but they are just beginning their implementation curve in Nebraska.

Because of the newness factor, it is even more critical that we collectively get rain gardens "right" so that there are plenty of good examples to draw from for aesthetic inspiration and functional success.

So... what constitutes a properly designed, constructed and managed rain garden? In attending a variety of rain garden workshops, reviewing numerous "how-to" rain garden manuals, visiting many rain garden installations and keeping in mind some basic design and people perception factors, here are some key factors for successful rain gardens:

☛ **Neat and tidy versus fuzzy.** The character of a rain garden can vary from loose and natural to more formal and refined. Gardens typically convey a naturalistic feel due to the use of recommended native and adapted plants. This aesthetic can create a strong visual contrast with what might be an otherwise highly manicured, trimmed and edged landscape. In a worst-case scenario, the garden is perceived as a weed patch, and is soon removed. If possible, rain garden design should take into account the aesthetics of the existing landscape as well as the owner's level of comfort with a naturalized landscape to help ensure long-term garden success and acceptance.

☛ **Rain gardens do require maintenance.** The use of native plants in rain gardens has prompted some people to assume that they will take care of themselves. Rain gardens, just as other landscaped areas, require weeding, remulching and supplemental watering during plant establishment and extended drought periods.

☛ **Rain gardens are best considered a work in progress.** Every garden is unique in its location and conditions. A design and maintenance attitude that allows for changes in plant selection,

arrangement and water level as the garden matures will ultimately lead to a more successful garden.

☛ **Most rain gardens should average about 4-8" deep.** I've seen many gardens designed with steep sides to an ultimate depth of 12-24". Gardens this deep collect more runoff than will effectively drain in less than the recommended 48 hours (especially in clay or compacted soils), and they create difficult areas in the garden to effectively plant and mulch.

☛ **Precise slopes and level areas can be a challenge.** Establishing the gentle landscape slopes that direct water to the garden and the level bottom of the garden are tasks that are often "eye-balled" rather than measured with a string level or other leveling instrument. The common inaccuracies that easily occur without equipment can lead to a garden that doesn't function... or worse yet, one that sends water where it isn't supposed to go (such as a basement).

☛ **Constructed berms should not be too high or steep.** The berm or mound of soil constructed on the downhill side of a rain garden is often narrow in width and steeply-sided, which makes it difficult for effective planting and mulching. The berm is an important aesthetic and functional component of a rain garden, and should be built with gradual slopes to blend better with the surrounding landform. A wider berm takes up more space in the landscape, but the ultimate garden size should account for this width, and the aesthetic gain is worth the trade-off in garden size.

☛ **Protect locations that concentrate water flow.** Wherever water flows into a rain garden (from downspout or surface flow) or out of a rain garden (the specified overflow point), the focused water flow has a greater potential to erode soil or mulch. Gravel, cobbles, erosion matting, etc. can be installed at these locations to slow the water down, dissipate the energy of the concentrated water flow and protect the surrounding ground surface from erosion.

☛ **An island versus an integrated landscape feature.** Often, a rain garden is designed as a separate landscape feature completely surrounded by turfgrass. In contrast, if the garden can be integrated into an existing landscape bed or edge, it will visually tie into the landscape more effectively. Rather than filling up landscape space, it will help define landscape space.

☛ **Not if it overflows but when.** I have seen several rain gardens designed without a specified overflow location. Every garden is likely to overflow during an unusually heavy rainfall event, so knowing where the excess water will go (straight to the street, for example, as opposed to into a neighbor's garage or basement) is extremely important.

☛ **Know the soil.** Every rain garden construction manual recommends that tests be completed to assess the soil structure and/or infiltration

potential for the rain garden location. The soil type dictates potential garden size, garden depth and the relative success potential of the garden. Inevitably, I have spoken to rain garden designers who have not undertaken a test because "they were in a hurry, and besides, the soil looked like it should drain okay." There is nothing more critical to rain garden success than accurate soil information.

☛ **Twelve hours may be better than 24 or 48.** Most design manuals recommend 24-48 hours as the maximum holding time for runoff in a rain garden. A regional expert now recommends 12 hours maximum because, in his experience, homeowners get nervous if the water stays around longer. As with the aesthetic comfort level of the homeowner mentioned earlier, there must also be a comfort level with the functional characteristics of the garden.

☛ **To amend or not to amend.** Some rain garden experts recommend soil amendments, some don't. Working without amendments tends to be a more naturalistic approach, but it must be acknowledged that these gardens will likely take more adjusting over time (water-holding depth can be expanded as the plant roots enhance the soil porosity and infiltration rates). Gardens that initially drain very slowly cannot be more than a couple inches deep or plants will not survive the ongoing inundation.

☛ **Native or adapted plants; the keys are rooting depth, adaptability and ultimate height.** Diverse opinions can be heard over what plants to use in rain gardens. Many native herbaceous plants tend to root deeply while continuously replacing old roots with new root growth. This pattern significantly opens up water-holding space in the soil, which enhances water infiltration. Many adapted plants and cultivated varieties of native plants also enhance infiltration through their rooting patterns. In addition to using deeply-rooted plants that are well-adapted to rain garden conditions (dry on berms, wet/dry within the garden), plants should not be selected that get too tall for the scale of the garden. Small gardens (100-200 square feet) tend to appear weedy if plants exceed 3-4' in height; this is especially true if the plants tend to flop when mature.

☛ **Rain gardens are not necessarily simple.** Rain gardens are conceptually simple. For the majority of residential sites—where gardens and runoff amounts are relatively small, adequate distances from buildings can be maintained and complicated slopes and soils are not evident—rain gardens are straightforward landscape features to design and build. Where sites are complex, however, it's best to consult with design professionals licensed to practice grading and stormwater management since incorrect design can lead to significant health and safety issues in addition to poor garden quality.



Rain gardens at a church (top) and college campus in Kansas City, Missouri. (Photos courtesy Steve Rodie)

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