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## Rain Gardens

by **Karen Cozzetto**

In at least one respect our cities are carefully planned. Roofs are slanted, sidewalks are sloped, and roofs are graded to carry away water. Stormwater rushes into sewers and tunnels, and then into treatment plants — which are necessary because all our paving prevents rain from doing what it's meant to do: filter through the ground. The system works, after a fashion. But there is a better way. And a movement is now emerging that just might get stormwater management out of the curb and gutter and into our front and backyards. This up-and-coming approach uses specialized rain gardens to do the job.

Rain gardens are shallow depressions designed to collect rain — typically from impervious surfaces such as roofs — and let plants, bacteria, and soils clean the water as it seeps its way into the ground. The concept is simple enough for anyone with some green space to put into practice. More importantly, according to Roger Bannerman, a stormwater specialist for the Wisconsin Department of Natural Resources, they are "truly sustainable in a way that our current system is not."

Our current system is based on a "pipe and pond" philosophy in which stormwater is a waste product, says Larry Coffman, an Associate Director for the Department of Environmental Resources in Prince George's County, Maryland. Gutters and sewers collect the stormwater and direct it to detention ponds, which slowly release it to streams and lakes. While the ponds do help reduce flooding and settle out sediments, they still ultimately "dispose" of rain offsite, sometimes at great distances from where it originated.

Rain gardens do the opposite. By keeping stormwater close to where it falls, rain gardens do help reduce flooding and settle out sediments. Yet they also prevent stormwater from becoming so contaminated with oils and other chemicals in the first place, and they actually remove pollutants from the water as it percolates through the soil on its way to becoming groundwater.

It is this latter aspect, groundwater recharge, that University of Wisconsin water resources engineering professor Dr. Ken Potter finds particularly exciting. He's been worried about declining groundwater levels for years, not only because of groundwater's importance for human use but also because of its significance for aquatic ecosystems. Groundwater discharges as baseflow into streams and is "vital to their well-being," says Potter. During periods of little rain, baseflow forms the main flow of streams, and during summer it provides a cooling influence which "can be critical since cold water holds more oxygen." So, altogether rain gardens make for better surface water quality, groundwater quality, and overall hydrological health.

Rain gardens got their start in 1988 while Coffman was thinking "out of the box." He had heard about the practice of growing plants on septic system drainfields as a way to break down pollutants. Why not use this kind of onsite treatment and infiltration, known as bioretention, in an urban setting, he pondered. Coffman and others felt that the name bioretention was too technical, too cold. So they brainstormed a bit and came up with "Rain Garden," which they agreed was "perfect: simple, and catchy."

More catchy than the name is the idea itself. Homeowners living in Prairie Crossing, a conservation community in Grayslake, Illinois, have built fifteen rain gardens thus far. And Ron Steiner, a civil engineer with General Engineering in Portage, Wisconsin is working on two residential developments with rain garden as part of their design. One development will consist of one-hundred single-family homes that will each have a rain garden. The second, a fifty-unit condominium project, will incorporate rain gardens into communal landscaping. The inclusion of rain gardens in the developments does not mean that traditional curbs and gutters will be absent, notes Steiner. Since rain gardens are designed to handle average rainfalls, not big blowout storms, that infrastructure is still needed. But the gardens will be an important part of the development.

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Potter predicts that eventually, "there will be something like a rain garden in every development." Coffman, too, foresees a world in which rain gardens are popping up in tree boxes, peeking over ditches, and peering off of rooftops, not to mention blooming in yards, campuses, and parks. If that seems like some far off utopian fantasy, take note: The Anacostia Watershed Restoration Committee is considering an effort to retrofit an entire watershed in the Washington, D.C. area with rain gardens, as a way to improve water quality in the Anacostia River. And River Alliance of Wisconsin director, Todd Ambts, says Wisconsin is considering rules that would include onsite infiltration standards for all new developments — criteria that rain gardens would go a long way in meeting.

When it comes down to it, why couldn't rain gardens become an integral part of our stormwater management approach? Their use doesn't involve a lot of centralized planning. They don't require much space, can be fitted into oddball shapes, and readily added to existing buildings. They look nice, and you don't need to be an engineer to build one. Anyone can make a rain garden — including you.

### Build Your Own Rain Garden

The first step in designing a rain garden, according to Bannerman, is "becoming aware that what you and I do affects the environment." After you've come to this understanding, he says, it's easier to make "a commitment to the idea that it's important to live with the land in a way that's sustainable." A resolution to dedicate time and perhaps a few hundred dollars to a rain garden comes next. Then it gets exciting, as you set goals for the garden you want to build. The goal Bannerman set for his first rain garden, for example, was to "treat all the runoff from a portion of his roof for an average rainfall."

Bannerman liked the idea of using native prairie plants both from a biodiversity perspective and because he had heard they were low maintenance. And if the truth were told, he'd rather spend his free time paddling than messing around in a garden. So he called Jennifer Baker, a consulting ecologist at Prairie Nursery in Mt. Horeb, Wisconsin, explained the rain garden concept to her, and asked Baker to design and install the plot for him. By combining wildflowers that bloom at different times, she created a kaleidoscope of colors that change slowly throughout the year in Bannerman's front yard.

During the course of the project, Baker herself became an enthusiast. She designed a prairie rain garden as a gift to her parents who live near Wisconsin's Elkhart Lake. She put it next to the bird feeders outside their kitchen windows. The pedestal birdbath in the middle of it has become an inviting refuge for the birds her mother loves.

Further south, Prairie Crossing environmental team leader Mike Sands was looking to add some visual variety to his landscape. He had a yard full of poorly draining clay soils and a sump pump that provided him with a constant source of water that had to go somewhere, a combination ideal for creating a rain garden wetland that has become a wildlife oasis. For low permeability soils, such permanently wet gardens are a good option, though their evaporative losses are high.

You, too, can reflect on your own situation, work with it, and develop your own personal rain garden. You might want to begin by borrowing Bannerman's rule of thumb: Figure out what kind of soils you have. Estimate the area from which your garden will get rain. Then take 20, 30, and 60 percent of that for sand, silty, and clay soils, respectively. This is how big your garden should be. Remember, though, that different parts of your roof drain to different downspouts. Bannerman notes that rain gardens for single family homes will typically range from 150 to 400 square feet in breadth.

Rain gardens vary in depth, as well. The norm is from three to six inches. "Adjust the depth to your infiltration rate," recommends Coffman. If you have poor infiltration, make your depression shallow to reduce the water volume that gets trapped there. Contrarily, if your soils suck water up, make your garden deeper to increase its storage capacity. Sands' wetland garden reaches one to two feet deep. Whatever the depth of your garden, be sure to keep the bottom fairly level so that water spreads out. To minimize digging or to capture runoff from several parts of your lot, you might want to take advantage of low-lying areas in your yard that naturally collect water. Placing plants in such spots will dry them out, says Coffman, and can positively transform muddy messes.

Bannerman warns, however, that no one should place a rain garden up against the house; or on top of a septic tank drainfield. Those placements would overload existing systems. He recommends keeping a ten-foot distance from the foundation; Coffman likes to stretch it out to twenty. He prefers to tuck rain gardens into wet areas at the edges of a yard so that the plots don't interfere with other uses of the land. You will want to locate your garden

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somewhere in the vicinity of a downspout. Since houses typically have several, this gives you lots of options.

**Soils and infiltration:** The permeability of soils in your yard will help determine whether plants grown in your rain garden are in for an occasional quick dip or some extended swims. Soils can be divided into three basic types — sands, loams, and clays — although most are some combination of the three. Sands drain the fastest, and fairly sandy soils will generally have ponding limited to at most a few hours, says Coffman. Clay soils, in contrast, drain the slowest, and notes Baker, may stay wet for several days.

If you'd like to get a more specific idea of how water infiltrates into your site, Baker suggests you make a mini-depression there, wait until it rains, and see how long the water sits.

Once you have an idea of how your site drains, you can decide to either work with what you've got or increase your soil's permeability. "Mixing compost or mulch into your soil," says Bannerman, "really increases the infiltration later." Incorporating dead leaves or dried grass clippings boosts permeability as well.

If you want to work with poor drainage conditions, you should choose highly water-tolerant plants and make your depression shallower so that it doesn't retain as much water. The poorer your soil drainage, the more water-tolerant the plants you choose should be, advises Baker.

**Plant selection:** Sands has special, consistently wet circumstances that make wetland vegetation ideal for his rain garden. In most rain gardens, however, plants are alternately deluged then left high and dry. So, the trick is to choose hardy species that can handle both situations. Some of the best vegetation for rain gardens in the Upper Midwest comes from the prairies native to this region. Prairie flowers have deep roots that may go down ten feet, explains Broughton. When the weather is dry, they can access sources of water unavailable to other vegetation, and when it's wet, their root structures provide deep conduits into which rain can flow.

If a prairie garden isn't what you had envisioned, however, home horticulture specialist Dr. Helen Harrison, of the University of Wisconsin-Extension, notes that there are more traditional trees, shrubs, and flowers that "don't mind getting their feet wet." Harrison also recommends starting your garden with a variety of plant species. That way, she says, "you can see what works with your site and what doesn't, then smooth out any kinks."

**Getting water in and out:** Unless you've chosen to let your rain garden infiltrate whatever comes its way, you will probably need to direct water from a downspout to your garden. You can follow Casetta's lead and just lay the piping on the ground. Hers is green, so it doesn't stand out much. Or, you can dig a trench into which you place plastic piping, or make a swale to guide the water.

Remember, rain gardens are meant to handle average storms, not major downpours. If you don't want to drown your plants when a big rain event comes along, you also need to provide the water with a way to drain out. Sands suggests positioning your garden "so that when it overflows, the water goes into the lot's existing drainage pattern." You may want to add an outlet furrow to your garden to ensure that excess water heads in the direction you'd like.

**By all means, mulch:** "A layer of mulch not only keeps weeds down," says Coffman, "it also acts as a sponge to capture heavy metals, oils, and grease. As the mulch decays, bacteria and plant roots have a chance to break down the pollutants." Harrison also notes that mulch holds in moisture, which can be helpful during a drought. Avoid cypress mulch, however; it's effective, but it's made by chopping down rare, old-growth cypress in Southeastern wetlands. Coffman has found that shredded hardwood works particularly well in rain gardens because "it doesn't float or blow away."

**Maintenance:** No matter what the kind of garden, there is still no way to avoid the need to weed. Baker notes that for prairie plots, an end is in sight: as the grasses mature, their dense roots squeeze out weeds. Every plot needs some kind of care, however; if the weather has been exceptionally dry, you may even have to water your rain garden!

**Enjoy!** The last step in this whole process, emphasizes Bannerman, is to enjoy the results! Your rain garden will add more birds, butterflies, colors, sounds, and smells to your life. Yet if you're like Casetta, one of the things you'll like the most is that your rain garden is "a chance to give back and make a little corner of the universe better for generations to come."

## Resources

**Rain gardens in general:** Prince George's County has a rain garden pamphlet for homeowners and a much more technical, 100-page design manual. You can get copies by calling: 301-883-5834. PG also has a [Web site with information](#) and good links, including one for an extensive plant list. Before using plants from any Prince George's County list, however, be sure to check that the species is cold hardy and that it is not on local invasive plant rosters.

Bannerman, Broughton, Sands, and the University of Wisconsin-Extension are currently working on an introductory brochure and on a how-to-make-a-rain-garden pamphlet. These are expected out in August. You can get copies by calling: 608-262-3346. The materials will also be available [online](#).

**Prairie gardens:** Prairie Nursery has a [Web site with lots of info](#) on everything from figuring out what kind of soil you have to prairie maintenance.

**Wetland gardens:** Prairie Crossing's [Web site](#) has an online article on making a wetland garden.

### Plant starter list



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