

“Every rain garden makes a difference. If you are managing any amount of stormwater, it is an incredible boon to nearby rivers and streams.”

— Patricia Pennell, Program Director  
Rain Gardens of West Michigan

# Shower power

BY ADAM LEVINE | PHOTOS COURTESY RAIN GARDENS OF WEST MICHIGAN

Planting a rain garden between sidewalk and street will help reduce stormwater runoff and add to your curb appeal.

**R**ain gardens are not new — in fact, they are probably as old as agriculture itself. It makes sense that early humans, once they figured out the connection between water and the growth of plants, might have tried to design planting spaces in ways that captured natural precipitation. Back then, capturing rainfall would have been a matter of survival — as it is today, but in a different sense. Our streams are fighting for their lives, and every gardener can help.

## Stormwater runoff

The Environmental Protection Agency (EPA), created in 1970, has been successful in bringing about legislation (including the Clean Water Act) that has almost completely eliminated industrial sources of stream pollution. Today most contaminants enter streams by way of stormwater runoff. As it races across parking lots and down streets, runoff can pick up dog waste, litter, petroleum products from cars, and who knows what else. In urban areas where combined sewers carry stormwater and sewage in a single main, heavy rains lead to overflows of diluted sewage into streams. In urban and suburban areas, as much as 50% of the pollution in stormwater comes from the activities of individual homeowners, including synthetic fertilizers and pesticides that run off during storms.

Even if storm runoff were pure, clean water, the sheer amount of it would still be a problem. Natural meadows, swamps, and woodlands absorb precipitation; impervious surfaces such as rooftops, pavement, and even lawns repel precipitation. As we develop more and more of what was once water-absorbing open space, the amount of stormwater running off into streams has increased dramatically. Higher storm flows erode stream banks and

The location of a rain garden depends on the needs and layout of your property. This bed (opposite page) will collect the runoff from the roof of the house and sloping lawn.

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## Read all about it!

An outstanding book about the subject is *Rain Gardens: Managing Water Sustainably in the Garden and Designed Landscape*, by Nigel Dunnett and Andy Clayden (Timber Press, 2007). It has plenty of photos and diagrams, many ideas for water management, and detailed plant lists. (This was the source of the plant list on page 34.)

An excellent web site is [www.RainGardens.org](http://www.RainGardens.org), run by the nonprofit group Rain Gardens of West Michigan.

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scour stream beds, compromising habitat for aquatic plants and animals. Because runoff now reaches streams more quickly, flash floods have become commonplace, threatening not just wildlife but human life and property as well.

This is a huge problem, but it's one that each of us can help with. Of the various ways that property owners can manage stormwater, creating a rain garden may be the most satisfying and is certainly the most attractive. While rain gardens will not eliminate the need for large-scale stormwater infrastructure projects, the cumulative effects of thousands of them within a particular watershed should not be underestimated. From Brooklyn to Berkeley and everywhere in between, rain gardens have become a great way for individuals to make a positive impact on the environment while beautifying their properties.

### Keep it simple

In its simplest form, a rain garden is a depression, filled with attractive plants, that captures part or all of the stormwater falling on a property so it can seep back into the ground. This style of landscape design has an intriguing aura that was missing back when rain gardens were called "bioretention basins."

Although everyone agrees on the ultimate goal — keeping stormwater on site and out of nearby bodies of water — this goal can be accomplished in a wide variety of ways. The more thought put into your rain garden's design, the more stormwater you'll be able to retain. By following a few simple

### Rain garden plants

The following plants all do well in "somewhat moist" to "usually moist" soil, and all will take periodic flooding.

#### Plants for sun

- Aster
- Echinacea (coneflower)
- Liatris (blazing star)
- Monarda (bee balm)
- Penstemon
- Trollius (globe flower)
- Veronica longifolia

Coneflower



Red Penstemon



#### Plants for partial shade

- Aruncus (goat's beard)
- Astilbe
- Eupatorium (Joe Pye weed)
- Ferns (including cinnamon, lady, and ostrich plume)
- Physostegia (dragonflower, false dragonhead, obedient plant)
- Primula (primrose)
- Rudbeckia (black-eyed Susan)
- Trollius (globe flower)

Goat's Beard



Black-Eyed Susan



guidelines, even a small rain garden can be an effective stormwater management tool.

Choose a location for your rain garden at least 10' from your home's foundation, to prevent water from seeping into your basement. If you place it close to the house, it will probably receive water only from the nearest downspout, but if you place it further away you can also

channel runoff from adjacent areas of lawn or driveway into your rain garden. Don't place it over a septic tank (where infiltration might overload the tank) or within the root zone of an established tree

(where excavation of the bed will damage the tree's roots).

The rain garden adjacent to the parking lot at the offices of Rain Gardens of West Michigan was planted in the morning (left) and put to the test that same afternoon (right).



PHOTOS BY PATRICIA FENNELLS/COURTESY RAIN GARDENS OF WEST MICHIGAN

### Doing the math

A rain garden is not meant to become a permanent pond or wetland (although these can also be used to help manage stormwater flows). The goal is to design a bed that will hold water for no more than 24 hours; longer than that and breeding mosquitoes may become a problem. The excavation should thus be no more than 6" deep. The horizontal area depends on two factors: the total size of the hard-surface areas on your property that will drain into the rain garden, and the permeability of the soil.

Start by calculating the total area of the hard surfaces that will be draining into the rain garden. The largest is probably the roof of your house; measure the length and width, including eaves and overhangs. Keep in mind that the entire roof surface may not drain to the downspouts that will lead to your rain garden; half or more of the runoff may be directed elsewhere. In addition to the roof, figure out the size of any paved areas (driveways, sidewalks, patios) that will also drain to your new catchment area.

The second step is to figure out how well your soil will accept that rain. Use a shovel, a hose, and a ruler to figure out soil permeability. Dig a hole 8" (about one shovel-length) deep and 8" wide, and fill it with water. Let the water sit for an hour or

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two to saturate the surrounding soil, then fill the hole to the top again. Mark the top level of the water with a Popsicle stick stuck into the side of the hole, and start the clock. Ideally, the water will drain at a rate of about an inch every four

hours; heavier, clay-laden soil will drain much more slowly.

Now you're ready to calculate the size of the rain garden you want. Take your total square footage number from step one. If your soil permeability is good (loam or sandy soil), the garden should be 25% of this square footage; if your soil permeability is poor (clay soil), the garden should be 60% of this square footage. This will give you the ideal overall area for your rain garden; you can then work out the length and width that will work in your yard. In general, you'll want a shape that's longer side-to-side along the slope and shorter uphill-downhill on the slope. By having the longer side available to the water running downhill, you'll be able to catch more of it.

Starting to feel your math phobia kick in? It's not really that bad — see the box above for an example of how to crunch the numbers.

Note that these are the sizes necessary to catch *all* of the water running off your impermeable surfaces. If you don't have the room (or the inclination) to install something this big, a smaller rain garden is better than no rain garden at all.

## Example

### Rain Garden Area Calculations

<b>Roof:</b> 30' x 40'	1200 sq. ft.
Half will drain to rain garden	x 0.5
Net roof surface	600 sq. ft.
Plus:	
<b>Driveway:</b> 15' x 60'	900 sq. ft.
<b>Patio:</b> 25' x 25'	625 sq. ft.
<b>Total:</b>	2125 sq. ft.
If good permeability x 0.25	
<b>Total:</b>	531.25 sq. ft.
(e.g., 10' x 54' OR 15' x 36' = 540 sq. ft.)	
If poor permeability x 0.60	
<b>Total:</b>	1275 sq. ft.
(e.g., 15' x 85' = 1275 sq. ft.)	

Remember, though, that to ensure the water drains away quickly, no rain garden should ever be more than 6" deep.

### Can you dig it?

No matter how wide or deep it is, the bottom of the rain garden should be level, so the water doesn't overflow before the entire space fills up. An ideal location is a level or gently sloping site where you can dig out a depression and use the excavated soil to build a water-retaining berm around the lower sides. Steeper slopes will need more careful construction to ensure both that the bed is level and that the berm can retain the water collected without washing out; steeper slopes may also require extra soil for the berm. You'll also need an underground drain or aboveground outlet, so excess water can drain away without eroding the surrounding landscape.

### Picking plants

A rain garden has three general moisture zones: the wettest at the bottom, a *mesic* (medium wet) zone in the middle depths, and the driest zone at the edges or on the berm. Many different perennial plants and shrubs will work for each of these areas, but remember that moisture-loving plants might not do as well in sandy soil, in which any accumulated water drains away quickly. "It's not as mysterious as people make it out to be," says David Dods, an environmental engineer turned rain garden promoter. "Any good gardener can figure out which plants will work in the various conditions. Get out in the rain and experiment. The idea is to have fun with it. If a few of the plants don't work, try some others next year." A great number of

This demonstration garden by Rain Gardens of West Michigan shows just some of the plants that do well in places with periodic flooding.

plants don't mind having "wet feet" for a day or two: See the box on page 34 for a few suggestions.

### While your ultimate

goal might be to capture 100% of your property's stormwater, it may be best to start small, to get a feel for how the water flows on (and into) your property. Experts agree on one thing: Even a small rain garden is better than no rain garden at all. Says Patricia Pennell, Program Director of Rain Gardens of West Michigan: "Every rain garden makes a difference. If you are managing any amount of stormwater, no matter how small, it is an incredible boon to nearby rivers and streams." ❁

**Adam Levine** is an environmental historian and author of several books, including *A Guide to the Great Gardens of the Philadelphia Region*.



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