

Step by Step Guide to

Building Your Own Rain Garden

You may have heard about rain gardens lately. They have received a lot of attention in the news for their

(in less than 72 hours). The rain garden is typically planted with water-absorbing native plants that can withstand intermittent flooding.

The rain garden should be strategically located to collect, filter and infiltrate rain that falls on hard surfaces like roofs, driveways, alleys or streets.

Rain gardens serve to minimize the negative impact excessive runoff from

these surfaces has on lakes and streams. Some rain gardens have drain pipes and impervious liners, but most do not.

Why Should We Care About Rain Gardens?

Minnesota is the Land of 10,000 Lakes and the home of the Mississippi headwaters. Minnesota also borders the largest freshwater body in the world – Lake Superior. The lakes, streams and rivers are an integral part of Minnesota’s development. All of our water is interconnected. Rainfall either infiltrates the ground and becomes ground water or runs off and becomes storm water. Both

ability to improve water quality in Minnesota’s rivers and lakes. Rain gardens are areas where storm water is captured and allowed to infiltrate into the ground. They are also known by other names: bioretention basins, ephemeral wetlands, water quality gardens, storm water gardens, planted swales, biofilters, or strategically placed puddles.

Rain Garden Basics

Typically a rain garden is formed by a shallow depression – 4 to 8 inches deep for a residential yard and less than 32 inches deep for large-scale treatment – with permeable soils that drain quickly

Where can I see rain gardens?

- ▶ Victory Drive, in front of Bandana Brewery, Mankato
- ▶ Lion’s Lake, Mankato (coming soon)
- ▶ City of Maplewood — residential streetside gardens
- ▶ 806 Rushmore Drive, Burnsville — residential
- ▶ MN Landscape Arboretum, Chanhassan
- ▶ Swede Hollow Café, St. Paul
- ▶ Como Park — Lexington Pkwy & Nebraska Ave., St. Paul
- ▶ Mount Calvary Lutheran Church, Excelsior
- ▶ Marcy-Holmes neighborhood, Minneapolis
- ▶ 706 14th Ave SE (condos), Minneapolis
- ▶ 1205 7th Ave SE (single family home), Minneapolis
- ▶ North corner of 4th St SE and 8th Ave SE (Andrew-Riverside Park), Minneapolis
- ▶ Downtown Wayzata
- ▶ Kwanzaa Community Church, 2100 Emerson Ave. N, Minneapolis
- ▶ El Colegio Charter School, 4137 Bloomington Ave. S, Minneapolis

groundwater and stormwater reach rivers and lakes. Breaking up the expanses of pavement that capture water with green space can greatly improve water quality.



For rain gardens near roads, select plants that can tolerate de-icing salts.

Benefits of a Rain Garden

- Soaks up 30% more runoff than lawns
- Keeps runoff on site
- Filters polluted urban runoff (oil, grease, salts, fertilizers, pesticide residue)
- Recharges groundwater
- Helps prevent flooding
- Provides habitat and food for butterflies and birds
- Beautifies a low spot, and
- Serves as a natural filter, removing sediment, phosphorus and nitrogen from runoff.

Flexibility in Design

Rain garden design features are flexible. Variables include: location, soil type, size and shape, and plants.

When picking a location for your rain garden you will want to “go with the flow.”

First, observe the drainage pattern in the landscape via topographic maps or site visit. Then locate the garden in a natural low spot: near sidewalks, driveways or other impervious surfaces; or down-slope from roofs, gutters, downspouts and sump pump outlets. Avoid septic system drainfields. Use a channel or buried plastic pipe to direct water into the rain garden.

Most importantly, the soil must drain! Make sure you place your rain garden in the right soils by doing a percolation test on the rain garden site. Fill a 6-inch deep hole with water, and it should drain within 24 hours. If not, don't put the rain garden in that spot. If it does drain, fill the hole again and time the rate of infiltration in inches per hour. The soil should drain at one inch per hour minimum. The higher the infiltration rate, the smaller the garden needs to be.

There is no standard size or shape.



Select plants that tolerate both wet and dry spells.

Kidney or teardrop shapes seem to work well. The rule of thumb is that your rain garden area should be five to ten percent of the drainage area you are directing toward it. For example, a 50 to 100 square foot rain garden accommodates 1,000 square feet of impervious area. Factors for optimal size include slope, soil type and distance from the runoff point. The longer side of the garden should face upslope in order to catch as much runoff as possible and to spread the water flow over a larger area. Even a small rain garden is beneficial.

Once you have decided on the right place for your garden, you can get outside and get dirty. Outline the boundary with a rope or hose to help you visualize the garden. Call Gopher State One Call (1-800-252-1166) at least two working days before digging to make sure you don't cut any utility lines. Remove the sod and dig to your desired depth. Mix in compost to improve the soil's infiltration capacity.

Where can rain gardens be integrated into our communities?

- ▶ New residential developments
- ▶ New commercial/industrial/institutional developments
 - ▶ Roadway projects
 - ▶ Redevelopment
- ▶ Revitalization and smart growth projects
- ▶ Urban retrofit storm water management projects
 - ▶ Streetscaping projects
- ▶ Private residential landscaping
 - ▶ Parks and trailways
- ▶ Commercial/industrial/public landscapes
- ▶ Curbless and curbed parking lot perimeters
 - ▶ Parking lot islands/medians
 - ▶ Adjacent swales

The garden should be level in the deepest spot. Gentle side slopes help prevent erosion and are safer if someone steps into the garden. A berm at the low end — less than 18 inches — helps hold the water in the garden. A grass filter strip on the top edge helps slow down the water before it enters the garden and settle out some of the sediment in the runoff. Mulch helps prevent weeds, aids in removing nitrogen

and their roots help crowd out weeds. Generally, you will need one plant per square foot of rain garden, with a third of the plants for the wet zone, and two-thirds for the upland zone.

Native plants have many advantages: they are adapted to the climate and native pests, deep rooted, tolerate dry spells, have long roots to draw water deep

from the soil and evapotranspire, and they are havens for butterflies, birds and beneficial insects. However, traditional ornamental garden plants may be more appropriate in a refined cultural setting.

Regardless of whether you pick

native species or ornamentals, make sure the plants can handle getting their feet wet occasionally. If your rain garden will be exposed to road de-icing salts, pick plants that can handle those conditions.

Some salt-tolerant native species are columbine, purple coneflower, black-eyed Susan, showy goldenrod, rough blazing star and big bluestem grass.

Some salt-tolerant ornamental species are hosta, coral bells, Stella D'Oro day lily, Silver Mound

artemisia, Autumn Joy sedum, Blue Lyme grass and fountain grass.

Maintenance

Rain gardens can be high or low maintenance, based on the plants you choose. After installation, pull weeds (especially important the first year) and water three times per week for the first two weeks and during dry spells. Fertilizer is not necessary or desirable, because it encourages weeds and strains soil filtering capacity. Over the long term, replace mulch (shredded hardwood, which aids denitrification) as necessary. Thin and transplant plants as needed. Leave seed heads on over the winter for wildlife habitat and winter interest, then burn, cut back or mow them down in the spring. For large-scale gardens, you may consider hiring a maintenance contractor for first two to five years. Adding “elements of care” such as ornamental fences, birdbaths, gazing balls and other accessories helps show observers that this is a special garden

What about mosquitos?

Rain gardens, when designed correctly, will not provide a breeding ground for mosquitoes, for the following reasons:

- A rain garden is not a pond
- There is no standing water between rainfalls (the garden should drain in less than 72 hours)
- Mosquitoes need at least seven



Locate your rain garden in a natural low spot — near sidewalks, driveways or other impervious surfaces, or down-slope from roofs, gutters, downspouts and sump pump outlets.

from the water and makes the garden look nice. Use shredded wood mulch rather than chips, which can float away when the garden fills up with water.

What plants should you choose?

Select plants that tolerate both wet and dry spells, tolerate de-icing salts (if near roads) and match up with existing soil and light conditions. Put plants that tolerate saturated soils in the deepest part. Grasses can help support flowers,

days in standing water one to twelve inches deep in order to hatch. They will not survive if the rain garden dries in less than one week. Therefore, there is no West Nile Virus threat from rain gardens.

How much will it cost?

If you do it yourself, it will generally cost \$3 to \$5 per square foot, including plants. If you hire professionals, it will generally cost \$10 to \$12 per square foot.

For your money, you get a two-fold return: the satisfaction

of doing your part to protect Minnesota's water resources, and an attractive addition to your property.

Bolton & Menk's Chantill Kahler-Royer, the author of this article, gave presentations on rain gardens to the Bolton & Menk offices as a brown bag lunch meeting last December and at the 2nd Annual Environmental Sustainability Conference at Minnesota State University, Mankato in February. For more information on rain gardens, contact Chantill at chantillka@bolton-menk.com.



Bolton & Menk provides engineering and surveying services to public clients throughout the upper midwest and private clients throughout the world. The firm maintains offices in Mankato, Burnsville, Fairmont, Willmar, Sleepy Eye and Chaska, Minnesota, and Ames, Iowa.

References

Rain Garden Basics

- ▶ City of Maplewood
www.ci.maplewood.mn.us
Click on "Welcome to Maplewood Storm Water Management," then click on "Rainwater Gardens"
- ▶ Friends of Bassett Creek
www.mninter.net/~stack/rain
- ▶ UW Extension
<http://clean-water.uwex.edu/pubs/raingarden/>
- ▶ Rain Gardens of West Michigan
www.raingardens.org

More In-depth Information

- ▶ Met Council's "Minnesota Urban Small Sites BMP Manual"
www.metrocouncil.org/environment/watershed/bmp/manual.htm
- ▶ Prince George's County, MD's Dept. of Environmental Resources Bioretention Manual
www.goprincegeorgescounty.com/government/agencyindex/der/ppd/lid/bioretention.asp
- ▶ Low Impact Development Center
www.lid-stormwater.net/bioretention/biolowres_specs.htm