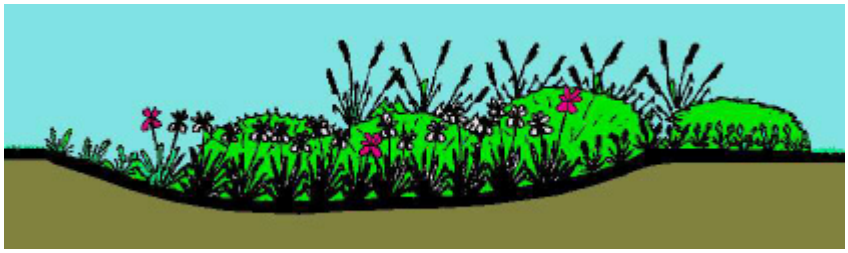
Plotting to Infiltrate? Try Rain Gardens.

Lorrie Stromme, Hennepin County Master Gardener



Courtesy of the Friends of Bassett Creek website.

This rainy spring has been an ideal time to notice the areas in your yard where stormwater and snowmelt have ponded. Instead of making plans to fill in that low spot in your yard, consider installing a rain garden instead.

What is a Rain Garden?

The term rain garden defies precise definition. Basically, a rain garden is a strategically located low area planted with native vegetation that intercepts runoff. Other terms include mini-wetland, storm water garden, water quality garden, stormwater marsh, backyard wetland, low swale, wetland biofilter, or bioretention pond. The variables include dimensions, design, engineering components, and plant selection.

Building a Rain Garden

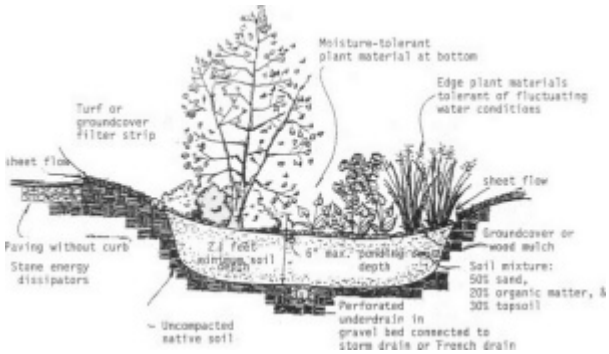
The design of a rain garden can be varied to accommodate soils, watershed hydrology, existing drainage patterns, aesthetics, microclimate, and purpose.

Basic design components include:

· Grass filter strip
· A shallow surface water ponding area
· A bioretention planting area
· A planting soil zone
· An underdrain system
· An overflow outlet structure.

The following diagram illustrates these components:

A shallow ponding depth - approximately six inches



Art credit: Zolna Russell

- is preferred, underlain by two to four feet of depth for the planting soil zones. A perforated underdrain in a gravel bed connects to a storm drain or French drain. A culvert can be installed, as well. A strip of turf or groundcover at the top edge of the rain garden slows water as it flows into the garden and filters sediments. Mulch over the surface helps to suppress weeds. Shredded hardwood mulch is recommended, because it resists flotation and has a greater surface area for binding metals in runoff. Water should infiltrate within 4 to 6 hours. If the percolation rate is lower than one inch per hour, native soils should be amended or replaced.

· **Size**

There is no standard size for a rain garden. One formula provides that the bioretention area should be 5% to 7% of the drainage area that the rain garden is intended to accommodate. Rainwater gardens installed by the City of Maplewood in several residential areas are three standard sizes: 12' x 24', 10' x 20', and 8' x 16'. The Water Quality Garden near Lake Como is 4,000 square feet. The rain gardens in the residential development in Somerset, Maryland, are each 300 to 400 square feet.

· **Location**

A rain garden should be placed near impervious surfaces so that rainwater and snowmelt will drain into the dip or depression. Locate the garden strategically near impervious surfaces, such as alleys, sidewalks, driveways, and under downspouts or gutters, to capture the rain as close as possible to the point where it falls. Rain gardens planted between two residential properties can channel runoff to front or back yard gardens, while simultaneously acting as a living fence between neighbors. In one instance, a rain garden located under a downspout to capture roof runoff captured approximately 14,000 gallons of water per year. Gardens should not be located over gas or water services.

Rain gardens and planted infiltration trenches have also been incorporated into parking lot designs. For example, the H.B. Fuller Company in Arden Hills, Minnesota, designed the parking lots at its corporate headquarters with planted islands and vegetated infiltration strips. The Ramsey Washington Metro Watershed District recommends using infiltration trenches on the edges of parking lots.

· **Soil Considerations**

A blend of 20% organic matter, 50% sandy soil, and 30% topsoil is recommended. This blend will naturally filter the rain as it runs into the rain garden. Some clay is desirable, because clay particles adsorb heavy metals, hydrocarbons, and other pollutants. However, the clay content should not exceed 10% of the total. Clay soils hold water well, but high clay concentrations may cause poor drainage. Sandy soil permits water percolation, but very sandy soil is too permeable. A soil pH of 5.5 to 6.5 is ideal for pollutant removal by microbial activity. A mulch layer on the garden surface aids in the decomposition of organic matter and helps to remove metals.

· **Plant Selection**

Plant species that can tolerate the extremes of wet soils and very dry periods are preferred for rain gardens. Most perennials demand well-drained soil. They can die if they remain in soils that are poorly drained or stay wet. But some perennials tolerate or even thrive in moist soils.

Plants that can tolerate standing water should be planted in the lowest part of the garden.

Native plants have several advantages. They are best adapted to the local climate and, once established, seldom need watering or fertilizing. Many are deep rooted, which enables them to tolerate drought. Native plants are attractive to diverse native butterflies and provide habitats for wildlife, especially birds. Natives are low maintenance, but they still require care, occasional weeding, and control of debilitating diseases and insect pests.

Gardens on high-traffic streets should include plants that tolerate de-icing salts. De-icing salts affect plants in two ways. First, direct contact from spray drift can cause bud death, twig dieback, or needle browning. Second, build-up in adjacent soils can damage plant roots so that they are unable to take up water. Plant symptoms include wilting, marginal leaf browning, needle tipburn, and general stunting. Plants within 60 feet of a highly traveled roadway (i.e., over 10,000 cars per day) are at the highest risk of salt injury.

· **Maintenance** Rain gardens require routine landscape maintenance: weeding, pruning, plant replacement, mulching, supplemental watering.

Functions of a Rain Garden
A rain garden traps rainwater and snowmelt and allows them to infiltrate the soil, instead of running over impervious surfaces, like driveways, roofs, roads, patios, and parking lots. Impervious features in the landscape do not let runoff percolate into the soil; water remains above the surface, accumulates, and runs off into rivers and streams.

According to the Environmental Protection Agency, a typical city block generates 9 times more runoff than a woodland area of the same size, because of impermeable surfaces. A rain garden is a natural, on-site means of controlling runoff. In addition to storing rainwater temporarily, a rain garden filters pollutants carried in surface runoff. Examples of pollutants generated in urban areas include: sediment from development and new construction; oil, grease, and toxic chemicals from vehicles; viruses and bacteria from failing septic systems; road de-icing salts; heavy metals; and nutrients and pesticides from turf management and gardening. The major sources of phosphorus in runoff are lawn clippings and tree leaves left in the streets and gutters. Polluted runoff becomes a water quality issue when it is released directly into lakes and streams without any treatment. Increased pollutant loads can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe.

Rain gardens are designed to direct polluted runoff into a low, vegetated area, where the pollutants can be captured and filtered. The features of a rain garden aid in this biofiltration process: a shallow basin depth, gentle side slopes, soil that allows infiltration, and vegetation that traps sediment and sediment-polluting runoff. Vegetation shields the soil surface from raindrop impact while the root mass holds the soil particles in place. Improved water quality results from the nutrient removal process as the water and pollutants come into contact with roots and microbes in the soil. Plants, trees, and groundcover absorb up to 14 times more rainwater than a grass lawn.

What about mosquitoes? A rain garden is not intended to detain water for long periods. Ideally, runoff will not be detained for longer than four days, to avoid concerns about mosquito breeding in standing water. Mosquitoes will not survive in wetlands that dry out in less than a week after a summer rain. The development of a mosquito from egg to adult takes 10 to 14 days. A mosquito larva must live in water for 7 to 12 days before maturing to the adult stage.

Locations to see rain gardens in the Twin Cities metro area

In St. Paul:
· Lower Phalen Rain Garden - near Swede Hollow Café (725 E. 7th St.)
· 118 Virginia Street (1/2 block north of Summit Avenue near Western)
· Como Water Quality Garden - near the intersection of Lexington Parkway and Nebraska, just northwest of Lake Como)

In Maplewood:
· Birmingham Street, between Ripley and Frost Avenues - completed in 1996.
· Harvester Area neighborhood, just south of Stillwater Road - installed in 2000
· Midvale Place, Ferndale Street, Brand Avenue, Michael Lane, Sterling Street, Evar Street, Edith Street, and Glendon Street
· Bartelmy Acres - to be installed in 2001
· Bartelmy Lane, Mary Street, Magnolia Avenue, Sterling Street
· H.B. Fuller Headquarters - 3210 Labore Road (in the parking lots)

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