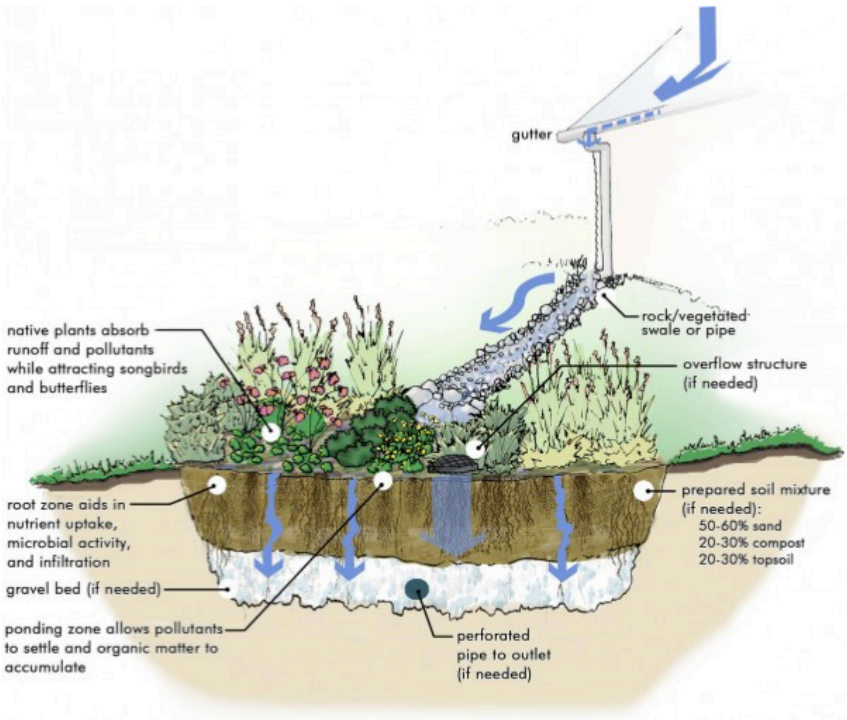
Stormwater Management | Rain Gardens and Bioswales

Rain gardens and bioswales are simple landscaping features used to slow, collect, infiltrate, and filter stormwater. Differences between these systems are subtle and the terms often are used interchangeably to describe systems that achieve the end goal of reducing stormwater runoff and improving stormwater quality. These structures mimic natural hydrology by infiltrating, evaporating, and transpiring stormwater runoff. Rain gardens are generally smaller and more appropriate for residential systems than bioswales. More complex rain gardens with drainage systems and amended soils are often referred to as bioretention or bioinfiltration cells.

Rain gardens are versatile features that can be installed in almost any unpaved space. In their most basic form, rain gardens are depressed areas in the landscape that typically collect rain water from a roof, driveway or street and allow it to soak into the ground. Rain gardens can also help filter out pollutants in runoff and provide food and shelter for butterflies, song birds and other wildlife. Planted with shrubs, grasses, and flowering perennials, rain gardens can be a cost effective and beautiful way to reduce runoff from your property. The existing soil is often used in rain gardens if it provides adequate water infiltration rates, although native soils can also be amended with some sand or compost if needed. Plants selected for a rain garden need to be able to withstand moisture regimes ranging from flooded to dry, with more drought tolerant species planted around the perimeter, and the more moisture tolerant species planted in the deeper central area.

A rain garden is an ascetically pleasing method of managing stormwater on residential property.



GENERAL CONSIDERATIONS

- The best locations for home rain gardens are near the house to catch only roof runoff, or at least 10 feet from the house if collecting water from the lawn and roof, so infiltrating water doesn't seep into the foundation.
- A rain garden is typically 7 to 20 percent of the size of the impervious surface that generates runoff.
- A typical rain garden is between 6 and 9 inches deep, as compared to the surrounding ground level. This depth, proportionate to surface area, helps assure water will infiltrate quickly and not pond.
- The edges of the rain garden should have side slopes of about 3:1.
- A good soil mix for rain gardens is 50 percent sand, 30 percent compost, and 20 percent topsoil.
- Choose plants based on need for light, moisture, and soil. Vary plant structure, height, and flower color for seasonal appeal and butterfly habitat. The use of native plants is encouraged.
- Do not place the rain garden directly over a septic system.
- Do not put the rain garden in a part of the yard where water already ponds. The goal of a rain garden is to encourage infiltration, and your yard's wet patches show where infiltration is slow.
- It is better to build the rain garden in full or partial sun, not directly under a big tree.

DISPELLING SOME COMMON MISCONCEPTIONS

Does a rain garden form a pond?
No. The rain water will soak in so the rain garden is dry between rainfalls. However, some rain gardens can be designed to include a permanent pond, but this is not typical.

Are rain gardens a breeding ground for mosquitoes?
No. Mosquitoes need 7 to 12 days to lay and hatch eggs, and standing water in the rain garden will last for a few hours after most storms. Mosquitoes are more likely to lay eggs in bird baths, storm sewers, and lawns than in a sunny rain garden. Also rain gardens attract dragonflies, which eat mosquitoes!

Do they require a lot of maintenance?
Rain gardens can be maintained with little effort after the plants are established. Some weeding and watering will be needed in the first two years, and perhaps some thinning in later years as the plants mature.

Is a rain garden expensive?
It doesn't have to be. A family and a few friends can provide the labor. The main cost will be purchasing the plants, and even this cost can be minimized by using some native plants that might already exist in the yard or in a neighbor's yard.

BIOSWALES

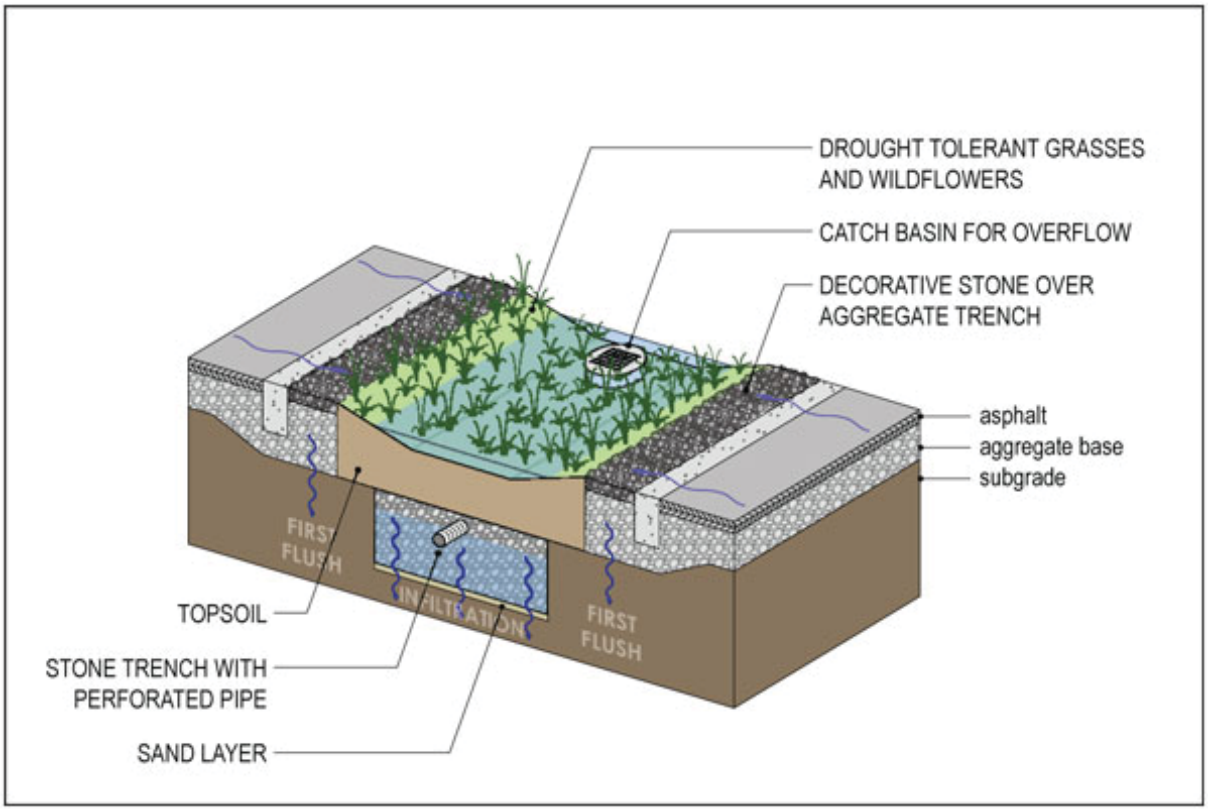
Bioswales are storm water runoff conveyance systems that provide an alternative to storm sewers. They can absorb low flows or carry runoff from heavy rains to storm sewer inlets or directly to surface waters. Bioswales improve water quality by infiltrating the first flush of storm water runoff and filtering the large storm flows they convey. The majority of annual precipitation comes from frequent, small rain events. Much of the value of bioswales comes from infiltrating and filtering nearly all of this water. However, bioswales are also typically designed to manage a large amount of runoff from large impervious areas, such as parking lots or roadways. To accommodate greater quantities of stormwater, they often require use of engineered soils and are deeper than rain gardens.

A roadside bioswale collects runoff from road.

Bioswales are usually linear systems that are greater in length than width. Like rain gardens, they are vegetated with plants that can withstand both heavy watering and drought. For best results, existing natural drainage swales should be enhanced and utilized whenever possible. Existing swales can be enhanced with native plants. The thicker and heavier the grasses, the better the swale can filter out contaminants. Under certain conditions, subgrade drains and amended soils may be needed to facilitate infiltration.

GENERAL DESIGN CONSIDERATIONS FOR BIOSWALES

- A parabolic or trapezoidal shape is recommended for bioswales, with side slopes no steeper than 3:1.
- Soil infiltration rates should be greater than one-half inch per hour.
- Care should be taken to avoid soil compaction during installation.
- Swales should be sized to convey a 10-year storm (approximately 4.3 inches in 24 hours)
- Deep-rooted native plants are well suited for bioswales because they will improve infiltration, reduce maintenance, and be more resistant to local pests and disease.
- Native plants will require less maintenance than turf grass because they need less water and no fertilizer.



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