

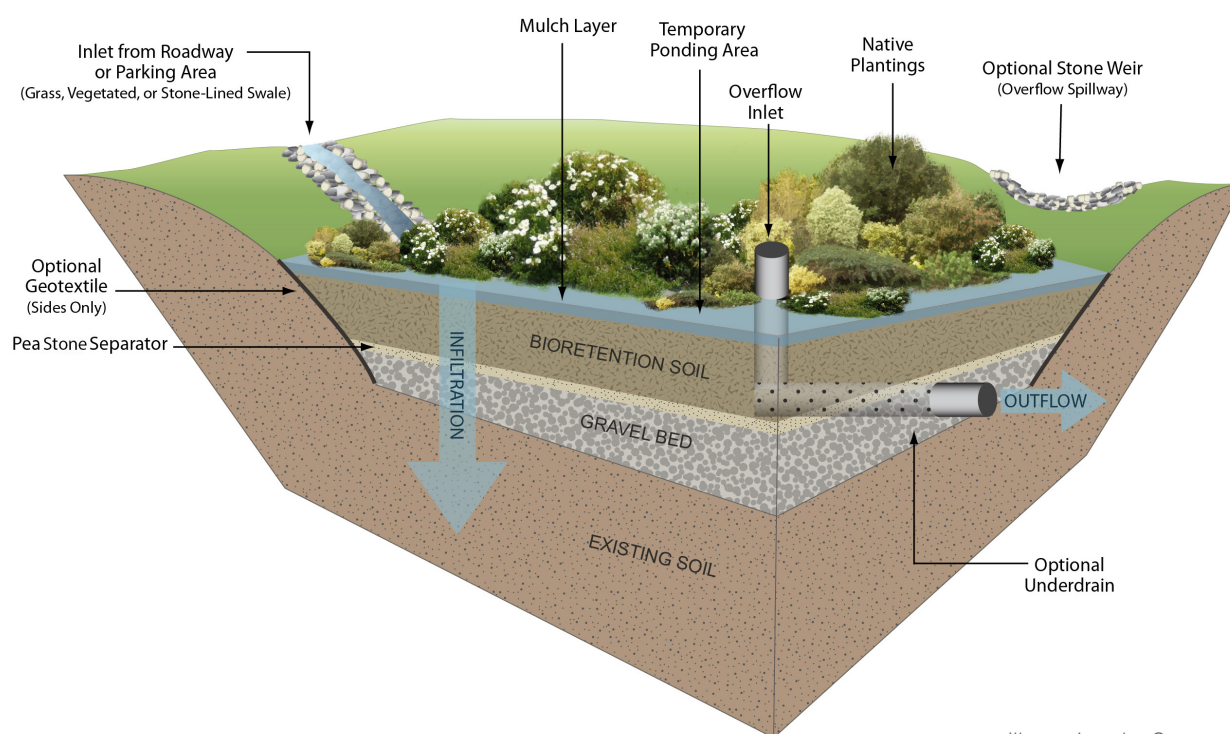
# BIORETENTION BASINS

## Guidelines for Maintenance

A **bioretention basin** is a storm water best management practice (BMP) that uses an engineered soil mix to reduce water pollution in urban runoff before it enters our lakes and streams. Runoff reaches the basin through a combination of underground pipes, ditches and overland flow. A bioretention basin is carefully designed to capture and treat runoff from small watersheds, usually less than two acres in size. Runoff will generally pond on the surface of the basin up to one foot in depth, but for no more than three days before it infiltrates. An overflow pipe and/or spillway will handle runoff events that exceed the design capacity. A small catch basin may be located near the inflow to trap sediment and other debris before it enters the basin.

In bioretention basins, the existing soil has been replaced with an engineered soil mix containing a high percentage of sand, intended to encourage infiltration and filter pollutants in the runoff. Under the engineered soil layer is a gravel bed that serves to temporarily store runoff, allowing it to infiltrate the underlying native soil. A perforated drainage pipe at the top of the gravel layer allows excess water to flow out of the basin, if necessary.

With this design, bioretention basins are commonly used in areas where the existing soil has a limited ability to absorb runoff. During the growing season, a cover of tall grasses and native wildflowers help make this BMP very effective at reducing water pollution, as illustrated below.



# THE NATIVE LANDSCAPE

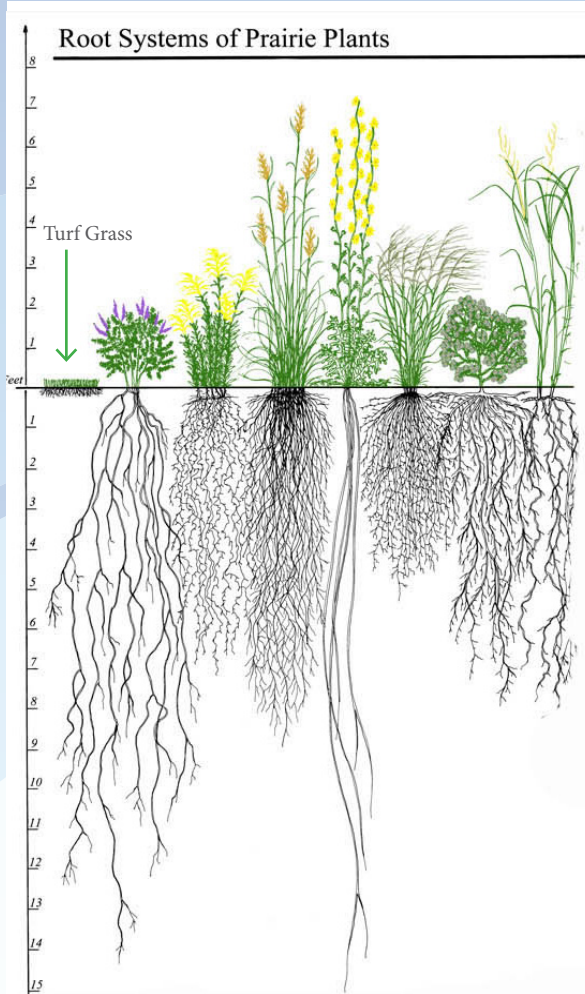


Image Source: Conservation Resource Institute

Before our landscape was developed, very little rainfall actually ran off the ground. Most of it soaked into the soil, where it was either used by plants or became part of the groundwater system. Native plants are used in bioretention basins to help replicate some of these conditions. Native plants have very deep root systems with as much as two-thirds of the plant being underground. This massive root system improves the soil, creating more pathways for infiltration, and making the basin more effective at soaking up runoff and filtering pollutants. By comparison, turf grass only has a few inches of root mass. Other benefits of using native plants include:

- Creating habitat and food sources for birds, butterflies, bees and other wildlife.
- Absorbing more nutrients in runoff like phosphorous and nitrogen, which cause algae blooms and excessive weed growth in lakes and streams.
- Improving aesthetics of the bioretention basin, providing year-round interest and color with a mix of wildflowers and grasses.
- Reducing maintenance needs (once established), such as mowing, watering (plants are drought resistant), or use of fertilizer or pesticide.

## MANAGING THE WATERSHED: WHAT PROPERTY OWNERS CAN DO

In addition to maintaining the bioretention basin, there are actions that owners can take to manage the land that drains to the basin. The following will help extend the life of the basin and reduce water pollution at the same time:

- Regularly sweep litter and grass clippings off sidewalks, driveways, streets and parking lots.
- Test the soil in landscaped areas, and follow recommended application rates for fertilizers and pesticides.
- Pick up after pets to keep excess nutrients and bacteria out of the basin.
- Minimize salt application to impervious areas. Salt generally passes through the basin soils, damaging the plants and polluting the receiving surface and ground water resources.
- Prevent sediment from leaving construction sites. The more sediment that enters the basin, the sooner it will require expensive maintenance like replacing the engineered soil.

# MAINTENANCE FOR BIORETENTION BASINS

## DO-IT-YOURSELF

There are some maintenance jobs that can—and should—be regularly attended to by the owner of the bioretention basin. This includes:

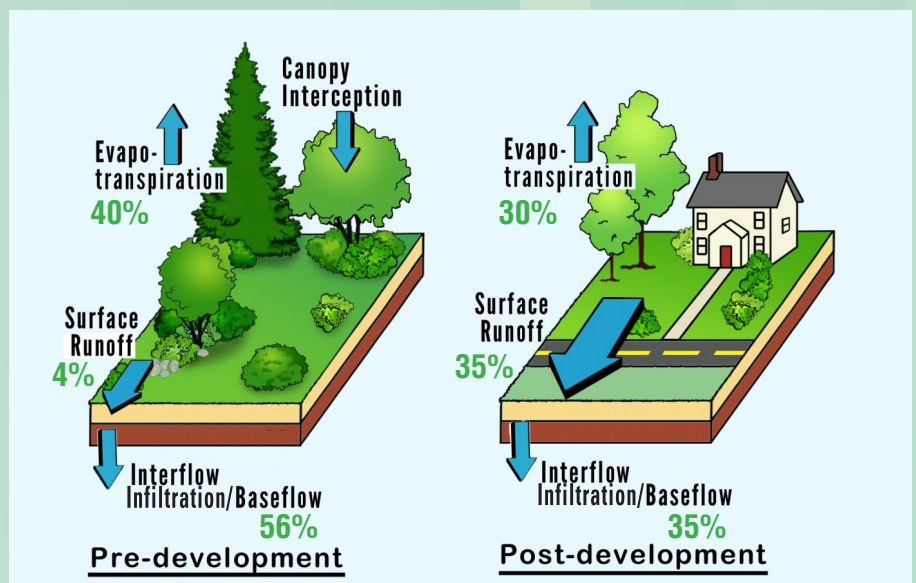
- Inspect and remove debris and sediment in the inflow area or near the overflow pipe and spillway.
- Repair any erosion in the embankment or other areas. Staked erosion matting works best. Use plant plugs to replace native plants.
- Water native plants during establishment only. Once established, watering won't be necessary.
- Remove small trees and weeds by carefully spot-applying herbicide rather than by pulling. This is because pulling them disturbs the soil and provides an opening for invasive species to grow.
- Remove excessive dead plant material in the early spring.
- Replant with different species if an original plant dies out. The original plant may have been unsuitable for the soil type or degree of wetness.

## ENLIST A PROFESSIONAL

Besides the maintenance that an owner can do, a qualified inspector should be hired annually to inspect and repair the following, as needed:

- The underdrain system, checking for obstructions like roots, sediment or animal nests.
- The condition of outlet structures, checking for obstructions or damage.
- The observation pipe (if there is one), checking during dry spells to see if runoff is infiltrating out of the gravel storage layer.
- The condition of embankments, looking for soft spots, settling and erosion.
- Diagnose any reported prolonged ponding (more than THREE days).
- Collect soil cores to evaluate engineered soil and gravel layers, if necessary.
- Remove accumulated sediment on the surface, replace engineered soil, and/or reestablish native vegetation, as needed to improve performance.
- Burn every-other-year in April where feasible. Otherwise, mow in late spring or very early summer to a height of 4 to 6 inches. The purpose is to cut the weeds before they can go to seed, and do it before the native plants start to really shoot up. This cutting height generally requires a brush hog or similar device. A normal lawn mower will cut it too short.


**Development greatly increases the amount of runoff. Runoff carries many different pollutants to our water bodies. At the same time, the amount of water that is able to soak into the ground and replenish groundwater is greatly reduced. About 80% of the population of Wisconsin relies on groundwater for their drinking water.**





# Enforcement of Bioretention Maintenance

Maintenance responsibilities for bioretention basins are usually documented as a deed restriction or a maintenance agreement that was recorded on the property when the basin was built. Maintenance can also be required through a local ordinance to meet clean water laws. The local municipality or storm water utility district is the likely regulatory agency for maintenance. Either way, the regulatory agency can require the owner(s) of a bioretention basin to perform and report inspections and to complete repairs and maintenance activities as needed. If the owner(s) fails to comply, the regulatory agency may resort to citations or other enforcement measures, or may perform the maintenance activities itself and recover the costs through special charges on the property tax bill.

A monarch butterfly with orange and black wings is perched on a tall purple flower. The background is a lush field of various wildflowers, including red and purple blooms, under bright daylight.

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