

## Bioretention Areas

A bioretention area is a shallow stormwater basin or landscaped area with well-draining soils, generally composed of sand, fines, and organic matter, and vegetation to capture and treat stormwater runoff. The basin or main treatment area of the bioretention area includes plants to aid in the filtration and infiltration of the stormwater flowing through the practice. An underdrain may be placed in the bioretention area to collect runoff that has filtered through the soil layers and pipe it to the storm sewer system or a nearby water body.



There are some common problems to be aware of when maintaining a bioretention area. They include, but are not limited to, the following:

- Sediment build-up
- Clogging in the inlet and outlet structure
- Establishing vegetation within the bioretention area
- Clogging the underdrain (if applicable)
- Mosquitoes breeding in the practice
- Ant mounds
- Maintaining the proper pH levels for plants
- Pruning and weeding to maintain appearance

Routine maintenance should be performed on the bioretention areas to ensure that the structure is functioning properly. Note that during the first year the bioretention area is built, maintenance may be required at a higher frequency to ensure the proper establishment of vegetation in the practice.

In addition to routine maintenance, bioretention areas have seasonal and intermittent maintenance requirements. For example, the following are maintenance activities and concerns specific to winter months. Planting material should be trimmed during the winter, when the plants are dormant. In the event of snow, ensure that snow does not pile up in the bioretention area. Accumulated snow adds additional weight and may compact the bioretention area soil, which would reduce its infiltration capacity. In addition, check to make sure that the materials used to de-ice the surrounding areas stay out of the practice to avoid clogging and further pollution.

Bioretention areas should be inspected after a large rainstorm. Keep drainage paths, both to and from the BMP, clean so that the water can properly infiltrate into the ground. Note that it might take longer for the water to infiltrate into the ground during the winter months and early spring. Mulch the practice

as needed to keep a thickness of 3-4 inches. Shredded hardwood mulch is preferred, and care should be taken to keep the mulch from piling on the stems of the plants. For more information on vegetation in bioretention areas, see Appendix D: Planting and Soil Guidance.

If the bioretention area is not draining properly, check for clogging of the inflow and outflow structures as well as the infiltration rate of the soil media. If the soil is not draining properly, it could be clogged or over-compacted. In a bioretention area, the media is likely to become clogged at the mulch or upper layer of the soil first. If the media is clogged or over-compacted, then the media should be replaced. Potential sources of excessive sediment that could clog the media include ant mounds and unstable soil upstream of the practice. Possible sources of compaction are vehicles, such as tractors, traveling through the practice. If the practice includes an underdrain, a structural repair or cleanout to unclog the underdrain may be necessary.

In order to keep the water that exits the bioretention area clean, fertilizers should only be used sparingly during the establishment of the practice. Once the vegetation in the practice has been established, fertilizers should not be used. While vegetation in the bioretention area is important, the primary purpose of a bioretention area is to act as a water quality device and introducing fertilizers into the bioretention area introduces nutrients such as phosphorus and nitrogen that can pollute downstream waters. In addition, bioretention areas should already be a nutrient rich environment that does not require fertilization. To control animal nuisances and invasive species, pesticides (including herbicides, fungicides, insecticides, or nematode control agents) should be used sparingly and only if necessary.

If designed correctly, there is no danger of bioretention areas becoming a breeding ground for mosquitoes. A mosquito egg requires 24-48 hours to hatch. In addition, it takes 10-14 more days for the larvae to develop and become an adult. By having a bioretention area that drains properly, it is unlikely that a bioretention area would provide a habitat that could become a breeding area for mosquitoes. Should the bioretention area become a breeding ground for mosquitoes, the problem is likely with the soil media or the overflow structure which may need to be addressed.

The table below shows a schedule for when different maintenance activities should be performed on the bioretention area.

**Bioretention Area Typical Routine Maintenance Activities and Schedule**

Activity	Schedule
<ul style="list-style-type: none"> <li>• Prune and weed to maintain appearance.</li> <li>• Dissipate flow when erosion is evident.</li> <li>• Remove trash and debris.</li> <li>• Remove sediment and debris from inlets and outlets.</li> <li>• Remove and replace dead or damaged plants.</li> <li>• Mow around the bioretention area as necessary, ensuring grass clippings are not placed in the practice.</li> <li>• Observe infiltration rates after rain events. Bioretention areas should have no standing water within 24 hours of a storm event.</li> <li>• Inspect for evidence of animal activity.</li> </ul>	<p style="text-align: center;">As needed or 4 times during growing season</p>

Activity	Schedule
<ul style="list-style-type: none"> <li>• Inspect for erosion, rills, or gullies and repair.</li> <li>• Inspect filter strip/grass channel for erosion or gullying, if applicable. Re-seed or sod as necessary.</li> <li>• Inspect trees and shrubs to evaluate their health, and remove and replace any dead or severely diseased vegetation.</li> <li>• Obtain a mulch depth of at least 3 to 4 inches should be inspected and obtained. Additional mulch should be added as necessary.</li> </ul>	Semi-annually in spring and fall
<ul style="list-style-type: none"> <li>• Trim planting material.</li> <li>• Inspect for snow accumulation.</li> </ul>	As needed or during winter months
<ul style="list-style-type: none"> <li>• Test the planting soils for pH levels. Consult with a qualified licensed Professional to determine and maintain the proper pH levels.</li> </ul>	Annually
<ul style="list-style-type: none"> <li>• Replace/repair inlets, outlets, scour protection or other structures as needed.</li> <li>• Implement plant maintenance plan to trim and divide perennials to prevent overcrowding and stress.</li> <li>• Check soil infiltration rates to ensure the bioretention area soil is draining the water at a proper rate. Re-aerate or replace soil and mulch layers as needed to achieve infiltration rate of at least 0.5 inches per hour.</li> </ul>	2 to 3 years