

FACTS ABOUT STORMWATER

Stormwater is rainfall that runs off the ground surface before it can be absorbed into the soil. There are two main problems associated with this stormwater runoff. The first is water quality and the second is water quantity.

WATER QUALITY: When it rains, water flows over lawns, driveways, roads, and parking lots picking up a wide array of pollutants such as nutrients, pesticides, hydrocarbons, heavy metals, sediment, and bacteria. These pollutants enter surface waters and cause algae blooms, increase turbidity, and degrade habitat. The first 1 inch of rainfall carries the highest concentration of pollutants and is called the "First Flush."

WATER QUANTITY: Impervious surfaces such as streets, rooftops, driveways, sidewalks, and parking lots prevent rain water from infiltrating into the soil and reaching the water table. The result is that each time it rains, water quickly flows over these hard surfaces causing flash floods and erosion of stream channels.

FACT: Stormwater pollution is the #1 source of water pollution in the United States.



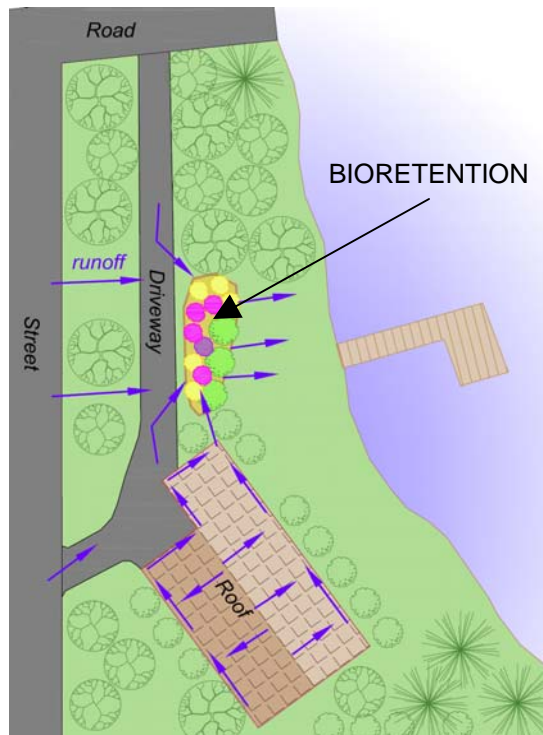
FACT: 5.7 million pounds of nitrogen and 4.2 million pounds of phosphorus are carried into the Bay via stormwater runoff from fertilized lawns and agricultural lands causing algal blooms which lead to low water oxygen levels.

BIORETENTION PLACEMENT

Commercial and residential landowners that are situated on waterfront property have a unique opportunity to provide the Bay's last defense against stormwater pollution. They can install a Bioretention facility (or rain garden for smaller applications) to intercept runoff that would otherwise flow untreated into the Bay.

Bioretention facilities installed in urban and residential areas throughout the watershed are important in reducing flooding, streambank erosion, and pollutant transport.

The reduction of stormwater runoff volumes and processing of pollutants achieved in a Bioretention will compliment the ability of Vegetated Buffers to filter stormwater and promote sheet flow. Water quality will be improved and water quantity will be reduced.



Arrows indicate runoff from the rooftop, driveway, and street. Runoff can be directed into a Bioretention facility where it is treated before reaching the bay.

For More Information:

STORMWATER Chesapeake Bay Program

<http://www.chesapeakebay.net/stormwater.htm>

Maryland Department of Environment: Stormwater Management Program

<http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/home/index.asp>

BIORETENTION

Using Native Plants for Rain Gardens & Wet Meadows

<http://www.wetland.org/downloads/Rain%20gardens.pdf>

http://www.lid-stormwater.net/bio_benefits.htm

Low Impact Development Center

http://www.lid-stormwater.net/bio_benefits.htm

Environmental Protection Agency Stormwater Technology Fact Sheet

<http://www.epa.gov/owm/mtb/biortn.pdf>

Prince George County

[http://www.goprincegeorgescounty.com/Government/AgencyIndex/DER/ESD/Bioretenion/bioretenion.asp?nivel=foldmenu\(7\)](http://www.goprincegeorgescounty.com/Government/AgencyIndex/DER/ESD/Bioretenion/bioretenion.asp?nivel=foldmenu(7))

Rainscaping.org

<http://www.rainscaping.org>



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Bioretention



**Environmental
Concern**

*Protecting the bay
from stormwater pollution*

WHAT IS BIORETENTION?

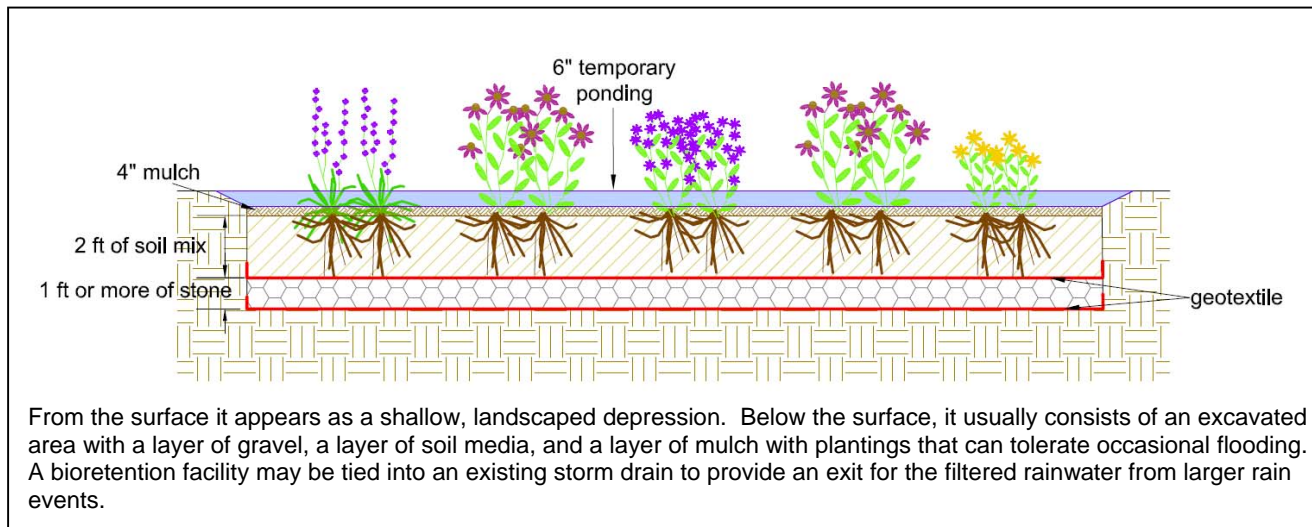
Bioretention is a stormwater management practice that was developed in the early 1990's by Prince George County, MD's Department of Environmental Resources. It has been recognized by many states for the ability to reduce pollutants and other impacts associated with stormwater runoff.

A Bioretention facility can provide water quality and water quantity benefits. It can provide habitat. It can also be an **attractive** landscape feature.

A Bioretention facility planted with native plants is well adapted to local climate, periods of drought and saturation, and provides the best habitat for local wildlife such as birds, butterflies, and beneficial insects.



Bioretention is one of the most effective ways to improve the quality and reduce the quantity of stormwater entering our surface waters. In this picture, a Bioretention facility captures runoff from the roof, sidewalk, and parking lot of a public building.



WHAT ARE THE BENEFITS?

Bioretention uses a combination of physical and biological components to capture and treat stormwater before it reaches our surface waters and the Chesapeake Bay. The EPA estimates that a Bioretention facility can reduce the amount of pollutants entering our surface waters by as much as 90%.

Bioretention facilities are best suited for runoff from one acre or less. This is ideal for residential, municipal, and commercial lots.

A Bioretention facility provides all the benefits of a typical stormwater retention facility such as:

1. Capturing and holding stormwater to allow time for pollutants to settle out,
2. Increasing infiltration to groundwater,
3. Reducing flash flooding,
4. Reducing erosion of stream channels by slowing the velocity of water entering natural streams.

Bioretention has additional benefits.

1. Living plants use up excess nutrients such as Phosphorus and Nitrogen from fertilizers and animal waste runoff.
2. The soil media in a Bioretention facility acts as a sponge, holding on to pollutants and filtering sediments.
3. Microbes living in soil can actually volatilize pollutants such as hydrocarbons rendering them harmless.
4. Plus living plants provide habitat for wildlife.

Pollutant	Removal Rate
Phosphorus	70% - 83%
Heavy Metals	93% - 98%
Nitrogen	68% - 80%
Suspended Solids	90%
Organics	90%
Bacteria	90%

(Source: EPA Storm Water Technology Fact Sheet: Bioretention. 1999. US EPA 832-F-99-012.)