



Stormwater Management Practices



Georgetown County, SC
February 13, 2006



Strategy for coping with polluted runoff

1st: Natural Resource Based Planning
2nd: Better Site Design
→ **3rd: BMPs & Remediation**

- Retain the natural landscape
- Reduce impervious surfaces
- Emphasize on-site drainage of stormwater
- Encourage natural vegetative buffers
- Improve stormwater management




What is a Best Management Practice?



SC DHEC says a BMP is...

a management and conservation practice that has been demonstrated to effectively control movement of pollutants, prevent degradation of soil and water resources, and are compatible with the land use






Types of Stormwater BMPs

- Infiltration (pervious surface materials)*
- Filtering (bioretention areas and rain gardens)*
- Open Channel (grassed swales)
- Stormwater Wetlands*
- Stormwater Ponds

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- In-line Devices (trash traps and pollutant adsorbers)

Infiltration - Pervious Materials, Pavers and Concrete

Alternatives to conventional surface materials

Increases chances for infiltration

Can be used in combinations

Pavers can be expensive

Maintenance....

Weeds and clogging





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Impervious vs. Pervious





Subterranean Retention

The diagram shows a cross-section of the Rainstore3 system. It features an access port on the surface pavement leading to a base course. Below this is a geogrid layer with Rainstore3 cells. An inlet pipe leads into a sediment filter, which is supported by a geotextile filter fabric. Below the filter is another geogrid layer, and an outlet pipe leads away. Two photographs on the right show the physical Rainstore3 cells stacked in a warehouse and installed in a trench.

Surface Pavement
Access Port
Base Course
Geogrid
Rainstore3 Cells
Inlet Pipe
Sediment Filter
Geotextile Filter Fabric
Outlet Pipe
Geogrid

Rainstore3™ www.invisiblestructures.com

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Filtering BMPs – Bioretention

The diagram illustrates a bioretention system. The top part is a plan view showing a parking lot with sheetflow leading to a stone drop, a grass filter strip, an optional sand layer, a bioretention area with plants, a gravel curtain, and a drain overflow. The bottom part is a cross-section showing a 6"-9" ponding area, 2"-3" mulch and planting soil, a filter fabric, and gravel.

PARKING LOT SHEETFLOW
STONE DROP
GRASS FILTER STRIP
OPTIONAL SAND LAYER
BIORETENTION AREA
GRAVEL CURTAIN
DRAIN OVERFLOW
PLAN
DERM
6"-9" PONDING
2"-3" MULCH & PLANTING SOIL
FILTER FABRIC
GRAVEL

Center for Watershed Protection (www.cwp.org)

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Use landscaped islands for stormwater management

The image shows two photographs of landscaped islands. The left photo shows a landscaped island with tall grasses and a car. The right photo shows a similar island with a circular concrete drain. An orange arrow points from the text 'drain' to the drain in the right photo.

drain

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A photograph of a landscaped island with various plants, including tall grasses and yellow flowers. The island is situated between parking spaces with cars. A date stamp 'MAY 15 2004' is visible in the bottom right corner.

Source: City of Portland, OR
MAY 15 2004

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Open Channel – Swales and Ditches

- Allows relatively rapid conveyance of stormwater
- Slows flow to allow sediment settling and some infiltration
- Can be attractor for wildlife and associated bacteria





Open Channel – Swales and Ditches





Stormwater Wetlands





Benefits from Using Stormwater Wetlands

- Good nutrient removal
- Aesthetically pleasing
- Provides natural wildlife habitat
- Relatively low maintenance costs
- Relatively low operations costs and energy use
- Great educational tools!





Limitations to Using Stormwater Wetlands

- Mosquito issues
- Invasive vegetation
- Nuisance “critters”
- Odor can be an issue
- Needs continuous baseflow for viable wetland
- Sediment regulation is critical to sustain wetlands






Stormwater Ponds










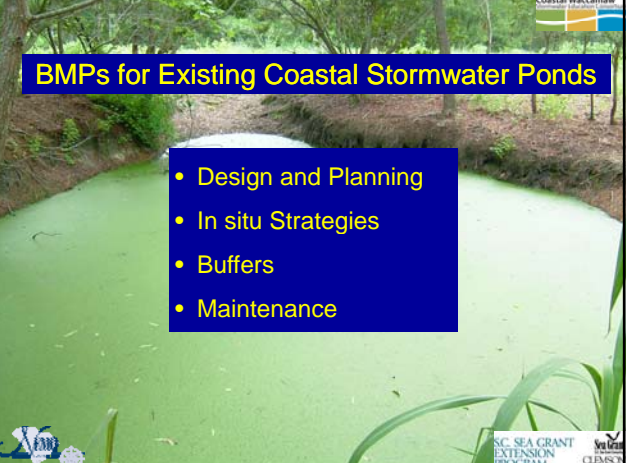



Stormwater Ponds

- **Advantages**
 - Manages stormwater *quantity*
 - traditional...everybody’s doing it
 - good at removing sediment and solids
- **Disadvantages**
 - relatively land intensive
 - safety issues
 - poor removal of nutrients
 - pathogen sink or source? TBD...



BMPs for Existing Coastal Stormwater Ponds

- Design and Planning
- In situ Strategies
- Buffers
- Maintenance



Stormwater Ponds Design and Planning

- Pond edges and littoral shelves or “benches”
- Pond maintenance plan
- Stormwater drainage and management plan
- Soil testing and nutrient management plan



Stormwater Ponds In situ Solutions

- Aeration
- Chemical amendments
- Floating vegetation mats
- Dredging



Stormwater Ponds Buffers

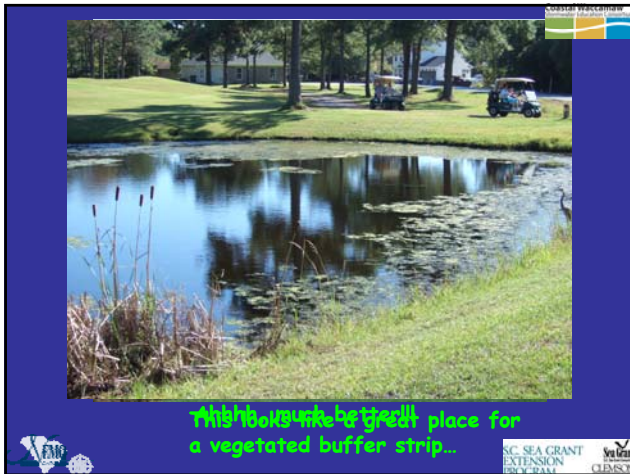
- Vegetated buffer strips
- Don't mow to the edge
- Stormwater collection and pre-treatment
- Littoral shelves or aquatic “benches”

Stormwater Ponds Maintenance

- Developer to homeowner
- Who, what, when, how?
- HOA/POAs or homeowner?
- Ordinances or neighborhood covenants?
- Education and outreach



Inline devices

Product Specifications Overview

FloGard-PLUS™

Downsize Complete Prof. Series

A multipurpose catch basin insert designed to capture sediment, debris, trash & silt/grass from low (first flush) flows.

A (dual) high-flow bypass allows flows to bypass the device while retaining sediment and larger floatables (debris & trash) AND allows sustained maximum design flows under extreme weather conditions.

FloGard-PLUS™ inserts are available in sizes to fit most industry standard drainage inlets (i.e., flat, grates, combination, curb and round inlets).

FloGard-PLUS™ catch basin inserts are recommended for areas subject to oil and debris as well as low-to-moderate levels of petroleum hydrocarbon (oil and grease). Examples of such areas are vehicle parking lots, aircraft ramps, truck and box storage yards, corporation yards, subdivision streets and public streets.

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Inline devices

How the SNOUT Oil-Water-Debris Separator Works

www.bmpinc.com

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Stormwater Management Strategies

The "M" word = MAINTENANCE!

- To ensure successful stormwater mgmt
- Must have a plan!! Who, what, when, where, how, how often?
- For std BMPs, consult Ch. 7 of SWM Design Manual
- For prefab BMPs, consult manufacturers guides
- Education and outreach programs available



Education and Outreach!!



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www.scseagrant.org/extension/extension_coaenvqua.htm

