

Stormwater Management Practices

Horry County, SC
April 19, 2006

Coastal Waccamaw
SC SEA GRANT
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What is a Best Management Practice (BMP)?

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

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Strategy for coping with polluted runoff

Best Management Practices (BMPs)

- Encourage mostly natural & vegetated stormwater controls
- Ensure maintenance of roads, lots, and catch basins
- Support restoration where effective
- Encourage redevelopment and infilling to avoid further sprawl

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Stormwater Ponds

Photo: Susan Liles

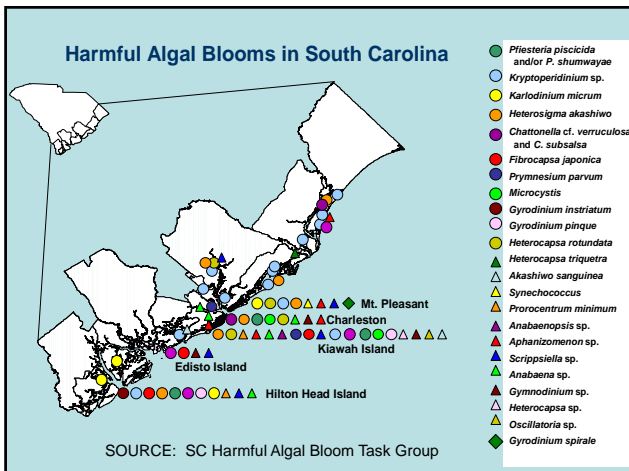
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Stormwater Ponds

- **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...

Nutrient Loading and Eutrophication

- **Nitrogen & phosphorus** are major **nutrients** associated with **nonpoint source pollution**
- For example, greater runoff volume along with greater concentration of nitrogen resulted in 11X more nitrogen loading at urbanized site (Murrells Inlet) (Source: USES)
- Can encourage **eutrophication**, which can potentially cause **algal blooms**, reduced **dissolved oxygen (DO)** levels, and **anoxia**



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”





This is a ~~great~~ **great** place for
a vegetated buffer strip...





Stormwater Ponds Maintenance

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

Types of Stormwater BMPs

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




Impervious vs. Pervious




Subterranean Retention

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

PARKING LOT
SHEETFLOW
STONE DROP
GRASS FILTER STRIP
OPTIONAL SAND LAYER
BIORETENTION AREA
GRAVEL CURTAIN DRAIN OVERFLOW
DERM
PLAN

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

drain

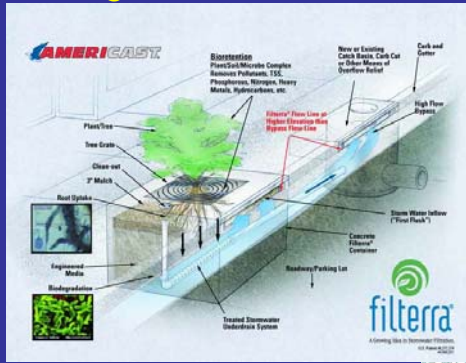
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Source: City of Portland, OR

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Filtering BMPs – Bioretention



www.filterra.com



Bioretention / Rain Gardens

- For any impervious surface (rooftop, sidewalk, parking lot)
- Allows collection of stormwater and infiltration
- Plants and microbes do the work of pollutant removal
- Can be attractor for wildlife such as birds and butterflies

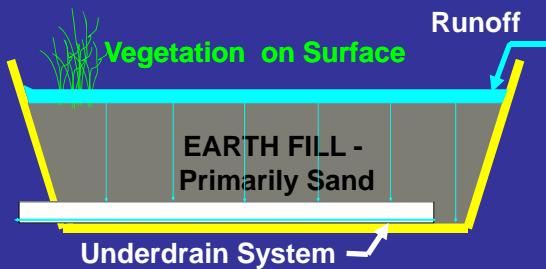


Photo: Center for Watershed Protection (www.cwp.org)



Photo: NC State Cooperative Extension (www.ba.ncsu.edu/stormwater)

Bioretention / Rain Garden Schematic



Source: Bill Hunt, NCSU



Open Channel – Swales, Ditches, Canals

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



Photo: University of Florida







Inline devices

- Used in urban areas
- Installed in line with stormwater infrastructure
- Usually sized based on impervious area
- Inspection and maintenance required

CST
...CLEAR SOLUTIONS

The CrystalStream Water Quality Vault
U.S. Pat. No. 6,797,161

www.crystalstream.com

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The StormTreat System

www.stormtreat.com

Inline devices

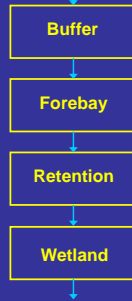
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How the SHOUT Oil-Water-Debris Separator Works

www.bmpinc.com

BMPs in Series = "Treatment Train"

- Some BMPs are better than others for certain pollutants
- Consider the connectivity of BMPs
- Front-end sediment collection = forbays or traps
- Vegetated BMPs can be overloaded = should be toward the end of train



Stormwater Management Strategies The "M" word = MAINTENANCE!

- To ensure successful stormwater mgmt
- Must have a plan!! *Who, what, when, where, how, how often?*
- Maintenance needs depend on type of practice – consult design manual or manufacturer guides
- Education and outreach programs available



Education and Outreach!!



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www.scseagrant.org/extension/extension_coaenvqua.htm