

Stormwater BMP Maintenance

Background and Definitions

What is Stormwater Runoff?



Stormwater

- Stormwater is the result of precipitation that flows overland to streams and other bodies of water
- Stormwater collects pollutants as the water flows overland
- Stormwater is typically not treated
- The amount of runoff is increased by hard, impervious, or compacted surfaces

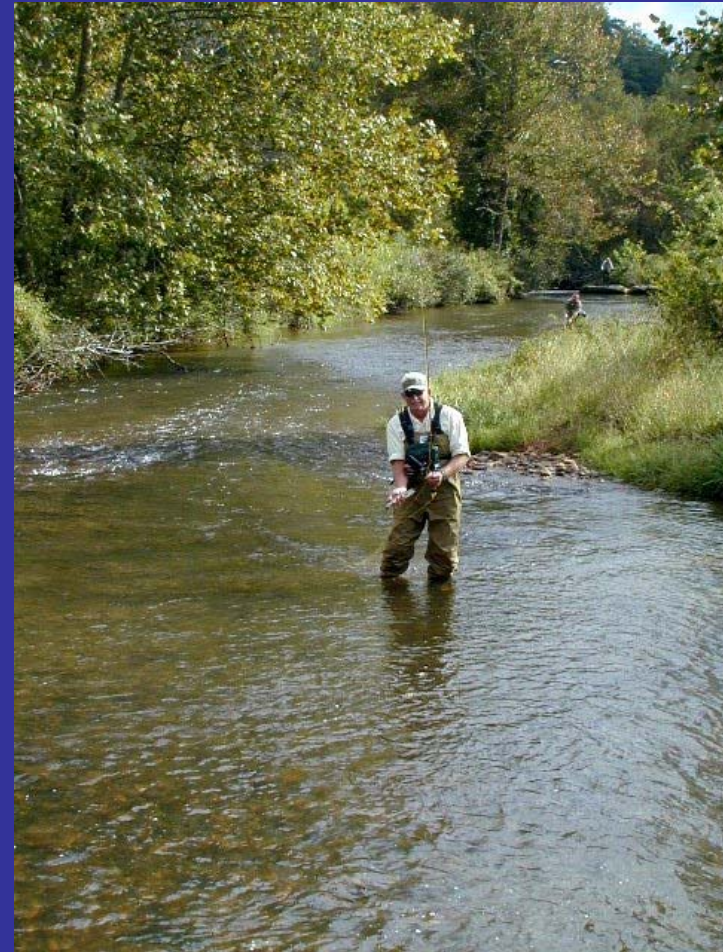
Convincing Property Owners to “Buy Into” Stormwater Inspection & Maintenance

Do you like to...

Swim



Fish



Had you rather swim in

This



Or This



Had you rather fish in...

This



Or
This



Is water related recreation important to North Carolina?




Is there a connotation to clean water in our culture?



Tourism and Water ???

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7 Day Forecast



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Business

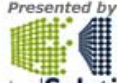
Visitor spending hits record \$17.1B in N.C.


Posted: Aug. 5, 2008

RALEIGH, N.C. — Visitor spending increased 7.4 percent across North Carolina last year, to a record \$17.1 billion, according to [information](#) released Tuesday by the state Division of Tourism, Film and Sports Development.

Wake County was one of six counties to register double-digit growth in visitor spending, with a 10.7 percent increase to almost \$1.5 billion. Nash County saw the largest jump statewide at 12.7 percent, to \$218 million.

All Triangle-area counties saw increased tourism spending, except for Lee County, which registered

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Video

- OBC rides tide of troubled economy

Documents


- 2007 N.C. visitor spending

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On the Commons
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MARKET WATCH

WRAL.com 30
▼ 646.21 -24.07 (-3.59%)

WRAL.com 30 (WRAL30)



Where does your drinking water come from?



Does it come from here?



Is Flooding a Serious Issue in North Carolina?



NC

Maintenance & Inspection



Is erosion a serious issue in North Carolina?



What's the difference?



The difference is...

Storm sewers lead to...



Streams



The difference is...

Sanitary sewers lead to...

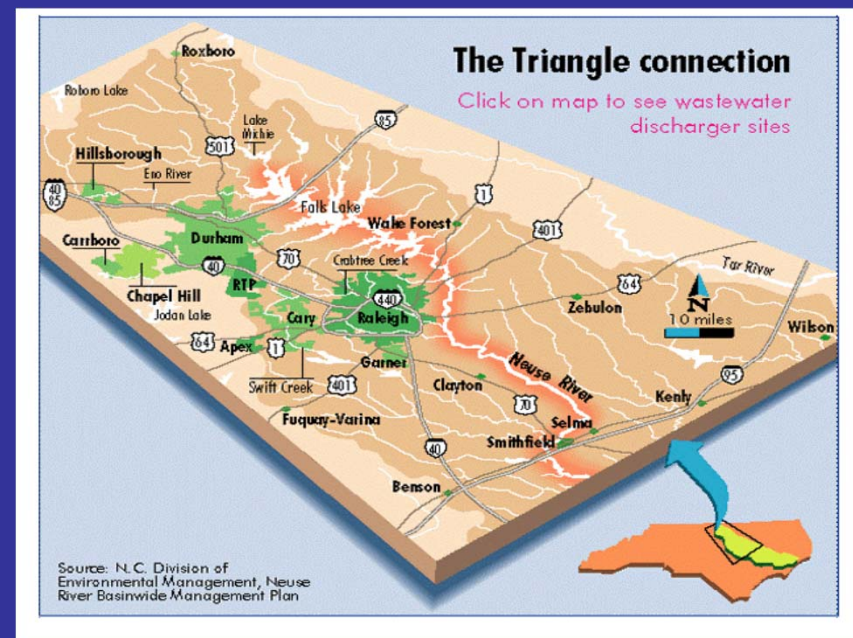


Waste water treatment plants



Watersheds and Land Use

- Watershed is that geographic area that drains into a stream or river
- Watershed = catchment = drainage area
- Urbanization of watersheds increases stormwater flows



Managing Stormwater

- Stormwater is directly related to land use
 - ‘generally, the more the land is *used* (developed) the more stormwater will be generated’
- Best Management Practices (BMPs) are installed to treat, slow, and reduce stormwater runoff

Stormwater Management vs. 'Drainage'

- Agriculture and Engineering have emphasized drainage for centuries – get the water off-site ASAP
- Stormwater management is fundamentally different... from previous slide:
- “Best Management Practices (BMPs) are installed to treat, *slow*, and *reduce* stormwater runoff”

Best Management Practice/ SCM

- Structural, vegetative, or management practices used to protect and improve our surface and groundwater
- The new term for this is “Stormwater Control Measures” (or SCMs)

Stormwater Control Measures

- Also known as 'BMPs'
- SCMs are expensive to design and install so they should be maintained to:
 - 1. LOOK GOOD
 - 2. FUNCTION PROPERLY
 - 3. BE SAFE

Please be aware....

- All BMPs need maintenance
- We will show many examples of BMPs that need maintenance
- BMPs that are well maintained should have a life span of 30+ years
- We are learning as we go, designs have improved, construction has improved, maintenance has improved....

Why Are We Here?

Cary Stormwater BMPs 2008

- Approximately 425 BMPs in Cary
- According to one of Cary's inspectors: Timothy Grady, RLA:
- 95% of BMPs fail initial inspection as they require repairs
- Most repairs are maintenance related: erosion, trash removal, tree removal

Why Are We Here?

Cary Stormwater BMPs 2010

- Approximately 600 BMPs in Cary
- Cary has digital tracking system for BMPs
- Strong educational program for contractors, has 2 inspectors
- Must pass initial inspection to get C/O
- ~ 95% pass first annual inspection now

BMP Water Quality Credits Neuse and Tar River Basins

	N	P
• Wet pond	25	40
• Wetland	40	40
• Bioretention	40	45
• Grass Swale	20	20
• Veg Strip w/LS	20	35
• 50' rip buff w/LS	30	30
• Permeable Pavements	40-60*	40-60*

* Coastal Plain & Sandhills Only

Wet Detention Basins



Stormwater Wetlands



Bioretention or Rain Garden



Dry Detention Basins



Riparian Buffers



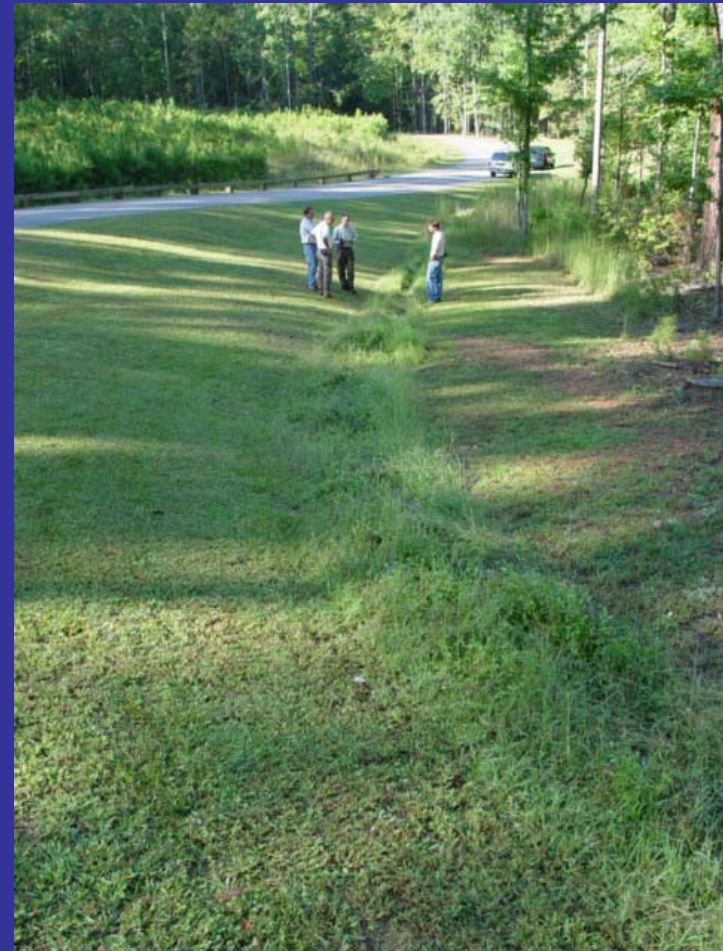
Level Spreaders



LS + Engineered Filter Strips



Grassed Swales



Green Roofs



Infiltration Devices



Cisterns/ Water Harvesting



Permeable Pavement



Sand Filter



Manufactured BMP Systems



Pollutants



Pollutants

- Nitrogen
 - From atmosphere (car exhaust, etc.)
 - From fertilizer
 - Water soluble
 - Feeds algal blooms
 - Contaminates shallow groundwater
- Phosphorus
 - Associated with sediment
 - 1/3 soluble, 2/3 insoluble in water
 - Feeds algal blooms



Pollutants

- Total Suspended Solids
 - A.K.A. sediment
 - # 1 water pollution problem in NC
- Heavy Metals
 - Lead, zinc, cadmium
 - Sources: cars, truck, industrial processes



Pollutants

- Hydrocarbons
 - Oil, gas, grease, etc. from cars/trucks
- Bacteria
 - Specified as fecal coliform
 - Pest waste one source
 - Dumpsters, diapers, etc.

