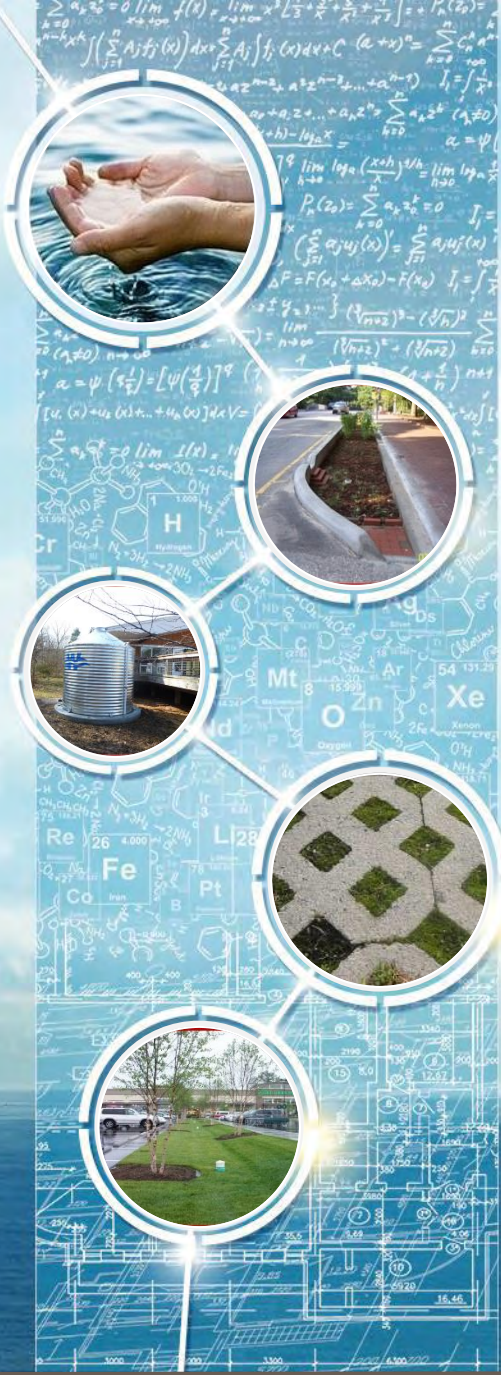




Behind the Stormwater BMP Curtain

Cradle to Grave Management of BMPs

Jonathan Smith, PE – Tetra Tech



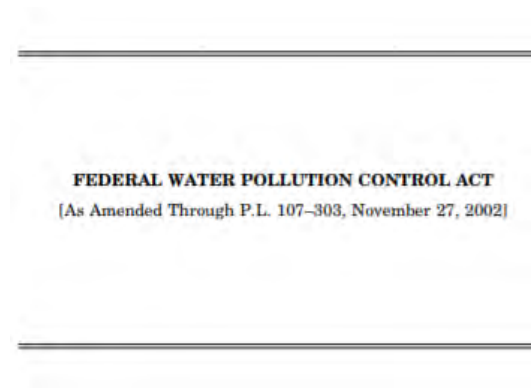
Permittee Regulatory Framework

- Clean Water Act
- TMDLs
- NPDES/MS4
- State Regulations
- Local Regulations



Clean Water Act

- Water Pollution Control Act of 1948
- 1972 amendments, renamed to Clean Water Act with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the U.S
- Gave EPA authority to implement pollution control programs
- Established basic structure for regulating discharge of pollutants into surface waters in the US.



Sections of the CWA

- 303 – Establishes water quality standards

- 401 – Regulates water quality impacts programs

Establishes Framework for TMDLs

- 402 – Establishes National Pollutant Discharge Elimination System (NPDES)

- 404: Regulates waters of the US

Establishes Framework for NPDES MS4 Permits

Section 402: 1987 Clean Water Act Amendments

- Expanded regulation to stormwater discharges
- 1990 - NPDES Phase I: Medium and Large Municipal Separate Stormwater Sewer Systems (MS4s) with population > 100,000
- 2003 - NPDES Phase II: reduced threshold to 10,000



National Map of Regulated MS4s



Source: EPA.gov

Six Minimum Measures of NPDES Phase II

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination (IDDE)
- Construction Site Runoff Control
- Post-Construction Stormwater Management in New and Redevelopment
- Pollution Prevention/Good Housekeeping

Post-Construction Requirement

- Develop and implement strategies which include structural BMPs
- Adopt an ordinance or other regulatory mechanism requiring post construction runoff controls
- Ensure adequate long term operation and maintenance
- Determine appropriate BMPs and **measurable goals** for this minimum measure

[EPA Phase II Measurable Goals Guidance:](https://www.epa.gov/sites/production/files/2015-11/documents/measurablegoals_0.pdf)

https://www.epa.gov/sites/production/files/2015-11/documents/measurablegoals_0.pdf

Section 303

- Requires States (or tribes) to determine beneficial uses for water bodies
- Water Quality Criteria are established to ensure that beneficial uses are attained
- Establishes a process to identify impaired waters -303(d) list
- Develop Total Maximum Daily Loads (TMDLs) for prioritized waters

Total Maximum Daily Load (TMDL)

- A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for that particular pollutant. A TMDL determines a pollutant reduction target and allocates load reductions necessary to the source(s) of the pollutant.
- Allocations:
 - Agriculture
 - Publicly Operated Treatment Works (POTW)
 - Industrial discharges
 - Urban stormwater

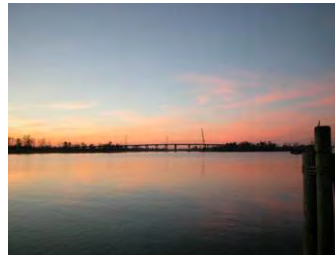
TMDL: Urban Stormwater Allocation

- Pollutant allocation reductions can be implemented into NPDES permits
- Permit conditions tied to load reduction or effluent limits
- Retrofits may be required



State Regulations

- States may enact their own regulations to address state or watershed level issues.
- Neuse River in NC
 - Late 1980's extensive fish kills in Pamlico Sound were determined to be caused by excessive nutrients leading to low oxygen.
 - In 1997 State Legislature passed a law that required a variety of nutrient reduction measures including nutrient effluent limits from new development in urban areas. Compliance with these rules often requires structural BMPs



Other Regulatory Drivers for BMPs

- State Water Supply Criteria
- Combined Sewer Systems
- Industrial NPDES

Local Regulations

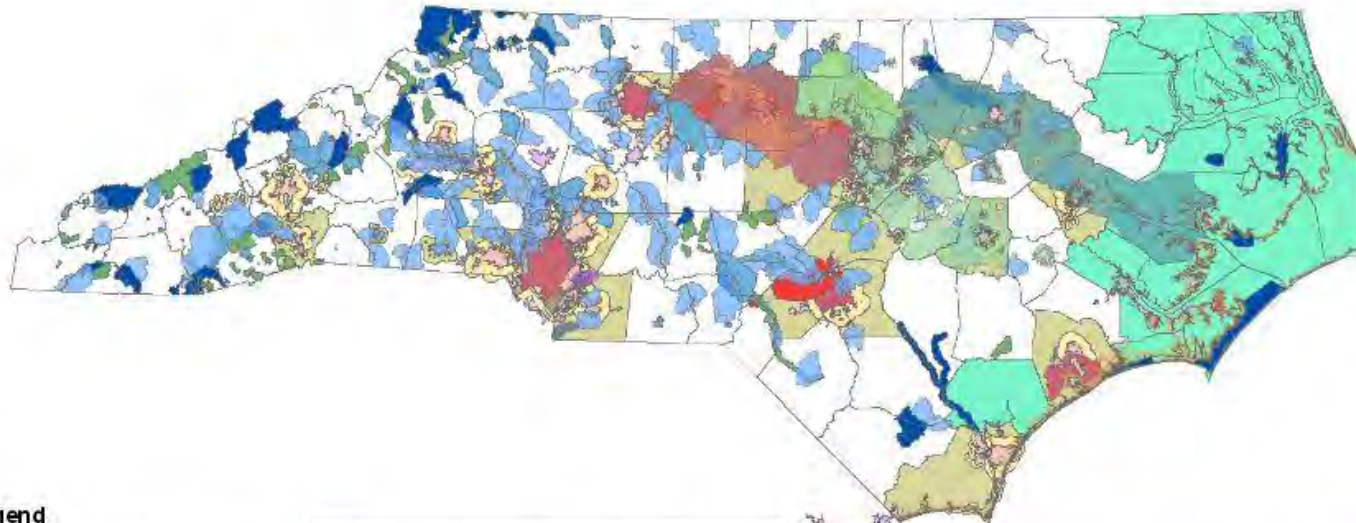
- Many municipalities adopt their own local regulations which require or encourage BMPs
- Examples:
 - Flood control
 - Stream protection



A Complex Stew of Stormwater Rules

2/12/2013

Stormwater Management Program Areas in North Carolina

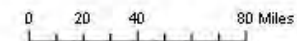


Legend

- | | |
|---|--|
|  Neuse NSW Strategy Area |  NPDES-Exempt Phase II Municipalities + ETJs |
|  Tar-Pamlico NSW Strategy Area |  NPDES Permit - Phase I MS4/Military |
| DESCRIPT |  NPDES Permitted Ph II MS4/Co |
|  Falls Lake Watershed |  NPDES Permitted Phase I MS4 |
|  Goose Creek Watershed |  NPDES Permitted Phase I/II city ETJ |
|  Jordan Reservoir Watershed |  NPDES Permitted Phase II MS4 |
|  Randleman Reservoir Watershed |  Phase II MSIs (from 2011 Boundaries) |
|  Sixmile Creek Watershed |  Designated Phase II Municipalities |
|  Waxhaw Creek Watershed |  Future MSIs (2010 Delineations) |
|  Water Supply Watersheds |  Urbanized Areas (2000 Census) |
|  ORW |  NEW Urbanized Areas (2010 Census) |
|  HQW (non-coastal) |  Phase II Tipped Counties (Post-Construction) |
|  SA (Shellfish) Areas |  Coastal Stormwater (CAMA Counties) |

Post-Construction Areas per Session Law 2006-246 and Coastal Stormwater Rules.

Note - Although Brunswick, New Hanover, and Onslow are Phase II Tipped Counties, projects there are subject to the Coastal Stormwater Rules.

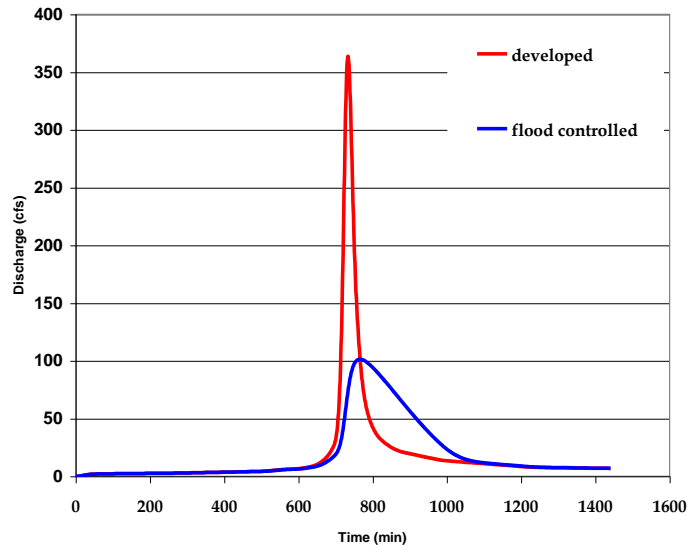


State Post Construction SW Standards

State	New Development		Redevelopment
	Volume Based	Treatment Based	
KY	N/A	Manage 80 th percentile precipitation runoff (0.75")	same
TN	Infil/evap/retain first 1" of rainfall		same
NC*	N/A	1" rainfall non-coastal, 1.5" rainfall or volume diff. of 1-yr 24-hr pre-post in coastal	None if no net increase in built area
SC	Varies by practice		same
AL	Narrative Standard		
MS	Infiltrate/evap/harvest first 1 inch of rainfall		same
GA	N/a	Treat runoff from 85% of storms (1.2")	same
FL	Predevelop match in closed basins	Varies, ½ " runoff to 1.25 X Imp + add'l ½"	Same

What Purpose to BMPs Serve?

- Manage flow
- Manage volume
- Manage pollutants



Best Management Practices: Unit Processes

- Settling
- Infiltration
- Filtration
- Adsorption/Absorption
- Consumptive use/harvesting
- Bioremediation



Emerging Issues: Green Infrastructure



Emerging Issues: Green Infrastructure

Green Streets



Emerging Issues: Green Infrastructure



Best Management Practices

- Four Key Phases to Success

1. Pre-Construction/Planning

2. Construction

3. Closeout

4. Long Term Mgmt/Maintenance



Questions and Discussion

