Annual Stormwater Report

Term II, Extended Period: April 1, 2010 – August 31, 2010

Term III, Year 1: September 1, 2010 – August 31, 2011

for the

North Carolina Department of Transportation
Highway Stormwater Program

For submittal to

NC Department of Environment and Natural Resources

Division of Water Quality

NC Department of Transportation

NPDES Permit No. NCS000250

November 2011

NCDOT Highway Stormwater PROGRAM

Annual Stormwater Report

NC Department of Transportation

NPDES Permit No. NCS000250

Term II, Extended Period: April 1, 2010 – August 31, 2010

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NCDOT's Term II permit was administratively extended after the timely submittal of a renewal application. This annual report covers the period from the expiration of the Term II permit, March 31, 2010, through the end of the first compliancy year for the Term III permit, September 1, 2010–August 31, 2011.

Certification

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

Jim Trogdon, PE
Chief Operating Officer

11/30/2011
Date

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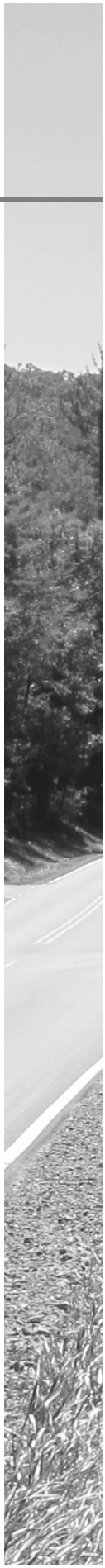
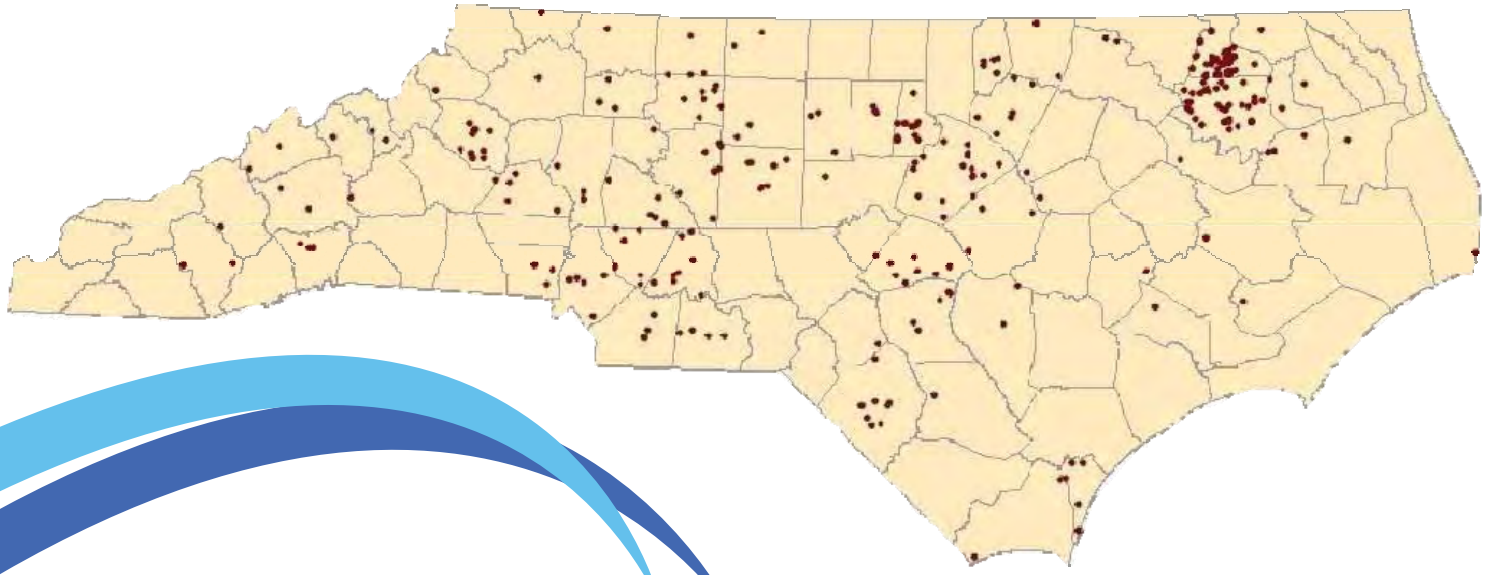


Acronyms and Abbreviations

AASHTO	American Association of State Highway Transportation Officials
BFC	Biofiltration conveyance
BMP	Best management practice
BUA	Built-upon area
CFR	Code of Federal Regulations
CoP	Community of Practice
DIS	Dune Infiltration System
DOT	Department of Transportation
DREE	Division Roadside Environmental Engineer
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
GIS	Geographic information system
GPS	Global positioning system
GREEN	Guided Reduction of Excess Environmental Nutrients
HSB	Hazardous spill basin
HSP	Highway Stormwater Program
IDDEP	Illicit Discharge Detection and Elimination Program
I&M	Inspection and maintenance
JLSLAT	Jordan/Falls Lake Stormwater Nutrient Load Accounting Tool
LEED	Leadership in Energy and Environmental Design
LID	Low impact development
LOS	Level of service
mg/L	Milligrams per liter
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDACS	North Carolina Department of Agriculture and Consumer Services
NCDENR	North Carolina Department of Environment and Natural Resources
NCDLR	North Carolina Division of Land Resources
NCDOT	North Carolina Department of Transportation
NCDWQ	North Carolina Division of Water Quality
NCHRP	National Cooperative Highway Research Program
NCSU	North Carolina State University
NPDES	National Pollutant Discharge Elimination System
PCSP	Post-Construction Stormwater Program
PE	Professional Engineer
PFC	Permeable friction course
PVC	Polyvinyl chloride
REU	Roadside Environmental Unit
RUSLE2	Revised Universal Soil Loss Equation Version 2
SCM	Stormwater control measure
SCMS	Stormwater Control Management System
SPCC	Spill Prevention, Control, and Countermeasure
SPPP	Stormwater Pollution Prevention Plan
SSIP	Stormwater System Inventory Program
TMDL	Total Maximum Daily Load
TN	Total nitrogen
TP	Total phosphorus
TRB	Transportation Research Board
TS4	Transportation Separate Stormwater Sewer System
TSS	Total Suspended Solids
UNCC	University of North Carolina at Charlotte
USGS	United States Geological Survey
WRRI	Water Resources Research Institute

Illicit Discharge Detection and Elimination Program



Illicit discharge locations reported through August 31, 2011

NCDOT Continues Illicit Discharge Detection and Elimination Program

22 Cases Documented in Term III, Year 1

The Illicit Discharge Detection and Elimination Program (IDDEP) is required to detect and eliminate illegal dumping, illegal drainage connections, and the illegal placement of hazardous waste materials along the state's roadway system. NCDOT employees participate in training to help enable them to identify potential illegal discharges and report them to IDDEP. The success of this program depends on NCDOT employees and the public detecting and reporting of this type of illegal activity. For example, one illicit discharge reported during this permit term was discovered by an NCDOT employee while doing unrelated compliance inspections with NCDWQ. A turbid discharge was noticed coming from a water treatment facility flushing their lines into a nearby creek. A sample was collected by NCDWQ and resulted in a fine for the treatment facility for sediment discharges. IDDEP also works in conjunction with NCDOT's encroachment permitting program to ensure that land owners are appropriately permitted under NPDES before connecting to NCDOT rights-of-way.

From September 21, 2010, to August 31, 2011, the IDDEP program identified 22 new illegal discharges from across the state. These newly discovered discharges, along with past illegal discharge sites, are tracked in NCDOT's internal database and are reported to NCDWQ Regional Offices on a monthly basis, in accordance with Management Measures (d) and (e). Throughout the course of the program, NCDOT has reported more than 372 cases of illegal dumping to NCDWQ. The figure above displays the locations of all cases reported through August 31, 2011.

Program Objectives

NPDES Permit Part II.A

Objectives

i. Implement an Illicit Discharge Detection and Elimination Program to assure that the illicit discharges, spills and illegal dumping into the NCDOT transportation separate storm sewer system (TS4) are detected and eliminated.

ii. NCDOT shall implement appropriate procedures and actions to report illicit spills, discharges and illegal dumping for appropriate enforcement or other action by NCDENR.

Management Measures

a. Provide illicit discharge identification training.

b. Perform illicit discharge inspections.

c. Maintain a standard point of contact.

d. Report illicit discharges.

e. Maintain a tracking database.

IDDEP Continues to Meet Management Measures

Management Measures (a) and (b)

NCDOT employees regularly receive training on how to recognize and report illicit discharges and illegal dumping. Training, including "Illicit Discharge: Know What to Do," is provided in conjunction with other training events, including Stormwater Pollution Prevention training and regularly scheduled Unit and Division meetings. This training enables NCDOT employees to continue identifying, inspecting, and reporting illicit connections and illegal dumping across the state.

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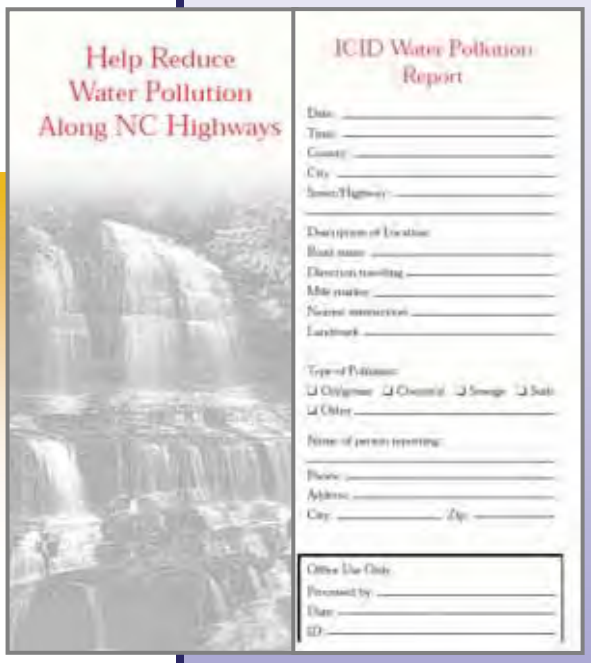
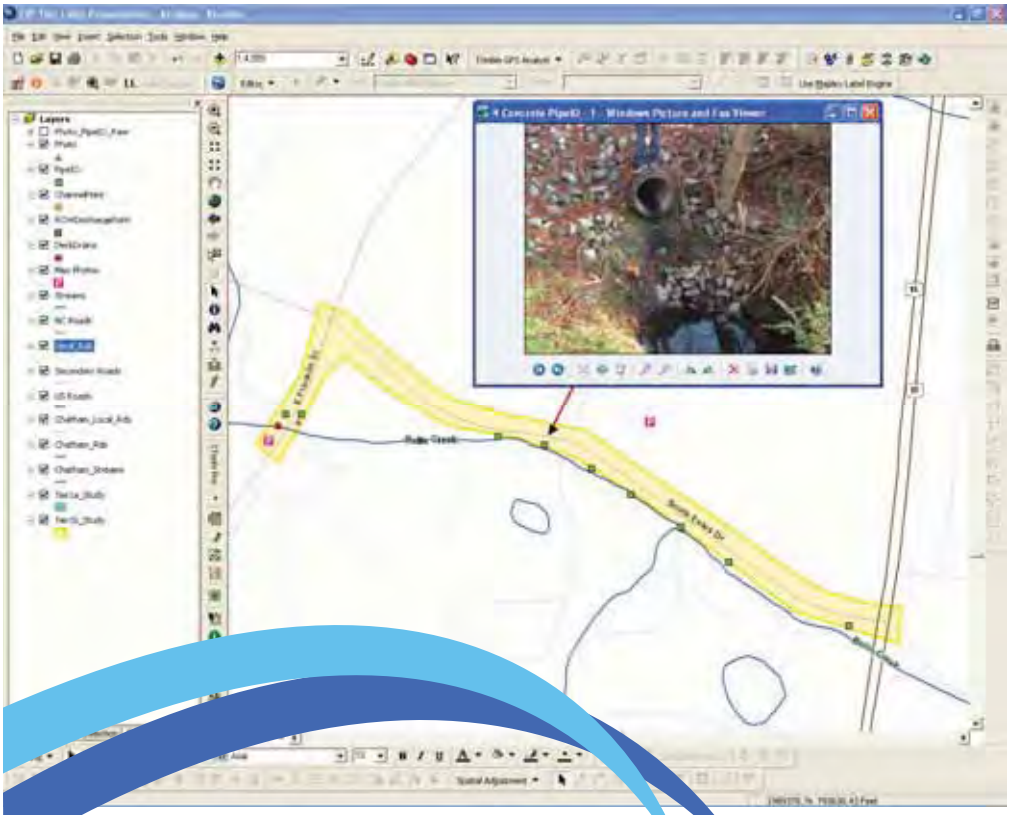


Management Measure (c)

NCDOT has maintained a standard point-of-contact and reporting format available to the public online at http://www.ncdot.gov/programs/environment/stormwater/awareness/involved.html#. The brochure "Help Reduce Water Pollution Along NC Highways" is available at this website and provides an illicit discharge water pollution report for the public to use to notify the Office of Beautification Programs of any stormwater pollutants noticed along the roadside.

Management Measures (d) and (e)

NCDOT continues to maintain a web-based tracking system and database for identified illicit connections and illegal dumps. When an illicit connection is identified, an IDDEP Field Report form is used to capture applicable information. Once sites have been investigated and verified by the IDDEP Manager, they are reported to NCDWQ Regional Offices on a monthly basis.



NCDOT Continues Stormwater System Inventory Program (SSIP)

NCDOT continues to maintain and update its stormwater outfall inventory in the form of a geographic information system (GIS). As shown above, the GIS-based inventory can be used to locate and display photos of entered outfalls. The inventory updates include new construction and industrial outfalls, as well as outfalls identified during field inventories.

GPS tool used in the Field Inventory Program

Field inventories for high priority areas have continued under the Field Inventory Program, which uses a mobile GPS mapping tool to capture the stormwater drainage system in the field. Examples of high priority areas include the Jordan and Falls Lake watersheds, coastal shellfishing waters, and watersheds for which total maximum daily loads (TMDLs) are being developed.

NCDOT maintains an inventory of implicit outfalls from roadways that cross or parallel sensitive streams

Program Objectives and Management Measures

NPDES Permit Part II.B.1

Objectives

i. Maintain the statewide NCDOT stormwater system inventory for the purpose of supporting other permit programs.

ii. Maintain a stormwater system GIS to map and prioritize sensitive water crossings.

iii. Maintain a field inventory procedure to be used for NCDOT/NCDWQ-identified priority areas.

Management Measures

a. Maintain a stormwater system inventory of existing stormwater outfalls to sensitive waters.

b. Include in the inventory outfalls from new construction projects to all surface waters and wetlands.

c. Include outfalls for NCDOT industrial facilities in the inventory.

d. Field outfall inventory procedure for priority areas.

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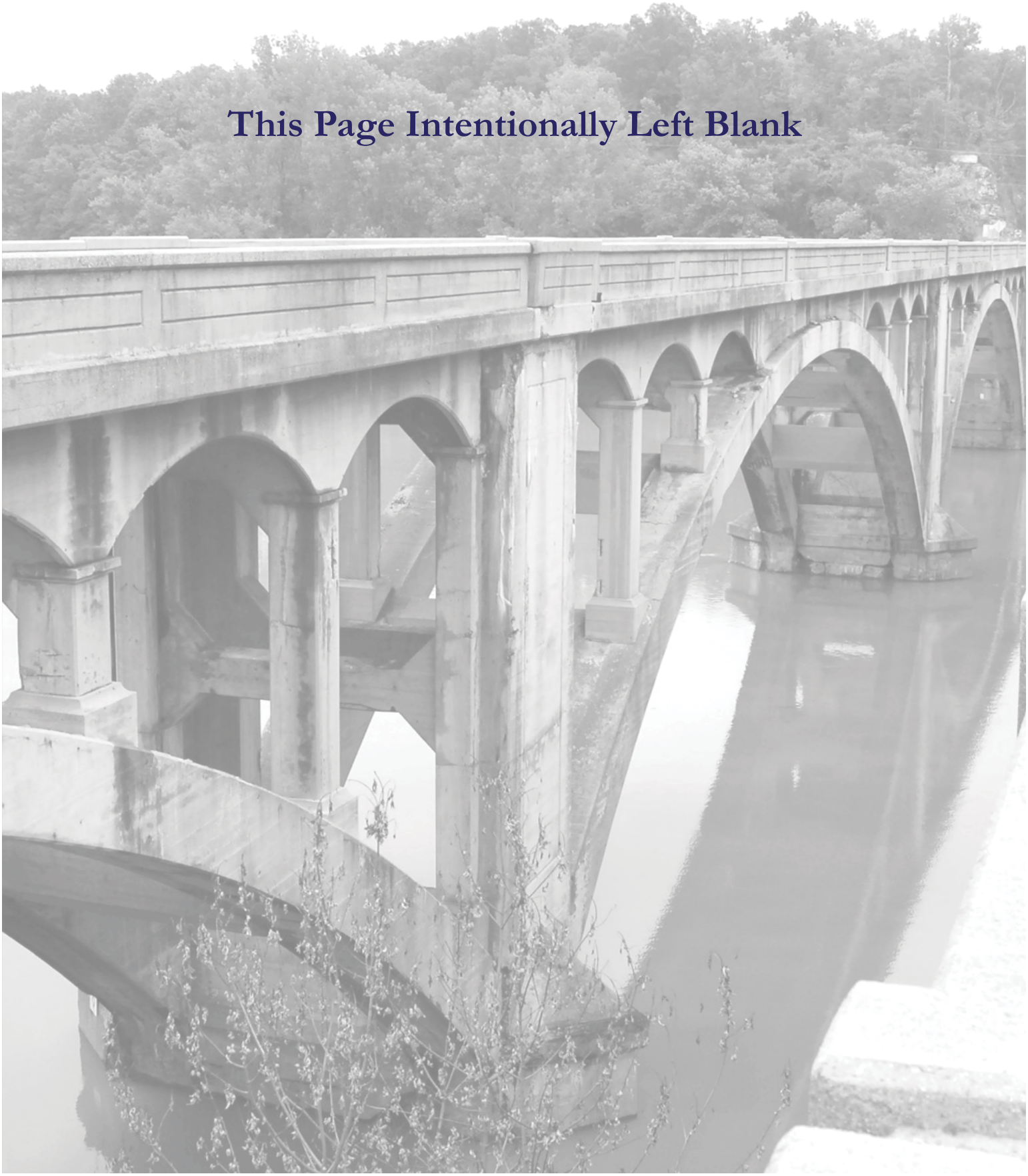

Program Objectives and Management Measures

NPDES Permit Part II.B.2

Objectives

i. Develop, implement, and support the NCDOT program to be consistent with NPDES post-construction control measures.

ii. Use retrofits to address pollutant loading from existing NCDOT activities.

iii. Retrofits should not be associated with meeting the requirements of any other NCDWQ program, unless otherwise allowed.

Management Measures

a. Identify appropriate retrofit sites.

b. Implement/Install BMP retrofits.

Randleman Lake Water Quality Enhancement Project

The Randleman Lake Water Quality Enhancement project, completed in July 2011, was initiated to support compliance with Session Law 2008-107, which required NCDOT to conduct pilot studies of stormwater control measures (SCMs) treating bridge deck runoff. NCDOT identified existing level spreaders at three bridge crossings of Randleman Lake in Guilford County (Division 7) that were not functioning as intended:

- Two level spreaders receiving runoff from bridge #400024 on NC 62 over Deep River (Randleman Lake), shown in the photo above
- One level spreader receiving runoff from bridge #400033 on NC 62 over Randleman Lake
- One level spreader receiving runoff from bridge #400049 on NC 62 over Randleman Lake

The level spreaders receive stormwater flow from the adjacent bridges, roadway surfaces, and overland flow adjacent to the roadway. The existing level spreaders at all four sites were composed of a trapezoidal concrete trough with a level outlet weir. The outlet weirs were not functioning as designed, so they were reconstructed where necessary to restore level outlet conditions. The level spreaders were also equipped with a series of weep holes that allowed the trough to drain after a storm event, and the receiving filter strips were retrofitted with stone filled trenches to encourage infiltration. This project is a good example of a retrofit that not only repaired existing SCMs, but also enhanced the original design to provide additional water quality benefits.

Level spreader repaired and enhanced as part of the Randleman Lake Water Quality Enhancement project.

Wade Avenue & I-440 Interchange Retrofit Project

NCDOT installed four SCMs throughout the interchange of I-440 and Wade Avenue on the west side of Raleigh. Construction was completed in late summer 2011. The SCMs included a filtration swale, a filtration basin, and two dry detention basins. These devices treat stormwater runoff from the interchange before it is discharged into House Creek. Since erosive conditions previously existed downstream of the interchange, SCMs were selected to attenuate peak flows and reduce volume and discharge velocities. NCDOT has been a partner with the North Carolina State University (NCSU) Biological and Agricultural Engineering Department in a study of the House Creek watershed sponsored in part by the NC Ecosystem Enhancement Program. NCSU has monitored highway runoff and instream conditions at House Creek to develop a baseline of water quality in the area. They will continue to monitor throughout the watershed as multiple SCMs are implemented to determine their impacts to the water quality of the receiving stream. Interchanges provide NCDOT with excellent opportunities for retrofit projects. As this project highlights, interchanges typically have ample land area, have drainage infrastructure in place, are less likely to have site constraints, and are easily accessible for operation and maintenance activities.

Filtration devices installed at the interchange of Wade Ave. and I-440 in Raleigh

Kure Beach Dune Infiltration System

In 2005, NCSU, NCDOT, and the Town of Kure Beach began collaborating to protect beachgoers from health effects sometimes associated with the discharge of stormwater from outfalls into beach areas, which often contains high levels of fecal bacteria. In an effort to treat this water and reduce discharge onto the beach, three experimental Dune Infiltration Systems (DISs) were installed within the dunes. The DISs were designed to capture stormwater within subsurface chambers beneath the dunes. Two of these sites were monitored for three years, and one site, added later, was monitored for one year. The monitoring results, reported in June 2011, showed an 80%-100% stormwater volume capture rating and fecal indicator bacteria concentrations similar to that measured in control dunes. Based on these results, DISs appear to be effective in reducing stormwater volume and associated fecal bacteria loads to beaches. In this study, NCDOT successfully implemented an innovative retrofit design and coordinated with the Research Program to evaluate its performance to inform future design decisions.

DIS monitoring system

BMP Retrofits Implemented

Term III, Year 1

NCDOT is required to implement management measures to meet the objectives of the BMP Retrofit Program including (1) identifying a minimum of 14 sites per year that are appropriate for retrofit installation and (2) implementing a minimum of five retrofits per year, with a total of 70 retrofits implemented over the 5-year period of the permit. A total of 16 BMP retrofits were completed in year 1 of this permit term.

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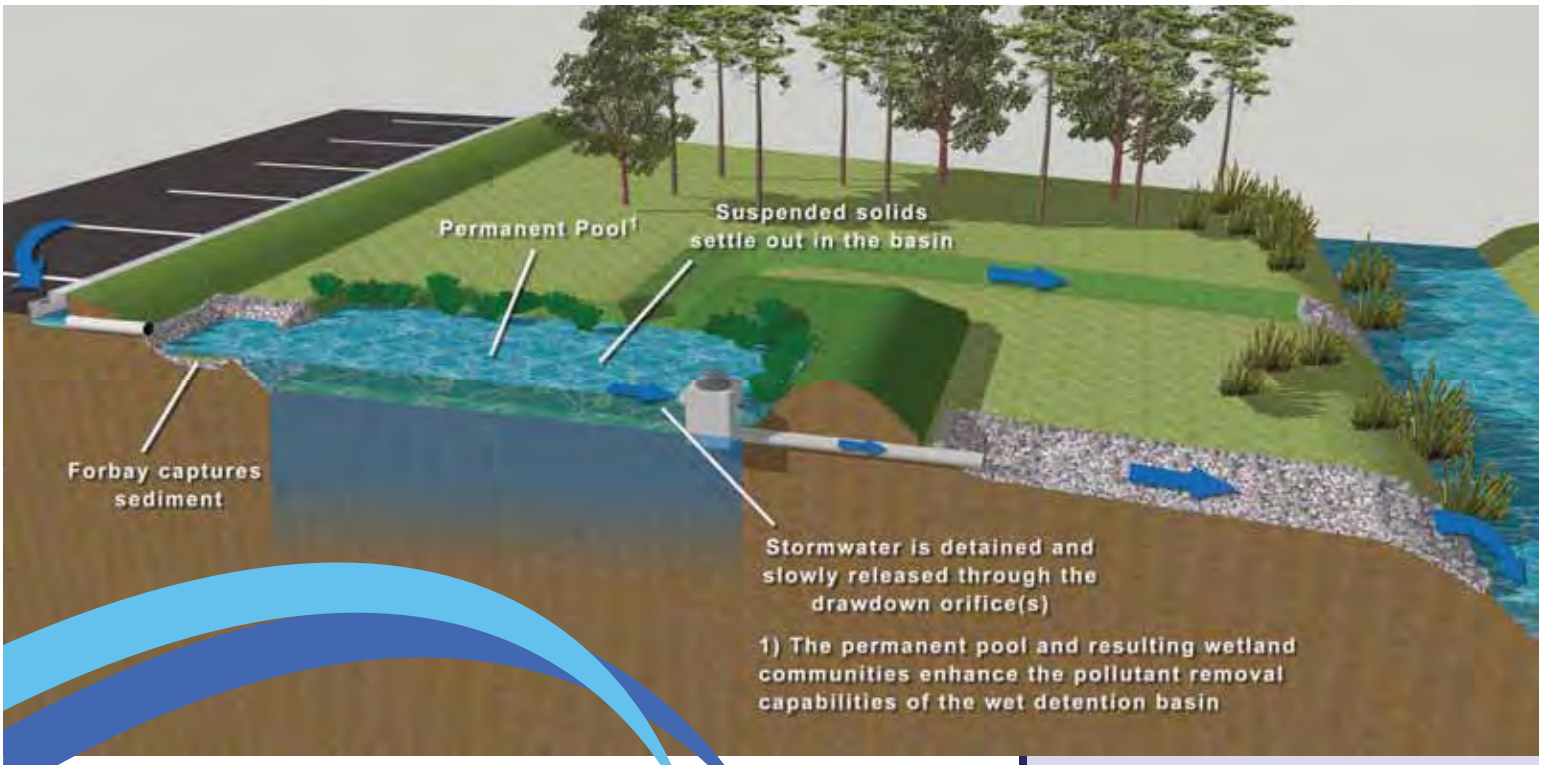

BMP Toolbox Updates: New Chapters and Improvements

The BMP Toolbox is being expanded and updated with two stormwater control measures (SCMs) and other revisions. This process began in 2011 and will continue into 2012. A new chapter entitled "Media Filters" will include design criteria, material specifications, and pollutant removal potential for media filter SCMs, which include bioretention basins and filtration basins. A second chapter, "Wet Detention Basin," will also be added that will include similar criteria for wet detention basins, which reduce peak stormwater flows and remove several stormwater pollutants. The image above illustrates a typical wet detention basin.

Additionally, NCDOT has initiated a review of the previously approved Toolbox with the intention of revising the manual to include valuable planning and design information synthesized from NCDOT's research projects. For example, the "Swale" chapter will be revised to include guidance from a recent research project indicating that roadside swales on Piedmont secondary roads are performing well at removing pollutants, especially total suspended solids and total nitrogen. The revisions will also include updating the SCM graphics and discussions to emphasize the unit processes of each SCM type and the pollutants they are believed to be effective at removing. This information will enhance the design process by improving the design engineer's ability to take site-specific hydrologic conditions into consideration.

Program Objectives and Management Measures

NPDES Permit Part II.B.3

Objectives

i. Maintain and update a BMP Toolbox to aid in the siting, design, and construction of stormwater quality BMPs with guidance on the suitability of each for NCDOT applications.
ii. Evaluate BMPs for applicability to a linear highway system.
iii. Implement new and innovative technology on an experimental basis in keeping with the current NCDWQ policy on new stormwater treatment technologies.

Management Measures

a. Maintain a BMP Toolbox.
b. Evaluate design-related BMPs.
c. Submit proposed BMP Toolbox revisions to NCDWQ for approval.

Implement New and Innovative Technology: Biofiltration Conveyance Systems

In an effort to evaluate new technology, NCDOT is funding a research project on the use of biofiltration conveyance (BFC) systems and, depending on the outcome of the research, may include BFC systems in a future version of the BMP Toolbox. BFC systems are open channel, sand seepage filtering systems that utilize a series of shallow aquatic pools, riffle weir grade controls, native vegetation, and underlying sand channels to treat, safely attenuate, and convey storm flow. BFC systems convert stormwater to groundwater through infiltration and belowground seepage. BFC systems can reduce the need for downstream detention and have good nutrient removal capability. Installation and maintenance costs for these systems can result in a cost savings as compared to conventional SCMs offering similar pollutant removal and flow attenuation features.

BFC system installed in an NCDOT right-of-way to treat stormwater runoff

Evaluated Applicability of Permeable Pavement

One of the objectives of the BMP Toolbox Program is to evaluate design-related BMPs. In fulfillment of this objective and in response to Session Law 2009-451, NCDOT evaluated the applicability of permeable pavement for sidewalks and other NCDOT facilities intended for pedestrian or bicycle use during this permit term. Permeable pavement reduces stormwater discharges by infiltrating runoff and capturing pollutants. Types of permeable pavements considered included porous concrete, permeable concrete pavers, concrete grid pavers, and porous asphalt. In making their evaluation, transportation engineers investigated such factors as depth to water table, type of underlying soil, potential for clogging, presence of tree canopy, frequency of maintenance, size and shape of pavement installation, traffic volume, and pavement surface type. NCDOT's investigation concluded that parking spaces at rest areas (automobiles only), office buildings, Department of Motor Vehicles offices, and ferry terminals are prime candidates for permeable pavement use. Permeable pavement must be carefully maintained to prevent clogging; thus, its applicability for use by NCDOT is limited, as sidewalks are never or rarely swept or vacuumed.

Permeable pavers installed at a rest area in McDowell County

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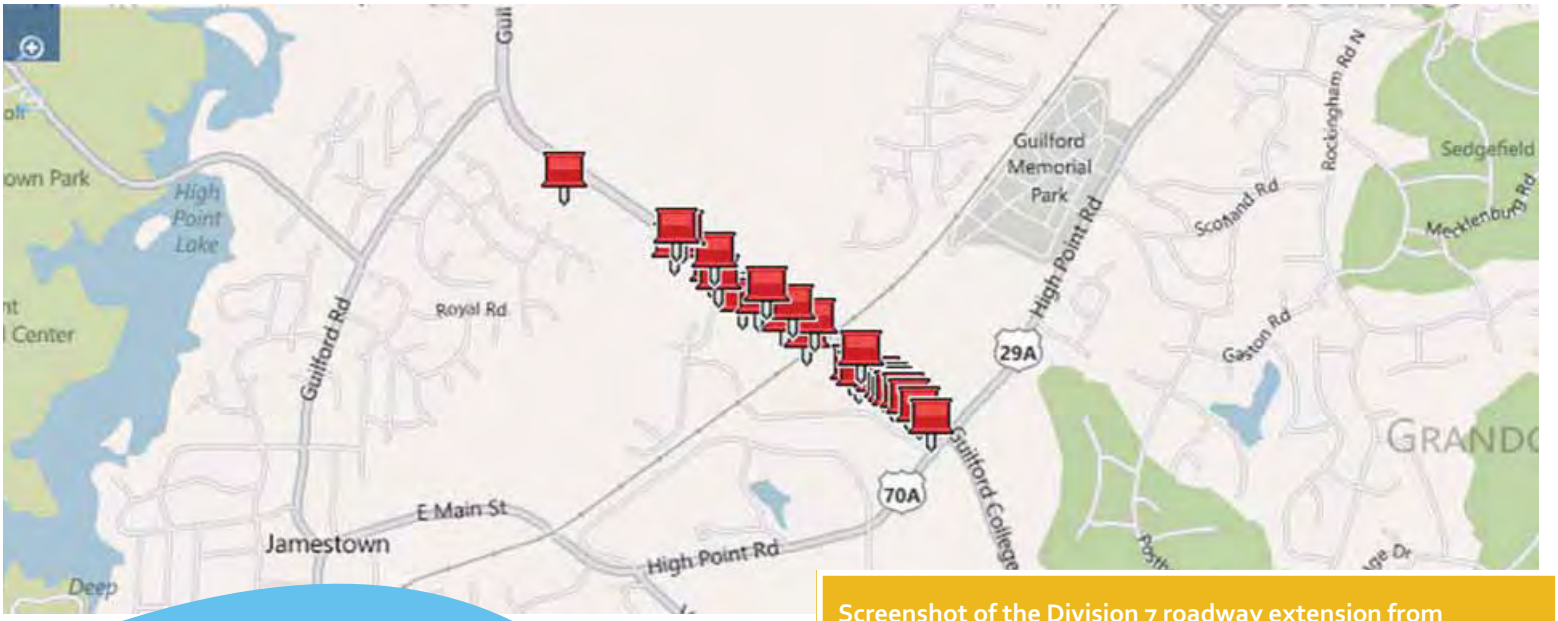

Screenshot of the Division 7 roadway extension from NCDOT's SCMS, which has extensive mapping capabilities for locating stormwater controls statewide

Division 7 Uses SCMS to Quickly Respond to Regulatory Request

As part of its BMP Inspection and Maintenance (I&M) Program, NCDOT developed a Stormwater Control Management System (SCMS) to help Division personnel manage stormwater control measures (SCMs). During this permit term, the Division 7 Roadside Environmental Engineer was able to quickly respond to a request by NCDWQ by utilizing information contained in SCMS. NCDWQ inquired about the I&M Program for 25 SCMs installed as part of a 2005 roadway extension project in Guilford County (U-2913). The construction permit for this project had special environmental provisions requiring that an I&M Program be in place to monitor the SCMs installed: 22 preformed scour holes, two level spreaders, and one dry detention basin. When NCDWQ inquired about the I&M Program for these SCMs in August 2011, the controls had already been inspected and had been added to SCMS. A follow-up meeting was held to verify that all SCMs were being maintained at their required level of service (LOS). SCMS allowed for quick access to detailed location, site map, and LOS information for each SCM located along Guilford College Road that had been entered into the system. This is an example of how SCMS plays a key role in the effective management of NCDOT's stormwater control inventory and the related I&M requirements.

Program Objectives and Management Measures

NPDES Permit Part II.B.4

Objectives

i. Maintain a BMP Inspection and Maintenance Program to aid in the inspection, operation, and maintenance of BMPs.

ii. Maintain and update as necessary the BMP Inspection and Maintenance Manual.

Management Measures

a. Evaluate new BMP inspection and maintenance needs.

b. Evaluate BMP Inspection and Maintenance Manual.

c. Implement a BMP Inspection and Maintenance Program.

d. BMP Inspection and Maintenance information.

Inspection and Maintenance Training

During this permit year, NCDOT's I&M Program has been focused on training both Division personnel and NCDOT Design Engineers. Division Roadside Environmental Engineers (DREEs) were trained to use NCDOT's new SCMS and the new Stormwater Control Inspection and Maintenance Manual at a training session held in Raleigh on December 7, 2010. Retrofit Design Engineers within the Hydraulics Unit were also trained to use SCMS in March 2011. The Roadside Environmental Unit conducted nine additional small group trainings in the past permit year. These sessions involved training NCDOT Division Environmental Officers and DREEs, and emphasized the importance of maintaining stormwater control inventories, conducting effective stormwater control inspections and maintenance, and promoting communication within Divisions to ensure sustainable I&M procedures are developed.

A screenshot from NCDOT's SCMS showing I&M records for a stormwater control located in Division 5

Hazardous Spill Basin Modification

A Hazardous Spill Basin (HSB) is a device strategically installed by NCDOT, in cooperation with NCDWQ, at locations where hazardous material spills have an increased risk of reaching surface waters. HSBs typically have a basin capable of containing a tanker truck fuel spill if the sluice gate is closed properly. However, as part of NCDOT's I&M Program, problems with the HSB sluice gates were identified. When the worm gear on the sluice gate is not greased, the gear will rust and the gate will not close. A modification was developed and has been installed on the worm gears. A white polyvinyl chloride (PVC) pipe and cap is placed over the worm gear after a marine-type grease is applied. This protects the worm gear from direct exposure to the weather, and the grease remains intact much longer before it must be reapplied. In addition, the white PVC pipe is easier for emergency responders to locate during nighttime hours.

PVC pipes cap HSP sluice gate gears to protect them from being exposure and rusting

NCDOT Highway Stormwater Program

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Program Objectives and Management Measures

NPDES Permit Part II.B.15

Objective

i. In cooperation with NCDENR, implement a PCSP to regulate stormwater from new NCDOT development and redevelopment for new built-upon area (BUA) by requiring structural and non-structural best management practices to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality.

Management Measures

a. Implementation post-construction stormwater control measures for discharges in accordance with the PCSP.

b. Implement a PCSP.

c. Submit revisions to the PCSP to NCDWQ for approval.

Post-Construction Stormwater Program (PCSP) Continued Development in 2010-2011

In 2009, NCDOT updated and submitted the PCSP approach to NCDWQ for review and approval. Under the new permit, the PCSP continues to expand with a focus on the development of training, guidance, and tools to support NCDOT personnel and contractors involved in the environmental permitting and drainage design of NCDOT projects. To prioritize the PCSP tasks, members of the Hydraulics Unit attended a workshop in January 2011 to discuss areas within the SCM design process that need development and clarification. Meeting attendees provided the following areas of critical importance to the PCSP:

- Developing methods and assessments to establish the environmental context of a project to help determine the stormwater management approach.
- Defining NCDOT's post-construction obligations under existing state regulations and streamlining the stormwater permit process with NCDWQ.
- Clarifying limitations and feasibility of SCMs in the linear environment.
- Linking the selection of particular SCMs to mitigation of receiving stream impacts.
- Improving the efficiency and repeatability of SCM design.
- Improving coordination and communication between the HSP and other NCDOT stakeholders.
- Developing guidance materials and a training program for internal and external staff.

The goals identified during the workshop will provide the direction for PCSP guidance development in this permit term.

Outfall Analysis Research Project

One focus of the PCSP is to develop a methodology to evaluate the project stormwater drainage system and downstream receiving channel to determine potential impacts. An outfall analysis is currently required by NCDOT's *Guidelines for Drainage Studies and Hydraulic Design* (1999), but the manual does not give details about the requirements, goals, and approved methods of the analysis. To support the development of more focused guidance, members of the NCDOT Hydraulics Unit are conducting geomorphological assessments of bank erosion potential at a variety of sites. The project, initiated in 2011, will photodocument evidence of erosion downstream of discharge points with pipes greater than 18-inches in diameter. In addition to visual monitoring, areas of erosion are being surveyed at varying time intervals to allow for comparisons between rainfall-runoff patterns and rates of erosion over the project time period. Evaluations of stream stability are also performed at these sites by estimating bank erosion potential using well-known Rosgen techniques. The results of this evaluation are scheduled to be available in 2012, and have the potential to influence a number of PCSP topics, including recommended drainage area sizes on roadway projects, stream stability evaluation requirements, and best practices to prevent erosion downstream of discharge points.

NCDOT outfall discharging runoff onto a slope with riprap for erosion prevention

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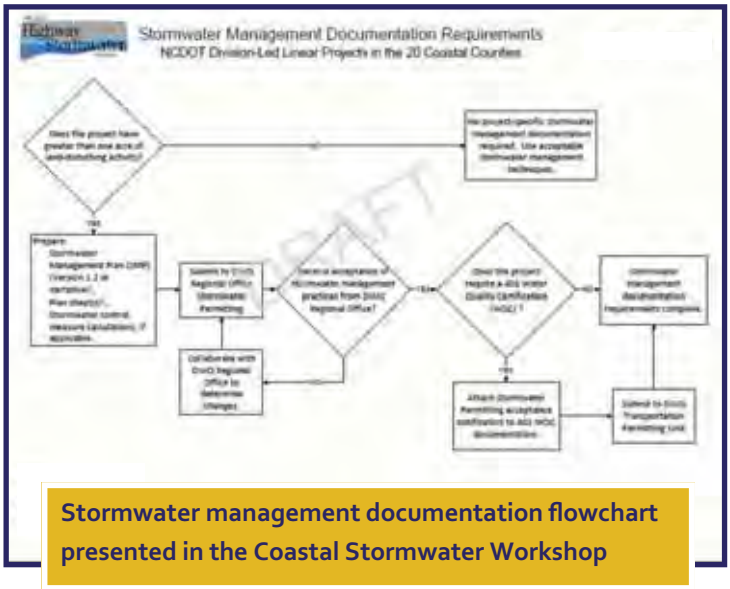
Coastal Stormwater Workshop – August 17, 2011

NCDOT HSP, NCDOT Division 3, and NCDWQ Central, Wilmington, Washington, and Fayetteville Regional Offices held a post-construction documentation guidance workshop to discuss documentation submittal requirements for stormwater projects in the 20 coastal counties. Under Session Law 2008-211, an NCDOT project is excluded from the coastal stormwater requirements if (1) it is regulated in accordance with NCDOT's NPDES permit or (2) it results in no net increase in BUA and provides stormwater control equal to the previous development (i.e., redevelopment projects). The workshop attendees developed a process by which the NCDWQ Regional Office staff would evaluate NCDOT projects for a six month period to determine the types of NCDOT projects that might be defined as redevelopment and the scope of projects that result in minimal post-construction impacts, such as minor roadway widening projects. Results of the NCDWQ assessment should be available in the spring of 2012. In addition to establishing procedures for coastal stormwater permitting, representatives of the NCDWQ Transportation Permitting Unit approved a project threshold for 401 Water Quality Certifications that require a Stormwater Management Plan. Under the new agreement, projects that add less than one travel lane or equivalent and the addition of an acre of BUA are not required to submit a Stormwater Management Plan with 401 Water Quality Certification documentation to receive a 401 Water Quality Certification. The results of the August 2011 workshop reflect the close working relationship between NCDOT and NCDWQ in development of the PCSP. Agreements and process decisions will be formalized into guidance documents and training materials for distribution among NCDOT staff in 2012.



Stormwater management documentation flowchart presented in the Coastal Stormwater Workshop

Left photo: Eroded slope before stabilization
Right photo: Slope after compost seeding treatment

Stabilization of Critically Eroding Slopes with Recycled Materials

During this permit term, NCDOT implemented a vegetation management initiative to minimize water quality impacts along highway rights-of-way. Critically eroding slopes located throughout the state were identified and targeted for vegetative stabilization. Over time, vegetation on nutrient-deficient cut slopes loses density and vigor due to environmental factors and cultural practices. NCDOT engineers implemented the use of compost seeding to target critically eroding slopes. Slopes were minimally scarified and recycled yard waste materials, in the form of composted mulch, was mixed with seed and applied to the slopes via a pneumatic blower. Nearly 17,000 tons of yard waste was diverted from the landfill through this initiative. Results on 123 acres of critically eroding slopes have been very successful; analyses indicate that compost seeding may reduce sediment delivery by over 30 tons/acre/year. Former eroded slopes, which were sources of sediment and visually unappealing, have become attractive additions to the roadside, and water quality impacts along these locations have been reduced.

Compost seeding used to stabilize critically eroding slopes

Program Objectives and Management Measures

NPDES Permit Part II.B.6

Objectives

i. Manage application of pesticides, fertilizers, and other vegetation management materials to minimize pollutant potential of stormwater runoff.

ii. Use only approved vegetation management materials.

Management Measures

a. Implement appropriate pest control practices.

b. Use appropriate vegetation management materials.

c. Provide training on vegetation management.

NCDOT Continues Management Measures

NCDOT continues to coordinate triennially with the North Carolina Department of Agriculture and Consumer Services (NCDACS) and North Carolina State University (NCSU) to ensure that approved pest control and fertilization methods and materials are being used, per Management Measures (a) and (b). The next review will be in Year 2 of the permit term. NCDOT also continues to provide vegetation management certification/recertification training for employees and contractors.

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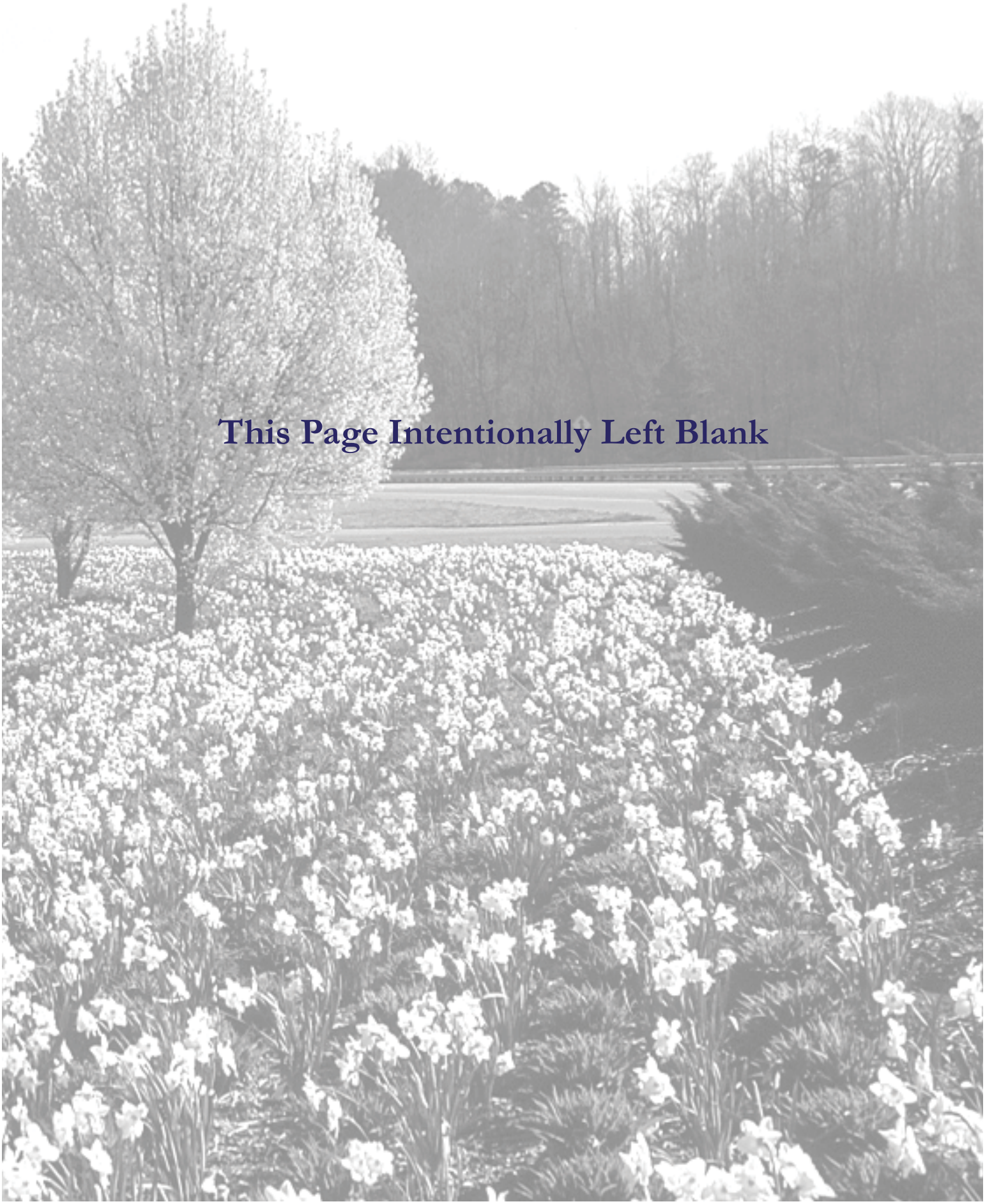
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NCDOT Continues Encroachment Program: Permitting Certification Required

Industrial, commercial, and residential parties who encroach upon NCDOT's right-of-way (as shown in the photo above) or disturb NCDOT's right-of-way during installation of water lines, power lines, or other utilities must certify that their stormwater collection and conveyance systems are appropriately permitted prior to discharging into NCDOT's stormwater system. NCDOT requires entities to self-certify their compliance with NPDES requirements on each encroachment agreement. In July 1, 2010, through June 30, 2011, the NPDES Stormwater Permit Compliance Certification was included in 92 encroachment agreement applications statewide; 23 of these applications did require a NPDES permit, and the remaining 69 applications certified that the permit was not required. Encroachment applicants are also required to self-certify that all required NCDENR and U.S. Army Corps of Engineers permits have been obtained and that the project is in compliance with all applicable sedimentation and erosion control laws and regulations. This certification process meets Management measure (a) required in NCDOT's stormwater permit and assists NCDWQ in identifying non-permitted discharges.

Program Objectives and Management Measures

NPDES Permit Part II.C

Objectives

i. Assist NCDENR to ensure all discharges to NCDOT's roadway drainage are properly permitted under applicable laws and rules.

Management Measures

a. Require certification of stormwater program coverage and compliance.

Encroachment Program Contacts

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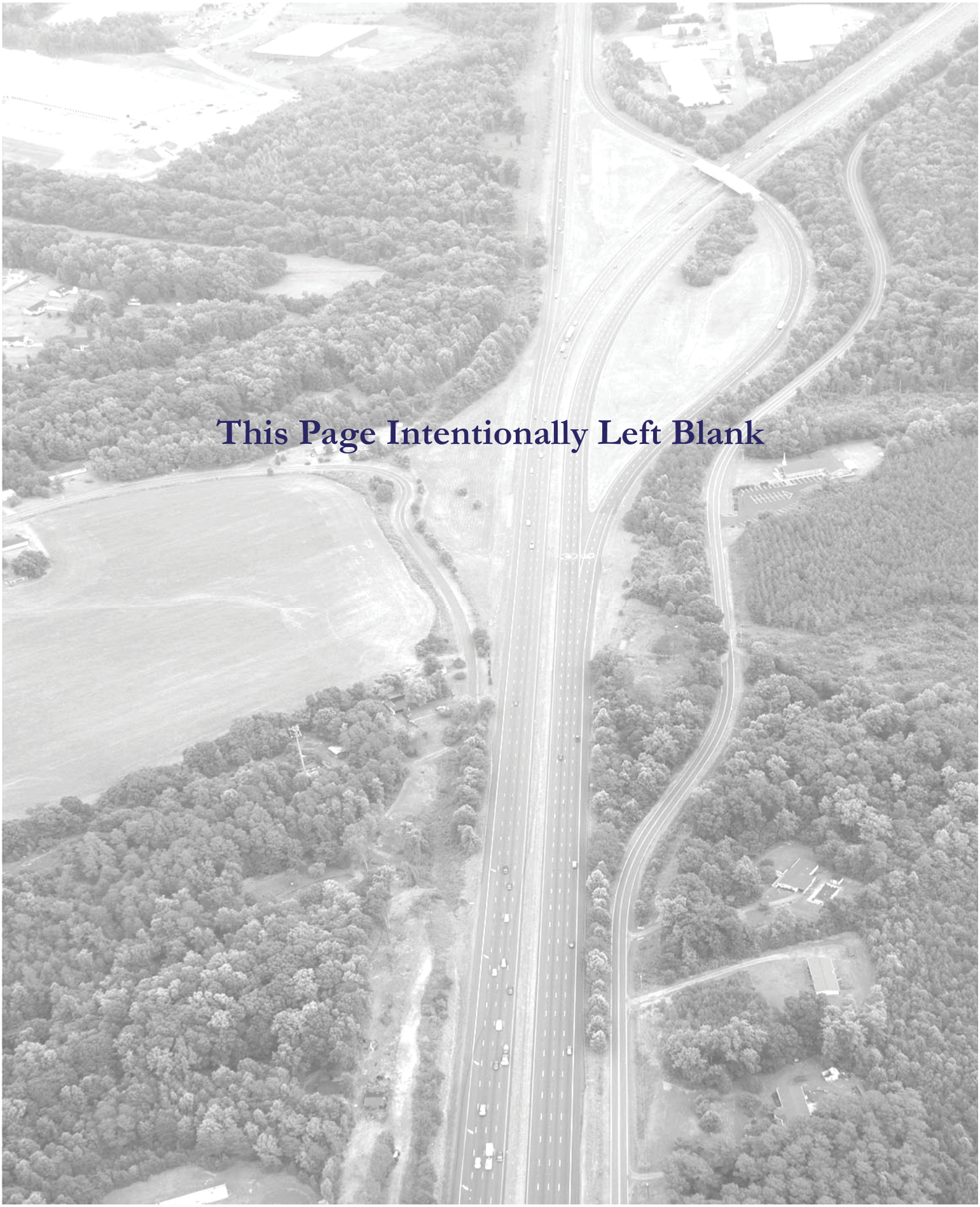
David West
Utilities Unit
919.707.7193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Program Objectives and Management Measures

NPDES Permit Part II.D.1

Sediment and Erosion Control Program

Objectives

i. Continue to control development activities disturbing one or more acres of land surface.

ii. Require construction site operators to implement appropriate erosion and sediment control practices.

iii. Require site inspection and enforcement of control measures.

iv. Establish requirements for construction site operators to control waste that may cause adverse impacts to water quality.

Management Measures

a. Implementation of the NCDENR DLR Erosion and Sediment Control Program delegated to NCDOT.

b. Incorporation of requirements of NCG010000 associated with construction activities into the Erosion and Sediment Control Program.

NCDOT Participated in Revising North Carolina General Permit for Construction Activities

Beginning in September 2010, NCDOT participated as a stakeholder in developing a consensus for new conditions that would be incorporated into the revised North Carolina General Permit for Construction Activities, NCG010000. NCDENR DWQ and Division of Land Resources (DLR) worked jointly with a Construction Technical Advisory Group composed of representatives from the construction and development industry and environmental stakeholders to formulate new and revised requirements for erosion and sediment control and water quality protection mandated by the U.S. Environmental Protection Agency (EPA). After months of collaboration, NCDWQ published the revised NCG010000 permit in August 2011. The permit revisions will task NCDOT and others in the construction industry to stabilize their sites with groundcover sooner and implement high efficiency components into their construction stormwater plan design. NCDOT is currently updating project special provisions and certification training program materials to educate its workforce and contractors to ensure compliance with permit conditions.

NCDOT participated in the Construction Technical Advisory Group

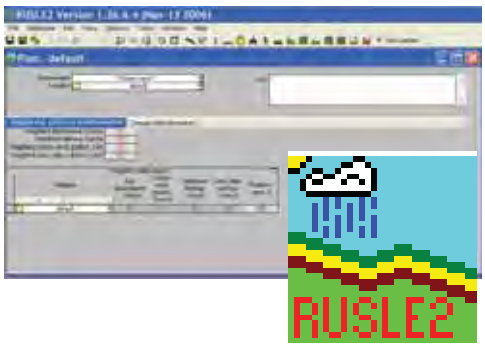
Calibration Training with Division of Water Quality

NCDOT continues to conduct annual training with NCDENR DLR and NCDWQ to calibrate NCDOT auditing techniques with those of the regulators for compliance with Sedimentation and Pollution Control Act erosion control requirements. During this permit term, NCDOT initiated additional training with NCDWQ that focused on compliance with requirements in the NCG010000 permit. From February through August 2011, NCDOT and NCDWQ jointly visited several construction projects across the state to ensure that the sites conformed to water quality regulatory requirements. The goal of these visits was for NCDOT to align their interpretation and implementation of construction stormwater permit conditions with that of NCDWQ. During the project review sessions, NCDWQ continually emphasized the importance of uniform, complete, and comprehensive documentation of NPDES site inspection records. By calibrating with regulators, NCDOT can focus on targeting specific areas for improvement and strive to deliver all projects involving land disturbing activities with environmental sensitivity.

NCDOT and NCDWQ personnel participate in "calibration" training to improve NCDOT compliance auditing techniques

Research Underway for Improved Erosion and Sediment Control Design Tool

During this permit term, NCDOT initiated a research project with Dr. Rich McLaughlin of North Carolina State University (NCSU) to investigate how the Revised Universal Soil Loss Equation Version 2 (RUSLE2) desktop modeling tool, used by many transportation erosion and sediment control plan designers, can be enhanced for sediment basin design. Current regulations require sediment basins to be designed based on watershed size, regardless of watershed characteristics. This research project will use RUSLE2's capabilities to predict sediment loading with specific watershed characteristics, including local rainfall, along with site-specific soils and slope aspects. Field data will be obtained from highway construction sites to validate the model and to determine how RUSLE2 can be utilized to provide basin designs appropriate to local conditions. The research work will ultimately result in an improved RUSLE modeling tool specifically designed to better address site conditions.



NCDOT Continues Erosion and Sediment Control Program

Delegation for NCDOT's Erosion and Sediment Control Program has been continued by NCDENR DLR and the Sedimentation Control Commission, covering projects that disturb one or more acres of land surface. NCDOT's delegation has been continuous since 1983.

NCDOT Highway Stormwater Program

Program Objectives and Management Measures

NPDES Permit Part II.D.2

Borrow Pit/Waste Pile Activities

Objectives

i. Continue to implement sediment and erosion control measures and reclamation plans on all borrow pit and waste pile projects.

Management Measures

a. Implement erosion and sediment control measures on all noncommercial borrow pits/ waste piles.

b. Implement approved reclamation plans on all borrow pits/waste piles.

c. Implement Borrow Pit Discharge Management Program.

NCDOT Continues Borrow Pit Discharge Management Program

NCDOT continues to implement its borrow pit and waste reclamation procedures, including construction staging areas, to protect the environment and reduce the potential for sediment loss from construction projects. NCDOT also continues to distribute relevant guidance documents and design spreadsheets to contractors to streamline implementation of NCDLR-approved practices.

Construction Program Contacts

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Johnie Marion
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Program Objectives and Management Measures

NPDES Permit Part II.E.1

Stormwater Pollution Prevention Plans

Objectives

i. Maintain and implement an SPPP for each facility with an industrial activity that is covered by the permit.

ii. Develop and implement an SPPP prior to operation of any new industrial facilities.

Management Measures

a. Maintain and implement an SPPP for each covered industrial activity and related facility.

NCDOT Maintains SPPP Implementation

NCDOT continues to maintain and implement site-specific Stormwater Pollution Prevention Plans (SPPPs) at industrial facilities, including county maintenance yards, equipment shops, ferry terminals, and remote material storage locations. During the permit year, SPPP updates were performed for many NCDOT industrial facilities that had been modified, and new SPPPs were developed for several new industrial facilities. NCDOT SPPPs describe potential pollution sources at each facility and provide BMPs to minimize potential impacts on stormwater from on-site industrial activities. SPPP BMP examples include maintaining vegetated buffers at the facilities, diverting runoff away from material stockpiles, providing cover and containment for oil and hazardous substance containers, conducting annual employee training, performing regular inspections of industrial activities, and implementing good housekeeping techniques for salt storage and loading. Employee training continues to be a major emphasis for NCDOT's SPPP program. NCDOT continues to incorporate the Spill Prevention Control and Countermeasure (SPCC) Plans requirements from 40 CFR 112 into the appropriate facility SPPPs as part of NCDOT's Industrial Activities Program. NCDOT SPCC Plans emphasize spill prevention practices and address specific inspections of SPCC-regulated oil containers.

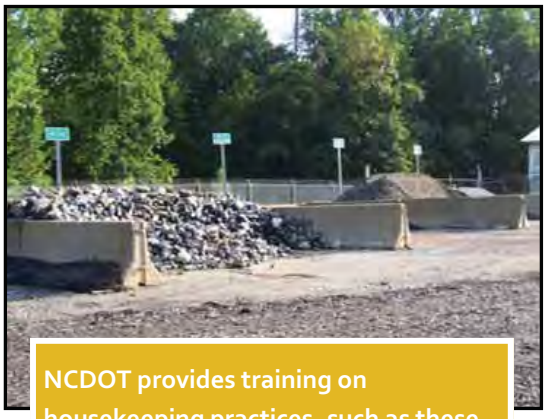
SPPP BMPs Implemented at NCDOT County Maintenance Yards

Concrete barriers and posted signs to manage material stockpiles

Portable cover for open scrap metal roll-off

County Maintenance Yard Environmental Compliance Reviews

In 2011, NCDOT HSP staff visited several county maintenance yards in the process of performing an SPPP program assessment to supplement the regular facility inspections performed by facility staff under the SPPP. During the visits, each facility's SPPP was reviewed, and a walk-through of the facility was performed to evaluate BMPs and identify important environmental issues for maintenance yard managers. HSP staff conducted this compliance check at a total of eight facilities during the first year of the permit. As a result of this review, NCDOT facility personnel implemented non-structural BMPs or took actions to prevent stormwater pollution for locations with readily resolved issues. For issues that require long-term planning, NCDOT facility personnel continue to work with HSP staff to implement appropriate structural BMPs to prevent stormwater pollution. The HSP staff also took this opportunity to provide one-on-one training on stormwater pollution prevention practices with facility staff to supplement the ongoing group training regularly provided (for more information on the group training, please see Internal Education). NCDOT anticipates continuing these review visits in the future.



NCDOT provides training on housekeeping practices, such as these concrete barriers and signs installed during this permit year to manage material stockpiles

Qualitative Monitoring

NCDOT Division personnel continue to evaluate SPPP effectiveness by performing semi-annual visual observations of stormwater discharges at the industrial stormwater discharge outfalls at each NCDOT industrial facility. NCDOT Division personnel continue to utilize the SPPP website as a tool to aid in documenting these observations. All outfall observations describe color, odor, clarity, floating solids, suspended solids, foam, oil sheen, erosion, or other indicators of stormwater pollution. If problems are identified at an outfall during the visual observations, NCDOT personnel pursue corrective actions to identify the source of the problem and to implement an appropriate BMP to address the stormwater runoff quality. For example, additional erosion and sediment control measures were installed at a facility outfall that was identified this year during a visual observation as being impacted by erosion at the outfall.

Stormwater discharge at an NCDOT outfall observed during a rain event during the fall of 2011

Program Objectives and Management Measures

NPDES Permit Part II.E.3

Qualitative Monitoring

Objectives

i. Evaluate the effectiveness of the industrial SPPP for each industrial facility.

ii. Perform required qualitative monitoring at stormwater outfalls identified in the SPPPs and during supplemental inspections for new sources and discharges.

Management Measures

a. Perform visual monitoring at each facility.

NCDOT Continues SPPP Website

NCDOT continues to utilize its SPPP website to help manage and track SPPP and SPCC Plan implementation at each industrial facility. The SPPP website allows Industrial Activities Program Managers and Division-level engineers track the overall program implementation and allows personnel at each facility to document SPPP and SPCC Plan task completion.

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Johnie Marion
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The filtration basin at the Sunset Beach Bridge proved to be a design, construction, and maintenance challenge because of limited space and access and proximity to the receiving stream

NCDOT Holds Internal Design/Construction/ Maintenance Workshop

In November 2010, NCDOT held a Design/Construction/Maintenance (DCM) workshop for Design Engineers and Division Construction, Maintenance, and Roadside Environmental staff to exchange information related to managing SCMs. Construction and maintenance considerations were shared with Design Engineers so that appropriate design specifications could be included to properly support and extend the life of SCMs. As a result, engineers are now including access for appropriate maintenance equipment in their designs. Design Engineers now include special access for the equipment used by the Divisions, which improves maintenance and allows safer access to the devices while performing routine inspections. This workshop helped to foster increased communication between Design Engineers and Division personnel responsible for inspecting and maintaining SCMs. In addition, NCDOT's BMP Toolbox is being updated to include language to emphasize the need for SCMs to have permanent access for maintenance purposes. A second workshop is scheduled for the spring of 2012.

Program Objectives and Management Measures

NPDES Permit Part II.F.1

Objectives

i. Implement a program to train NCDOT staff and contractors about the importance of stormwater quality.

ii. The training should include topics such as spill control, chemical application, illicit discharges, and illegal dumping, etc.

Management Measures

a. Provide pollution prevention awareness training for construction workers.

b. Provide pollution prevention awareness training for maintenance workers.

c. Provide pollution prevention awareness training for NCDOT staff.

d. Develop and submit an Internal Education and Involvement Plan.

Snow Removal and Deicing Training

During this permit term, NCDOT provided updated snow removal and deicing training to managers and operators. Snow removal and deicing training stresses the importance of estimating the amount of winter weather expected and the related level of deicer applications. Calibration of the application equipment is important to ensure that appropriate amounts of deicer are applied without exceeding maximum levels, which were established to balance the need for roadway safety with environmental concerns. To assist in equipment calibration, NCDOT produced a video and calibration calculating spreadsheet. In addition, managers' snow removal and deicing training includes reminders of additional stormwater management topics, such as salt storage at the maintenance yards.

Training includes proper salt storage methods: there are no hay bales in the top photo to provide containment

SPPP Implementation Training

NCDOT continues to utilize many approaches to provide training to Division-level personnel on stormwater pollution prevention, good housekeeping, and spill prevention. NCDOT training materials and methods include the following:

- SPPP/SPCC Plan Implementation Training Workshops (regional and individual)
- NCDOT training video "Stormwater Pollution Prevention: Do Your Part at NCDOT"
- NCDOT training video "Spill Prevention and Response"
- Division-level monthly briefings that often include an environmental topic
- Educational posters displayed at NCDOT industrial facilities
- Industrial and Roadside Maintenance Activities BMP Guidance Manual (under development)
- Annual program briefings at NCDOT Management meetings

NCDOT industrial facilities continue to utilize the training videos to provide initial training to applicable newly-hired personnel, annual refresher training to individuals, or in-group training sessions as part of the SPPP/SPCC Plan training requirements. SPPP/SPCC Plan Implementation Training Workshops continue to focus on providing new or updated training to NCDOT facility team leaders and team members.

NCDOT facility personnel are trained to divert stormwater runoff away from material stockpile and loading/ unloading areas when possible

NCDOT Highway Stormwater Program

NCDOT Continues Ongoing Training

NCDOT continues to implement the following ongoing NPDES internal training:

- Annual SPPP/SPCC group training
- Erosion and sediment control training, which includes training on the General Permit for Construction Activities NCG010000
- Vegetation Management training including chemical application and mowing techniques
- General stormwater pollution prevention training presented at internal meetings
- Winter weather (snow removal and deicing) training
- Illicit discharge detection training
- BMP inspection and maintenance training

Internal Education Program Contacts

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Education Manager
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NCDOT Supports Clean Jordan Lake Events

Clean Jordan Lake, a grassroots non-profit organization founded in July 2009, organizes clean-up days on a semi-annual basis for volunteers to remove trash and debris from the banks of Jordan Lake. Volunteers include Clean Jordan Lake members, area high school students, and community members. The HSP Program supports this effort by providing supplies, including the orange trash bags pictured above, which are easy for boaters to spot on the banks of the lake, and gloves for the volunteers. Additional supplies are also provided by the NC Big Sweep organization. The BoatUS Foundation provides financial support, and the U.S. Army Corps of Engineers pays for proper disposal of hundreds of tires that are removed from the lake.

During this permit term, Clean Jordan Lake events were held on October 9, 2010, and October 1, 2011. The October 9, 2010, Clean Jordan Lake outing was an especially challenging one. The group cleaned up one of the most sensitive areas of Jordan Lake, a portion of the shoreline near the Haw River and Robeson Creek that is ringed with wetlands and was covered by a pile of trash 2,000 feet long by 200 feet wide. The area was accessible only by foot (walking on trails) and by boat. Kayaks and canoes were also used to ferry trash bags or to get to otherwise inaccessible shoreline sections to collect trash. More than 200 volunteers removed 600 tires and 700 bags of trash from a one-mile length of the Haw River Arm shoreline. The trash filled two dumpsters (pictured above). The October 1, 2011, cleanup extended south from the 2010 clean-up site.

Program Objectives and Management Measures

NPDES Permit Part II.F.2

Objectives

i. Implement a program to educate the public about the importance of stormwater quality, including chemical application, illicit discharges and illegal dumping, etc.

ii. Maintain diverse educational materials to engage and educate the public from different social, economic and age groups.

iii. Public involvement in NCDOT water quality programs.

Management Measures

a. External Education and Involvement Plan.

b. Provide pollution prevention awareness educational materials to general public.

c. Maintain a public education website.

NCDOT provided supplies for Clean Jordan Lake events

Stormwater Project Posters

NCDOT developed public educational posters for several of its projects that have a positive impact on stormwater management. An educational poster was developed for the Kure Beach dune infiltration system project, which was completed in 2010 and was found to decrease stormwater runoff volume and fecal coliform release onto recreational beaches (poster at right).

In 2010, posters were developed and displayed at the rest area in Wilkes County, a LEED Gold certified building constructed in 2009, that include stormwater topics such as bioretention and hazardous spill basins (poster at left), pet waste stations, and rainwater harvesting.

In 2011, a poster was developed to highlight the raingarden NCDOT installed at Smyrna Elementary School to treat runoff from the school's parking lot (poster at right).

NCDOT Presentations at 2011 WRRI Conference

NCDOT personnel, research partners, and contractors presented at the Water Resources Research Institute (WRRI) Annual Conference held March 22-23, 2011. NCDOT presented topics including the NCDOT Stormwater Inspection and Maintenance Program, Evaluating Stormwater Control Measures for the Linear Highway Environments, and Characterizations of Stormwater Runoff from Bridge Decks in North Carolina.

NCDOT presented its Stormwater I&M Program at the 2011 WRRI Conference

NCDOT Highway Stormwater Program

NCDOT Continues Adopt-a-Highway Program and Litter Sweep

NCDOT sponsored Litter Sweep, its biannual statewide roadside cleanup, in the last two weeks of September 2010 and April 2011. NCDOT provided materials and safety equipment, and NCDOT personnel participated in the cleanup along with volunteers. NCDOT also continued the Adopt-a-Highway Program. As part of this program, the Department provides volunteer groups with the materials necessary to collect litter along their stretch of adopted roadway and posts a sign with the groups' names at the beginning and end of adopted roadways. In 2010, the Adopt-a-Highway Program saved $6.6 million dollars in clean-up costs and included approximately 12,000 miles of roadway.

External Education Contacts

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NCDOT Researches Permeable Friction Course

NCDOT has been exploring the use of permeable friction course (PFC) as an SCM; potentially in conjunction with other linear SMCs as shown in the image above. PFCs are gap-graded, bonded wearing courses that are applied to improve traffic safety during storms. PFC generally has less fine aggregate than traditional surface courses and includes polymer-modified asphalt to maintain pavement integrity. NCDOT-sponsored research, conducted by Dr. Bill Hunt of North Carolina State University (NCSU), indicates median total suspended solids (TSS) of 9-31 mg/L in runoff from PFC-covered portions of I-40 in Johnston, Duplin, and Sampson counties. NCDOT is currently funding a project by Dr. Jy Wu and Dr. Craig Allan of the University of North Carolina in Charlotte (UNCC) that compares edge-of-pavement concentrations from paired sites with PFC and traditional hot-mix asphalt pavements.

PFC has less fine aggregate than traditional surface courses

Program Objectives and Management Measures

NPDES Permit Part II.G

Objectives

i. Conduct research with faculty and staff at state universities or other designated institutions that results in independent quantitative assessment of stormwater from NCDOT permitted activities and/or measures structural BMP effectiveness.

ii. Conduct research to enhance or improve existing practices or develop new methods or processes to meet future permit requirements.

Management Measures

a. Maintain a Research Plan in keeping with guidelines established by the FHWA.

b. Submit the Research Plan to NCDWQ for approval.

c. Implement the Research Plan.

National Stormwater Research Facilitation

NCDOT stormwater staff facilitate and guide national research by participating on a Transportation Research Board (TRB) standing committee, National Cooperative Highway Research Program (NCHRP) panel, and the American Association of State Highway Transportation Officials (AASHTO) Stormwater Community of Practice (CoP).

Currently, staff participate on the TRB subcommittee Hydraulics, Hydrology and Water Quality (AFB60), developing research problem statements and facilitating dissemination of results. For the NCHRP panel 25-42 (*Bridge Runoff Treatment Analysis and Treatment Options),* NCDOT staff assist to guide and direct NCHRP-sponsored research. Other on-going NCHRP projects of interest include *Recommended Techniques and Best Practices to Reduce, Minimize or Mitigate Transportation Impacts on Watershed Functions and Value; Evaluation of Long Term Performance of Stormwater Controls;* and *Guidance for Achieving Volume Reduction of Highway Runoff in Urban Areas*.

Finally, NCDOT staff participate in the AASHTO Stormwater CoP, which includes members from over 12 DOTs and the FHWA, develops reports on state-of-the-art stormwater practices, and generates research ideas for AASHTO committees and subcommittees. This year NCDOT staff participated in developing a research topic on *Nutrient (Nitrogen/ Phosphorous) Management and Source Control* with the Florida DOT.

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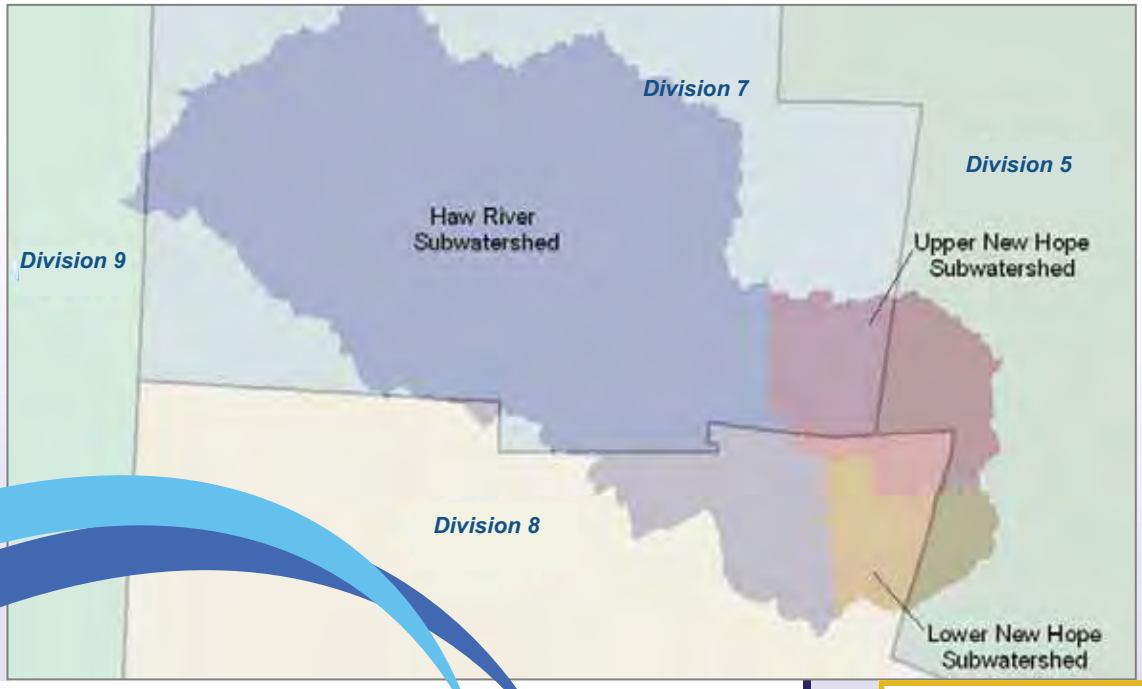
Research Roundtable

NCDOT sponsored a research roundtable featuring researchers from NCSU, UNCC, and the United States Geological Survey (USGS). The researchers discussed the results of highway stormwater research studies related to edge-of-pavement and bridge deck runoff quality, effectiveness of linear vegetated controls, bioretention system design, and innovative coastal region stormwater controls and how the research findings may affect NCDOT practices. The presentations were followed by panel discussions covering a variety of topics, including challenges and solutions associated with monitoring in the linear environment; hydromodification and development of SCMs based on project context; monitoring for and reduction of pathogens in stormwater runoff; and laboratory and field methods for measuring metal concentrations, including implications of a change in focus of the regulatory community from total recoverable to dissolved metals. The meeting served as an advisory committee to help the Research Program identify priorities for the remainder of the permit term.

Research Roundtable included NCDOT personnel and researchers from NCSU, UNCC, and USGS

Monitoring Along I-40

NCDOT continued to support monitoring to determine the effectiveness of PFC, filter strips, and wet and dry swales in reducing the levels of parameters of interest, specifically TSS, total nitrogen (TN) and total phosphorus (TP). Monitoring was conducted at four locations along I-40 between Raleigh and Wilmington; two sites featuring wet swales and two featuring dry swales. All four locations included pavements with a PFC overlay. The study results indicate that the wet swales are more effective in removing stormwater TN concentrations. The NCSU researchers also compared the effluent concentrations to instream concentrations in healthy Piedmont streams and found that well-maintained swales were generally able to reduce TSS and TP concentrations to below these benchmarks.



Map of Jordan Lake watershed

Jordan Lake Stormwater Management Program

Over the past year, NCDOT has supported a variety of initiatives related to the Jordan Lake Nutrient Reduction Strategy and rules (15A NCAC 02B .0262-.0273 and .0311). The rules establish requirements in the watershed for wastewater discharges, riparian buffers, fertilizer management, agricultural activities, and nutrient reductions from new and existing development activities. The rules also include nutrient reduction measures that are specific to NCDOT activities.

In 2011, NCDOT initiated the development of a nutrient-specific program, named Guided Reduction of Excess Environmental Nutrients (GREEN) to support compliance with the nutrient reduction requirements unique to the Jordan Lake watershed. The Jordan Lake GREEN Program will build upon existing stormwater management activities already in place through NPDES and related programs, and blend into those activities new techniques and practices that are known to provide nutrient load-reducing benefits. Activities to be completed under the GREEN program include an extensive review of NCDOT's water quality research data and collaboration with North Carolina State University (NCSU) on a nutrient accounting tool (NCDOT-JLSLAT) to incorporate the unique land use/cover conditions at NCDOT facilities.

Session Law 2009-216 required the formation of a Nutrient Scientific Advisory Board (SAB) to improve on the tools needed to address nutrient loading from existing development in any watershed, statewide, where nutrients are of concern. NCDOT has participated as an SAB member since its inception in 2010 and has remained an active participant in SAB subcommittees tasked with providing recommendations on watershed remodeling and geographic information system (GIS).

Program Objectives and Management Measures

NPDES Permit Part III.C

Objectives

NCDOT will develop and implement a program to address impaired waters identified in Total Maximum Daily Loads (TMDLs) in which NCDOT is named as a significant contributor of the pollutant and an assigned Waste Load Allocation.

Management Measures

Management measures include: assessment & monitoring plans for each TMDL location, schedules for plan execution, and findings reports submitted to NCDWQ.

LID Planning in Lockwoods Folly River Watershed

NCDOT is participating in the Clean Water Management Trust Fund Grant 910 project, "Low Impact Development (LID) Planning in the Lockwoods Folly River Watershed," in cooperation with the North Carolina Coastal Federation, the grant recipient; Brunswick County; and Larry Coffman, an expert in the field of LID. The purpose of the project is to raise awareness and train professionals in the use of LID concepts in the linear transportation environment, and will have a focus on treatment of fecal coliform in stormwater. NCDOT participated in the fecal coliform TMDL for Lockwoods Folly, completed in August 2010, which was the impetus for this grant. The grant project includes an LID workshop and design charrette, which will be held in Year 2 of the permit term, that will provide LID designs for NCDOT hydraulic engineers.

View near US-17 over the Lockwoods Folly River

TMDL Tracking and Compliance Database Enhancements

The HSP Program monitors the completion of draft and final TMDLs and maintains a database that is used to track TMDL development and related NCDOT permit requirements. The Tracking and Compliance Database allows NCDOT managers to access details associated with each TMDL and quickly identify compliance requirements and schedules. In 2011, several enhancements to the database were initiated, including integration with GIS mapping and improved tracking of NCDOT activities associated with TMDL compliance and reporting.

NCDOT Continues as TMDL Stakeholder

NCDOT remains involved as an active stakeholder in reviewing and commenting on TMDLs. NCDWQ developed several TMDLs during the permit year. For each TMDL listed below, NCDOT reviewed the draft reports and provided comments to NCDWQ. In many cases, NCDOT also developed a right-of-way GIS layer that was used to assess NCDOT pollutant loading in the impaired watershed.

Lumber River Basin
- Lockwoods Folly River (Fecal Coliform)
- Lockwoods Creek (Fecal Coliform)
- Mill Creek (Fecal Coliform)
- Montgomery Slough (Fecal Coliform)
- Mullet Creek (Fecal Coliform)
- Intracoastal Waterway (Fecal Coliform)
- Spring Creek (Fecal Coliform)

Tar-Pamlico River Basin
- Oyster Creek (Fecal Coliform)

Yadkin River Basin
- Abbots Creek (Turbidity)
- Ararat River (Turbidity)
- Hunting Creek (Turbidity)
- Second Creek (Turbidity)
- South Deep Creek (Turbidity)
- South Yadkin River (Turbidity)
- Third Creek (Turbidity)

White Oak River Basin
- Bear Creek (Fecal Coliform)
- Queen Creek (Fecal Coliform)
- Bell Swamp (Fecal Coliform)
- Dicks Creek (Fecal Coliform)
- Halls Creek (Fecal Coliform)
- Parrot Swamp (Fecal Coliform)
- White Oak River (Fecal Coliform)

Yadkin-Pee Dee River Basin
- Roaring River (Turbidity)

Cape Fear River Basin
- Little Alamance Creek (Biological Integrity)

NCDOT Highway Stormwater Program

Southeast White Oak Assessment and Monitoring Plan

In 2011, NCDOT prepared an Assessment and Monitoring Plan for bacteria in the Southeast White Oak Basin (Carteret County). The Plan describes NCDOT's strategy for reducing pollutant contributions from NCDOT areas in Boathouse Creek and White Oak River watersheds in accordance with the conclusions and recommendations of the TMDL and NCDOT's assigned waste load allocations in those watersheds.

NCDOT Continues to Serve on Technical Advisory Committee

Over the past year, NCDOT remained an active member of the Technical Advisory Committee to support TMDL development in the High Rock Lake watershed. In support of the TMDL under development, NCDOT partnered with members of the Yadkin/Pee Dee River Basin Association discharger coalition to provide additional technical support and review of watershed and lake models developed by the U.S. EPA.

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