

South Carolina Nonpoint Source Management Program



**2008
Annual Report**

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Nuts and Bolts of Nonpoint Source Pollution

Working for Clean Water in South Carolina

What is nonpoint source pollution? What is the 319 Grant Program? What is South Carolina doing to improve water quality in the State?

WHAT IS NONPOINT SOURCE POLLUTION?

Why is there still water that's unfit for swimming, fishing or drinking? Why are many species of plants and animals disappearing from many rivers, lakes, and coastal waters?

The United States has made tremendous advances in the past 30 years to clean up the aquatic environment by controlling pollution from industries and sewage treatment plants. Unfortunately, we did not do enough to control pollution from diffuse, or nonpoint sources. Today, nonpoint source (NPS) pollution remains the Nation's largest source of water quality problems. It's the main reason that approximately 40 percent of our nation's surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming.



*Nonpoint source
pollution is the Nation's
largest source of water
quality problems.*

NPS or runoff pollution occurs when rainfall or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into ground water. It may also come from atmospheric deposition when pollutants settle onto water from the air. NPS pollution also includes adverse changes to the vegetation, shape, and flow of streams and other aquatic systems, called hydrologic modification. Imagine the path taken by a drop of rain from the time it hits the ground to when it reaches a river, ground water, or the ocean. Any pollutant it picks up on its journey can become part of the NPS problem.



NPS pollution is widespread because it can occur anywhere activities disturb the land or water. Agriculture, forestry, grazing, septic systems, recreational boating, urban runoff, construction, physical changes to stream channels, and habitat degradation are all potential sources of NPS pollution. Careless or uninformed household management also contributes to NPS pollution problems.

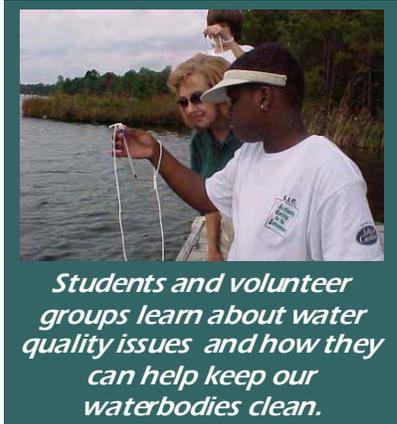
The most common measured NPS pollutant in South Carolina is fecal coliform bacteria. Other common ones

include nutrients such as phosphorus and nitrogen, pesticides, oil and grease, toxic chemicals, and heavy metals. These wash into water bodies, most often in sediments, from agricultural land, small and medium-sized animal feeding operations, construction sites, and other areas of disturbance. In urban areas, wash-off from parking lots, stormdrains, and roads are also major sources. Beach closures, destroyed aquatic and marine habitat, unsafe drinking water, fish kills, and many other severe environmental and human health problems result from NPS pollution. The pollutants also ruin the beauty of healthy clean water habitats. Each year the United States spends millions of dollars to restore and protect the areas damaged by NPS pollutants.

WHAT IS BEING DONE ABOUT IT?

During the last 20 years, our country has made significant headway in addressing NPS pollution. At the federal level, recent NPS control programs include the Nonpoint Source Management Program established by the 1987 Clean Water Act Amendments, and the Coastal Nonpoint Pollution Control Program established by the 1990 Coastal Zone Act Reauthorization Amendments. Other recent federal programs, as well as state, territorial, tribal and local programs also tackle NPS problems. At the state level, the South Carolina Department of Health and Environmental Control (SCDHEC) developed and began implementing a comprehensive Nonpoint Source Management Program in 1990.

In addition, public and private groups have developed and used pollution prevention and pollution reduction initiatives and NPS pollution controls, known as management measures, to clean up



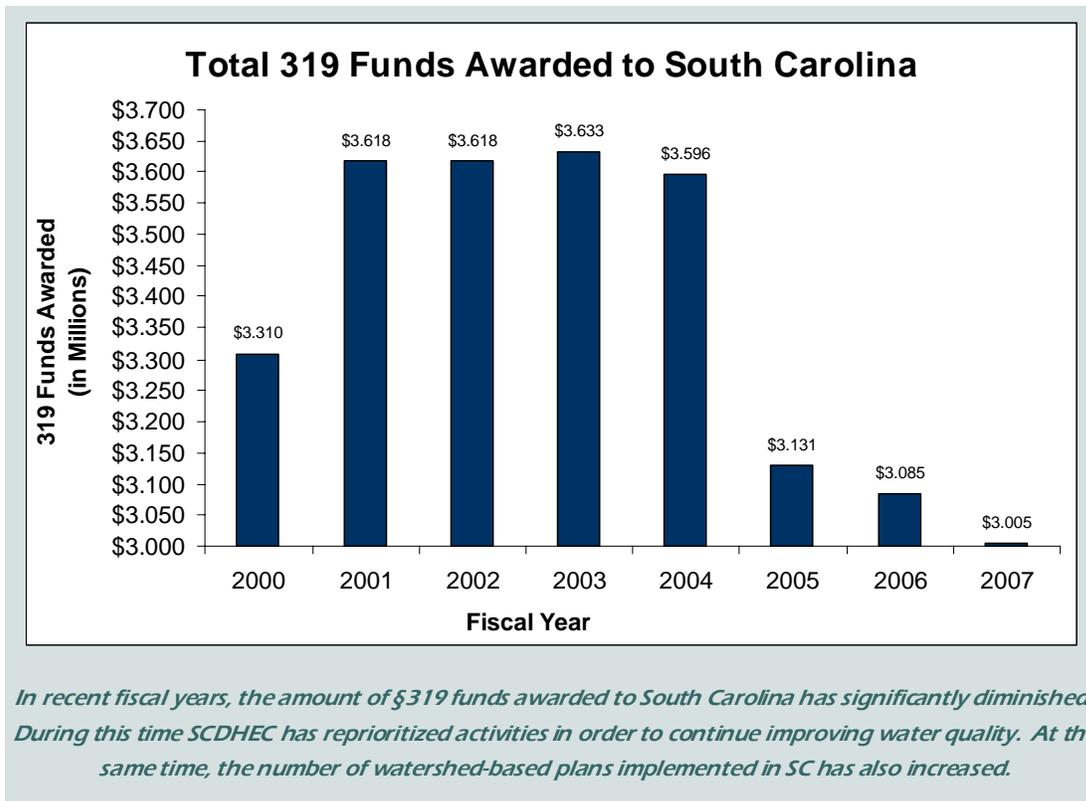
our water efficiently. Water quality monitoring and environmental education activities supported by government agencies, industry, volunteer groups, and schools have provided information about NPS pollution and have helped to determine the effectiveness of management techniques.

Also, use of the watershed approach has facilitated addressing water quality problems caused by NPS pollution. The watershed approach looks at not only a water body but also the entire area that drains into it. This allows communities to focus resources on a watershed's most serious water quality problems--which, in many instances, are caused by NPS pollution.

Just as important, more citizens are practicing water and resource conservation and participating in stream walks, beach cleanups, and other environmental activities sponsored by community-based organizations. By helping out in such efforts, citizens address the Nation's largest water quality problem, and ensure that even more of our rivers, lakes, and coastal waters become safe for swimming, fishing, drinking, and aquatic life.

SOUTH CAROLINA'S STRATEGY

South Carolina is taking full advantage of Clean Water Act Section 319 funding that is available from the Environmental Protection Agency (EPA) to prevent and reduce NPS water pollution in the state. The annual grant funds and resultant workplan is the principle financial mechanism for implementing the goals of the NPS Management Program. All projects described in the workplan are linked to one or more of the goals described in the NPS Management Program. In order to meet the goals of the NPS Management Program, emphasis has shifted over the last several years toward implementing projects that address specific NPS impairments in priority waterbodies/watersheds. Beginning in fiscal year 2003, in accordance with the latest guidance from EPA, South Carolina began focusing resources exclusively on watersheds where nonpoint source Total Maximum Daily Loads (TMDLs) have been developed. In October 2008, recognizing the need to address additional water quality issues, the grant solicitation was expanded to include implementation of watershed-based plans for not only TMDLs, but also impaired or threatened waterbodies, though waterbodies with TMDLs remain the funding priority. See **"Means to an End"** for more on TMDLs.



While Section 319 grant funds provide significant financial resources for implementing the NPS Management Program, it is actually much broader in scope. There are a variety of other programs including enforceable mechanisms that are applied to NPS pollution prevention. Within SCDHEC, several regulatory programs are administered including agricultural animal facility permitting and compliance, erosion and sediment control permitting and compliance, municipal and industrial facility NPDES stormwater permitting, coastal zone permitting, state water quality standards and Pollution Control Act compliance, Section 401 certification for wetlands disturbance and hydrologic modification, and onsite wastewater system standards and permitting. Further, the SC Forestry Commission implements a very successful forestry Best Management Practice (BMP) compliance program. Since its inception in the early 1990s, the rate of compliance has increased significantly (see “**SC Forestry Commission Works to Improve Water Quality**” to learn more).

Another significant source of funding for nonpoint source abatement projects is a state and federally supported low interest loan program known as the State Revolving Fund (SRF). The SRF may be preferable to local governments for large budget projects since more funds are available than through the Section 319 grant program. Several local governments have applied for SRF loans for NPS projects.

The 1999 update to the NPS Management Program plan incorporated South Carolina’s Coastal Nonpoint Pollution Control Program (CNPCP) under Section 6217 of the Coastal Zone Act Reauthorization Amendments. The purpose of the CNPCP is to address nonpoint source pollution issues within the coastal zone and ensure that all applicable management measures are implemented to protect and restore the State’s coastal resources. SCDHEC’s Office of Ocean and Coastal Resource Management prepared a 15-year strategy for the CNPCP, which describes general objectives for the comprehensive and effective management of polluted runoff within the coastal zone.

In April 2001, the National Oceanic and Atmospheric Administration (NOAA) and EPA conditionally approved the State's CNPCP with one remaining condition. That condition related to the vertical separation distance between an onsite sewage disposal system's drain field and the seasonal high water table. South Carolina has addressed this issue and has received final program approval by NOAA and EPA.



South Carolina continues to work to protect our vulnerable and valuable coastal resources

Stakeholders play an integral part in the State's NPS strategy. Federal agencies such as the USDA Natural Resources Conservation Service (NRCS), Farm Service Agency (FSA), US Forest Service (USFS), US Army Corps of Engineers (USACOE), and United States Geological Survey

(USGS) have major roles. State agencies with complementary programs include the Department of Natural Resources, Clemson Extension Service, and the Forestry Commission. Non-profit groups such as the SC Wildlife Federation, Sierra Club, and SC Coastal Conservation League, and industry trade organizations including the Farm Bureau, SC Assoc. of Conservation Districts, Cattlemen's Association, and the Forestry Association are also active participants.

\$1.5 million of FY08 funds are targeted for implementation of Nonpoint Source TMDLs.

In fiscal year 2008, South Carolina's Section 319 grant workplan contains projects funded under two different EPA defined categories; annual and incremental. The annual allocation of approximately \$1.5 million is used to implement projects that address NPS pollution with activities and programs that are statewide, while the incremental allocation of \$1.5 million is targeted for implementation of nonpoint source TMDL projects in designated priority watersheds. The total

amount of the incremental funds are put into a project within SC's workplan and allocated periodically for the specific implementation projects.

South Carolina currently has 408 approved TMDLs (mostly for fecal coliform bacteria) with 116 more under development. Cooperating agencies and organizations throughout the state are becoming highly involved in the implementation process. One or several can jointly implement TMDLs in a given watershed using the Section 319 funds. Projects to be implemented by outside agencies and organizations are selected using a competitive proposal process. A Request For Proposals (RFP) is promulgated at least once per year through various meetings, workshops, web site, mailings, and advertisements in the publication *South Carolina Business Opportunities*, a biweekly publication with wide circulation.

Applicants must follow specific guidelines, which are published on the SCDHEC web site (www.scdhec.gov/water) to develop a proposal. The proposed project must implement a watershed-based plan for an approved TMDL, impaired waterbody or threatened waterbody; the objective must be to reduce the pollutant load so as to allow streams in the watershed to meet water quality standards. The guidelines specify that the project must address the eight elements of a well-designed watershed implementation project as specified by EPA.

Proposals received as a result of an RFP are reviewed and selected by a review committee. A proposed project must meet all of the criteria described above to be selected for funding. The federal funds must be matched with at least 40 percent in non-federal funds. South Carolina encourages combining funds from other sources such as USDA EQIP funds.

Information on TMDLs and grants can be found online at www.scdhec.gov/water

In the FY 2008 workplan, annual allocation projects (1-5 and 7) are statewide or regional in scope and continue to institutionalize the state's nonpoint source program. Many of these projects

address various nonpoint source categories including forestry, urban runoff, animal agriculture, wetlands, construction and groundwater impacts. Annual allocation category projects are implemented by SCDHEC staff (1-5) and the SC Forestry Commission (7). A significant portion of the annual allocation is used for NPS education and outreach, NPS monitoring, watershed management, compliance, and TMDL development. It is also used to continue implementation of a statewide forestry BMP compliance program.

Federal guidance allows for a maximum of 20 percent of the funding allocation to be used for assessment activities including TMDL development. This workplan contains two assessment projects, one and four. Project #4 includes funding for TMDL development work.

MEETING THE GOALS OF THE PROGRAM

The SC NPS Management Program document describes 17 long-term goals and guiding principles that facilitate and promote the state's efforts to manage NPS water pollution. Those goals are:

- 
- South Carolina's NPS
Management Plan outlines
a strategy for 1999 to 2014.*
- 1. To continually identify and quantify water quality problems that are caused specifically by NPS pollution including those identified on the state's 303(d) list through NPS water quality monitoring activities conducted by SCDHEC NPS monitoring staff, specific Section 319 assessment projects and activities, SCDHEC ambient surface water monitoring data, the Total Maximum Daily Load development (TMDL) process, and other assessment tools.*
 - 2. To ensure that all applicable management measures to protect and restore coastal waters will be implemented in the coastal zone within 15 years of February 23, 1998, the date of conditional Coastal Nonpoint Pollution Control Program approval.*
 - 3. To integrate and implement all applicable management measures on a statewide basis by 2013, exclusive of their requirement for enforceable policies outside of the coastal zone except where statewide regulations already exist or will be promulgated..*
 - 4. Have controls in place by the year 2013 (in 15 years) that will provide the mechanism(s) to delist 100 percent of 303(d) listed NPS waterbodies and prevent new NPS impacted waterbodies from being listed.*
 - 5. To focus Section 319 incremental grant funds and non-federal matching resources on Category I Priority Watersheds as defined in the Watershed Restoration Action Strategy/Unified Watershed Assessment (WRAS/UWA) process and on 303(d) listed waterbodies within the priority watersheds.*
 - 6. To focus Section 319 annual grant funds and non-federal matching resources on an NPS management program that balances education, assessment, technical assistance, BMP implementation, and regulation.*
 - 7. To develop NPS Total Maximum Daily Loads (TMDLs) for all 303(d) listed waterbodies impacted by NPS within 13 years. All NPS TMDLs for waters where dissolved oxygen and fecal coliform bacteria impairments identified on the 1998 303(d) list will be developed by the end of FY-2007. By the end of FY-21010, TMDLs will be completed for waters identified on the 1998 303(d) list impacted by nutrients, pH, and toxics from NPS, and all remaining pollutants.*
 - 8. To maintain and expand partnerships and cooperative opportunities with NPS stakeholders, other agencies, organizations, and citizens.*

9. *To assure effective and efficient use of financial resources and to leverage funds with other programs to target NPS priority issues and areas.*
10. *To have in place animal waste management plans for all agricultural animal facilities in South Carolina that conform with national priorities within 15 years.*
11. *To continue to develop and implement a proactive program protective of the groundwaters of the state by preventing and mitigating impacts from nonpoint sources.*
12. *To continue proactive groundwater management of in-ground wastewater treatment and land application facilities by conducting comprehensive, site specific evaluations during facility development and long-term compliance monitoring.*
13. *To provide regulatory oversight and technical guidance to responsible parties at facilities where groundwater quality standards have been exceeded to accomplish source remediation, assessment, and groundwater corrective actions.*
14. *To continue proactive coordination with other state programs to implement, maintain, and protect South Carolina's groundwater resources.*



15. *Work proactively with potential applicants in order to insure the Clean Water State Revolving Fund (SRF) is fully accessible for nonpoint source projects.*
16. *To continue to implement NPS programs and initiatives that will prevent NPS impact to water quality.*
17. *To periodically review and assess the goals and objectives of the NPS Management Program and revise the program as appropriate in light of the review.*

To assure attainment of these goals, a number of quantifiable five-year action strategies were developed and described. Each set of strategies includes a short-term goal, the implementing mechanism, the implementing agency(s), and a reference to the antecedent long-term goal. Many of the action strategies are in turn supported by milestones, which are associated with implementation of Section 319 projects.

Currently, the State is on track toward meeting interim milestones and strategies that lead to full attainment of the long-term goals by the specified deadline. The current status of several of these long-term goals is described below.

Goal one addresses assessing water quality and other methods to identify NPS impacted problem areas so that management solutions can be implemented. See **“A 101 on the 303(d)”** for more information.

Goal two requires that all applicable management measures to protect and restore the state's coastal waters are in-place within 15 years. To accomplish this goal the state, through SCDHEC's Office of Ocean and Coastal Resources Management (OCRM), is implementing South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP) as required by Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA). See **“South Carolina's Coastal Nonpoint**

Program” for an update on the Program. Currently, the Program received final approval from NOAA and EPA in 2008.

Goals four, five, and seven of the Program are interrelated. Goal four focuses on addressing problem pollutants that are listed on the 303(d) list and goal five describes the use of 319 funds at the watershed level.

Goal four says we will have the controls in place to delist the waterbodies. To accomplish this, we will develop and implement Total Maximum Daily Loads (TMDLs) for all impacted waterbodies listed on the 303(d) list. Goal seven says we will develop those TMDLs during the 15-year period ending in 2014. To accomplish these three goals, and to make an actual positive impact on water quality, the state has focused its Section 319 grant resources on TMDL development and implementation. To date, 524 TMDLs (mostly for fecal coliform) have been developed or are under development by SCDHEC staff and contractors. Of these, 103 have been implemented with Section 319 funding.



*Following work from
three §319 projects, ten
waterbodies are showing
improvements!*

Eleven projects implementing twenty-seven TMDLs have been completed. In addition, fifteen other projects implementing 76 TMDLs in specific watersheds have been awarded and are underway. This includes the following watersheds:

- Fishing Creek in York and Chester Counties
- Allison Creek, Calabash Branch, Beaverdam Creek & Brown Creek in York County
- Big Swamp and Singleton Swamp in Florence County
- Spears Creek and Kelly Creek in Richland and Kershaw Counties
- Tyger River in Newberry, Greenville, Spartanburg and Union Counties
- Cane Creek and Little Cane Creek in Oconee County
- Enoree River in Spartanburg, Union and Laurens Counties
- Chapel Branch Creek in Orangeburg County
- Middle Savannah Watershed in Aiken County
- Long Cane Creek in Abbeville and Greenwood Counties
- Rabon Creek in Greenville and Laurens Counties
- Little Pee Dee River and Catfish Creek in Marion, Dillon and Horry Counties
- Pawley’s Island and Litchfield Estuary in Georgetown County
- Turkey and Bullock Creeks in York and Chester Counties
- Hills Creek in Chesterfield County

These projects are implementing control measures in order to reduce the pollutant load, e.g. fecal coliform bacteria, to a level where state water quality standards are met. Data collected in 2008 suggests that **multiple waterbodies have been restored**. See the following articles, “**Project Successes – Three Projects Improve Water Quality in Ten Watersheds**”, “**TMDL, a Tool for Water Quality Improvement**,” and “**TMDL Implementation Projects Underway**” for more information.

Goal six describes using Section 319 annual grant funds to reduce and prevent NPS pollution through activities that implement regulatory, outreach, assessment and technical assistance activities. These activities complement the Watershed Restoration Action Strategy implementation and help to ensure attainment of goal three. More and more, regulatory programs at the state and local level that serve to reduce nonpoint source pollution from many sources are being put in place. For example, South Carolina has an innovative program to assure that compliance with water quality BMPs is maintained on tree harvesting sites. See “**SC Forestry Commission Works to Improve Water Quality.**”

Goal six also discusses the importance of outreach programs and activities. The South Carolina Nonpoint Source Management Plan recognizes that effective and comprehensive outreach is an important requirement for the success of the state's nonpoint source pollution management program. Unless governmental agencies, educational institutions, and stakeholder groups spread the word to local communities and individual citizens about the water quality problems, and what works in preventing or solving those problems, people will not step forward to implement solutions to prevent or solve these problems. That is why education and outreach programs are critical to the success of any NPS management program. SC's Section 319 grant funds several NPS outreach staff within SCDHEC, as well as funding outreach activities that are a component of specific Section 319 projects. See **"SCDHEC Nonpoint Source Outreach Update," "Champions of the Environment Program Rewards Water Quality Improvement Projects"** and **"Public Notification of Potential Swimming Hazards"** for more information on the NPS Outreach Programs.

Maintenance and expansion of partnerships and cooperative opportunities with stakeholders, other agencies, and citizens is the focus of goal eight. Numerous activities are currently being conducted with students, homeowners, and local governments that support this goal. In particular, federal agency support of the State's NPS Program is critical. The USDA Natural Resource Conservation Service (NRCS) has long been a partner with the state in working to improve water quality. Membership by SCDHEC NPS staff on the NRCS State Technical Committee and NRCS staff membership on the State Nonpoint Source Task Force facilitates cooperation between the two agencies. Further, SCDHEC and NRCS have been jointly exploring the ways to focus Environmental Quality Incentive Program (EQIP) cost-share funds in watersheds where nonpoint source water quality problems occur, particularly in watersheds where TMDLs are being implemented. Through the work of SCDHEC staff, the State Technical Committee voted to include 319 projects in the FY 2007 and FY 2008 NRCS statewide priority ranking tool for EQIP and WHIP. **Any proposed NRCS contract falling within a 319 TMDL implementation watershed would automatically receive a higher priority than another similar project outside the watershed.**



Cooperatively using both funds from §319 and USDA programs ensures that all nonpoint source concerns can be addressed in a watershed.

The goal of collaborative funding has been realized in many projects across South Carolina. USDA NRCS funds such as EQIP and CSP have been secured to increase BMP implementation in project watersheds. Several counties have combined these funding sources to ultimately make participation in 319 projects more accessible for homeowners. The Chesterfield Soil and Water Conservation District has been particularly successful in this effort (See **"Chesterfield Conservations Partnership Combines Funding Sources to Project and Improve Thompson Creek Watershed"** for more). The infusion of the additional funds will help to guarantee that all nonpoint sources in the watershed are addressed, and sufficient reduction in fecal coliform bacteria is achieved so as to allow the streams to meet water quality standards.

To assure effective and efficient use of financial resources and to leverage funds with other programs is the focus of goal nine. The State Revolving Fund (SRF) provides low interest loans for utility infrastructure projects, usually sewage treatment facility construction. The fund can also be used to fund nonpoint source projects and NPS staff have promoted this funding source to local governments to implement stormwater BMPs. This effort resulted in the award of multiple loans for more than \$8 million to the City of Rock Hill for stream restoration/urban stormwater projects in several small watersheds within the City. This funding source has shown a sudden

resurgence in interest and multiple applications for NPS projects across the state are currently under review for funding in 2009.

RELATING PROGRESS TO EPA'S STRATEGIC PLAN

EPA updated their Strategic Plan in 2003 to include several five-year results-based performance goals to protect the environment. South Carolina will incorporate their applicable goals and objectives into the state's NPS Management Program. EPA goal two, clean and safe water, has several objectives and sub objectives related to NPS. In that regard, EPA has asked states to report on four of these NPS objectives:

1. *The number of watershed-based plans (and acres covered) supported under state nonpoint program grants developed since 2002:*

South Carolina has developed **watershed-based plans for 103 watersheds covering 3,014,393 acres** within the state.

2. *The number of watershed-based plans (and acres covered) supported under state nonpoint program grants developed since 2002 that are being substantially implemented:*

South Carolina has completely implemented 27 watershed-based plans covering 1,034,812 acres. An additional 76 watershed-based plans are currently being implemented. South Carolina has **substantially implemented 79 of the total 103 watershed-based plans**, covering 2,459,670 acres within the state.

3. *The number of waterbodies identified by states in the year 2000 as being impaired by nonpoint sources that are fully restored:*

From 2000 to 2002, a net total of 126 impaired waterbodies were removed the state's 303(d) list because the water quality standard was attained. From 2002 to 2004, a net total of 88 impaired waterbodies were removed from the state's 303(d) list because the water quality standard was attained. Between 2004 and 2006, 87 impaired waterbodies were removed and between 2006 and 2008, 170 impaired waterbodies were removed because water quality standards were attained. **Since 2000, a total of 471 waterbodies have been restored.**



Since 2000, a total of 471 waterbodies have been restored.

4. *The annual reduction in lbs./tons of nitrogen, phosphorus, and sediment from nonpoint sources to waterbodies:*

In cooperation with its 319 partners, SCDHEC has developed methodologies for estimating pollutant load reductions from past and ongoing projects. In accordance with EPA instructions, these initial estimations have focused on sediment and nutrient pollution. Among the projects with current annual load reduction estimates are:

TMDL Implementation Projects (Quantities per year):

Scape Ore Swamp: 260,961.2 pounds of nitrogen, 47,611.51 pounds of phosphorus, 66.3 tons of sediment and 1.17×10^{14} CFU fecal coliform bacteria.

Cane and Little Cane Creeks: 586.53 pounds of nitrogen, 212.73 pounds of phosphorus, 11.46 tons of sediment and 5.97×10^{11} CFU fecal coliform bacteria.

Allison Creek, Calabash Branch, Beaverdam Creek and Brown Creek: 4,460.9 pounds of nitrogen, 910.6 pounds of phosphorus, 569.9 tons of sediment and 7.80×10^{12} CFU fecal coliform bacteria.

Fishing Creek: 30,306.9 pounds of nitrogen, 5,449.8 pounds of phosphorus, 5,871.3 tons of sediment and 1.04×10^{13} CFU fecal coliform bacteria.

Tyger River: 9,544.82 pounds of nitrogen, 3,415.4 pounds of phosphorus, 2,333.1 tons of sediment and 6.93×10^{12} CFU fecal coliform bacteria.

Enoree River: 9,300.44 pounds of nitrogen, 3,355.3 pounds of phosphorus, 3,975.3 tons of sediment and 4.29×10^{13} CFU fecal coliform bacteria.

Middle Savannah: 9,792.45 pounds of nitrogen, 207.4 pounds of phosphorus and 8.01×10^{11} CFU fecal coliform bacteria.

Long Cane Creek: 9,111.85 pounds of nitrogen, 741.36 pounds of phosphorus, 194.59 tons of sediment and 2.58×10^{12} CFU fecal coliform bacteria.

Spears and Kelly Creeks: 15,358.99 pounds of nitrogen, 1,718.39 pounds of phosphorus, 568.6 tons of sediment and 9.21×10^{12} CFU fecal coliform bacteria.

Completed Section 319 Projects:

Coneross/Beaverdam Creeks: 28,622 pounds of nitrogen, 5,620 pounds of phosphorus, 15,638 tons of sediment and 8.6002×10^{11} CFU fecal coliform bacteria.

Big Generostee Creek: 1,026.3 pounds of nitrogen, 402.6 pounds of phosphorus, and 7.98×10^{11} CFU fecal coliform bacteria.

Identification and Mitigation of NPS Fecal Coliform Pollution in the Rocky Creek Watershed: 47 pounds of nitrogen, 1336 pounds of phosphorus, 50 tons of sediment and 3.84×10^{13} CFU fecal coliform bacteria.

Upper Little Pee Dee River: 24,525.7 pounds of nitrogen, 11,682.1 pounds of phosphorus, 12,655.7 tons of sediment, and 3.5×10^{12} CFU fecal coliform bacteria.

Thompson Creek: 10,919.7 pounds of nitrogen, 2,883.3 pounds of phosphorus, 778.5 tons of sediment and 2.36×10^{12} CFU fecal coliform bacteria.

Twelve Mile Creek: 3,148.4 pounds of nitrogen, 1,259.5 pounds of phosphorus, 2,018.6 tons of sediment and 1.33×10^{14} CFU fecal coliform bacteria.

Bush River: 24,202 pounds of nitrogen, 8,050 pounds of phosphorus, 9,659 tons of sediment and 9.2×10^{13} CFU fecal coliform bacteria.

Fork Creek: 3,901.1 pounds of nitrogen, 982.9 pounds of phosphorus, 603 tons of sediment and 5.15×10^{12} CFU fecal coliform bacteria.

Big Wateree Creek: 21,454.68 pounds of nitrogen, 3,443.10 pounds of phosphorus, and 1,705 tons of sediment.

Big Swamp: 1,635.5 pounds of nitrogen, 585.6 pounds of phosphorus, 161.2 tons of sediment and 9.9×10^{11} CFU fecal coliform bacteria.

Constructed Wetlands as Alternative Treatment for Failed Septic System Tile Fields: 36.47lbs phosphorus, and 2.28×10^{12} CFU bacteria per year from seven rehabilitated septic systems using wetlands treatment.

Stream Restoration and Demonstration (Little Garvin Creek): 29 lbs phosphorus, 29 lbs nitrogen, 99,000 CFU fecal coliform bacteria, and 22 tons sediment from restoring the stream channel, planting a vegetative buffer and fencing out cattle.

North Elementary Constructed Wetlands Project: 5 tons sediment, 16 lbs phosphorus, and 44 lbs nitrogen removed through wetlands treatment of a 33-acre school site.

BMPs and Responsible Homestead Practices to Reduce Fecal Coliform Bacteria in Horse Range Swamp Watershed: 31.1 lbs nitrogen, 12.2 lbs phosphorus, and 4.84×10^{12} CFU fecal coliform bacteria primarily from repaired septic systems and community education.

When totaled, these figures translate to an annual reduction of 53,391 tons of sediment (equivalent to 5,339 truckloads of sediment), **234 tons nitrogen, 47.4 tons phosphorus and 4.4x10¹⁴ CFU fecal coliform bacteria.**

This represents estimates from nineteen projects across South Carolina. Several implementation efforts are just beginning and therefore planning for BMP installation is only in the earliest stages. Current and future grantees will be required to supply detailed information in their interim and final reports so that the variables required to make these estimations are more accurate and readily available. Load reduction information is reported to EPA using the Grants Reporting System (GRTS).

*53,391 tons of sediment,
234 tons of nitrogen and
47.4 tons of phosphorus
were kept out of SC
waterbodies in 2008.*



*South Carolina's 319 projects annually
keep 5339 truckloads of sediment out of
the state's waterbodies.*



As always the bottom line for effectiveness, particularly in 319-funded TMDL projects, is measurable improvement in water quality. SCDHEC will continue to assess water quality through its extensive ambient water quality monitoring strategy. South Carolina has seen measurable improvements due to the work of TMDL implementation projects. See **“Project Successes – Three Projects Improve Water Quality in Ten Watersheds”** to find out more.

Means To An End

The 303(D) List And Total Maximum Daily Loads

*How are water quality problems identified and what steps are taken to improve them?
What current projects are happening in South Carolina?*

A 101 ON THE 303 (d)

When talking about water quality, the term *303(d) list*, or *list of impaired waters*, is often heard. So what is this list?

Section 303(d) of the Clean Water Act mandates that every two years each state must compile a list of waters that do not meet water quality standards. In South Carolina, portions of streams, rivers, lakes and other waterways are placed on the 303(d) list when a five-year period of monitoring data indicate that the established state water quality standards are not met.


Waters on the 303(d) list are targeted for improvement.

Waters can be impaired for a variety of causes including, but not limited to, bacteria, phosphorus, heavy metals, etc. Sources of these impairments vary with land uses such as urban, rural or agricultural.

Once a waterway is on the 303(d) list, it is targeted for water quality improvement. Often local stakeholders are eligible for grants for improvement projects through SCDHEC. The implementation projects listed in this report are funded in such a manner through Section 319 of the Clean Water Act.

South Carolina submitted the 2008 303(d) list in March 2008 and the Environmental Protection Agency approved it in July 2008. The 2008 list can be found online at www.scdhec.gov/environment/water/tmdl/.

TMDL, A TOOL FOR WATER QUALITY IMPROVEMENT

The passage of the Federal Clean Water Act laid the groundwork for improving water quality in all of the nation's waterbodies. An important part of that groundwork is contained in Section 303(d) of the Act, which requires states to compile lists of waterbodies that are not meeting water quality standards. Once on the list, a Total Maximum Daily Load (TMDL) must be developed for each impaired water.

In EPA-speak, a TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. TMDLs for a waterbody are calculated based on point source wasteload allocations (industrial discharges, wastewater treatment discharges, etc.), nonpoint sources (pollutants from runoff), natural background sources such as wildlife, and a margin of safety.



TMDLs are developed for each pollutant causing impairment to a waterbody. Therefore, a waterbody may have multiple TMDLs if it is impaired by more than one pollutant.

In South Carolina, the overwhelming majority of impairments to the state's surface waters, as listed on the 303(d) list, are due to fecal coliform bacteria. These are almost invariably due to nonpoint sources since all point source dischargers are required to disinfect their effluent. The development of a TMDL involves the assessment to determine the characteristics of the impairment. Under what conditions do exceedences of the water quality standard occur: after rain events, under low flow conditions, or perhaps only during hot weather? Answers to these questions will help point to the sources of the impairment. For pathogen (fecal coliform bacteria) caused impaired waters, the sources are typically failing septic systems, cattle with access to streams, runoff from improperly applied manure, leaking or over-flowing sanitary

sewers, and runoff from urbanized land. A computer model or another method, such as load-duration curves, is used to determine the existing load of pollutant and the Load Allocation (LA) or quantity of pollutant allowed from nonpoint sources for the TMDL.

Before it is submitted to EPA for approval, the public is given an opportunity to comment on the TMDL. The TMDL document is posted on the SCDHEC web site (<http://www.scdhec.gov/environment/water/tmdl>) and the public is notified of its availability through a mail-out and legal notice in a local newspaper. Subsequent to the public notice period, the TMDL is submitted to EPA for review and approval. Once approved, the TMDL becomes eligible for implementation. South Carolina currently has 408 approved TMDLs (mostly for fecal coliform) and 116 under development.



Wasteload allocations for permitted facilities are determined in a TMDL.

An approved TMDL also establishes the available wasteload allocations for point sources. Permits for NPDES facilities (point sources) and NPDES stormwater permits must be consistent with any TMDL that applies. Generally SCDHEC does not have regulatory authority over the control of nonpoint sources. Rather control of nonpoint sources is encouraged by using 319 grants, USDA cost share programs, etc to encourage landowners, farmers and interested citizens to voluntarily work to improve the water quality.

SC has 408 approved TMDLS (mostly for fecal coliform impairments).

Once the TMDL has been developed the next step is implementation. At this point, the TMDL can be used to formulate a strategy to reduce the pollutant loading through best management practices and stream restoration projects in the watershed. It is important to note that watershed stakeholders play a major role in realizing source reductions as TMDLs are implemented.

In response to EPA's Section 319 national guidance, more and more federal nonpoint source funds are being allocated for the development and implementation of TMDLs. In South Carolina, Section 319 nonpoint source dollars are now available primarily for TMDL implementation. **To date, South Carolina has funded 26 TMDL implementation projects in 103 watersheds around the state.**



South Carolina has implemented 26 watershed-based plans (shown in dark green on the map). These plans cover 103 TMDLs and more than 3 million acres. Fifteen of these projects are currently underway. Additional projects covering new areas of the state are in the approval process and will begin early in 2009.

SOUTH CAROLINA'S CURRENT TMDL IMPLEMENTATION PROJECTS

Fifteen projects that implement 76 TMDLs are currently underway around the state. Annual updates of these projects follow.

TMDL Implementation for Fecal Coliform Bacteria in Allison Creek, Calabash Branch, Beaverdam Creek, and Brown Creek

Research Planning, Inc., in a partnership with York County Soil and Water District (YCSWD), York Natural Resource Conservation Service (NRCS), Clemson Extension, and York County Engineering, has been implementing a TMDL for fecal coliform bacteria in the Allison Creek, Lower Allison Creek, Calabash Branch, Beaverdam Creek, and Brown Creek Watersheds since 2005. The project ends in early 2009.

Participants include 7 beef cattle and horse farmers and 3 landowners with septic repair issues. To date over nearly 500 animals have been excluded from waterbodies.



Horses with access to the water had trampled the banks of this stream in the Allison Creek Watershed.

By fencing the horses out and providing alternate water sources, the stream banks are naturally being restored and the horses have clean, fresh water to drink.



Fecal Coliform Bacteria TMDL Development and Implementation and Dissolved Oxygen Characterization for the Big Swamp and Singleton Swamp Watersheds



Concrete block septic systems with plywood tops are common in the Big Swamp Watershed.

The Big and Singleton Swamp Watershed Project, led by the Santee-Wateree Resource Conservation and Development Council, has resulted in over 75 low income families being assisted. To date over 39 septic system have been renovated and improved with another 25 projected to be installed by the end of the BMP Implementation cycle.

Homes with failing septic tank absorption field were identified as being a major contributor to water quality problems in the watershed. Small, old block tank with plywood tops are typical of many of the failing septic drain field systems in the watershed. Septic tank drain fields

must be properly installed for a septic tank to function properly. New and larger capacity septic tanks have been installed for homeowners with existing noncompliant tanks. The completion of the upgraded Pamlico Waste Treatment system will also help improve the water quality within Big Swamp.

With the improvement of approximately 64 failing septic systems and the upgrading of the Pamlico Waste Water Treatment System the Santee-Wateree RC&D Council is confident the Big Swamp Watershed will meet SC water quality standards for fecal coliform bacteria.

More than 60 septic systems have been replaced in the Big Swamp Watershed.



Total Maximum Daily Load (TMDL) Implementation for Fecal Coliforms in the Fishing Creek Watershed



Agricultural field days and farm tours are a great way to showcase and encourage the use of BMPs.

Research Planning, Inc., in a partnership with York County Soil and Water District (YCSWD), York Natural Resource Conservation Service (NRCS), Clemson Extension, and York County Engineering, has been implementing a TMDL for fecal coliform bacteria in the Fishing and Tinkers Creek Watersheds since 2005. The project ends in late 2008.

Participants included 11 beef cattle farmers and 11 landowners with septic repair issues. One constructed wetland was built in order to mitigate issues associated with a failing septic system. To date over 100 BMPs have been installed in this watershed. In order to encourage

other community members to install and use BMPs, RPI hosted field days and farm tours on properties receiving 319 funds. Landowners were on hand to explain each BMP and the benefits they received from using it, such as improved herd health and better grazing management.



Agricultural BMPs such as reinforced creek crossings and water wells and troughs limit livestock access to water and provide clean drinking water. This also reduces bacteria loading in Big Wateree Creek.

Fecal Coliform Bacteria TMDL Implementation for the Spears and Kelly Creek Watershed



Cattle have unlimited access to more than 8 miles of streams in the Spears - Kelly Creek Watershed.



In the Spears-Kelly Creek Watershed, farmers with cattle have been targeted by the Santee-Wateree Resource Conservation and Development Council for BMP installation. Within the watershed, over eight miles of perennial stream channels have been identified with cattle having unlimited access. Cattle in streams will result in stream bank degradation and negative impacts to water quality.

To date, eight alternative water supplies have been installed and over 16 watering facilities with heavy use protection areas has been completed within the watershed. When completed the spears-Kelly Creek water Quality project will result in over 10 miles of perennial streams and 1,500 acres of wetlands protected from cattle having unlimited access to these environmentally sensitive areas.

Careless handling and storage of animal waste is also a problem within the Spear-Kelly Creek Watershed. Four animal waste storage sheds have been constructed within the watershed to assist farmers in properly managing animal wastes and improve water quality.

Improper animal waste management, such as this uncovered manure pile, are a problem in the Spears-Kelly Creek Watershed. To combat this, four waste storage facilities have been constructed to properly store waste.



Fecal Coliform Bacteria TMDL Implementation for Cane Creek and Little Cane Creek

The Friends of Lake Keowee Society (FOLKS) is wrapping up an effort to reduce bacterial loadings to Cane and Little Cane Creeks in Oconee County. To date, fifteen septic systems have been repaired and agricultural BMPs have been installed on both a goat farm and a dairy cattle farm. Work to recruit additional landowners such as horse owners continues through the end of the project. FOLKS has also worked with the Town of Walhalla to identify and improve broken sewer lines and other collection system issues.



After discovering overflowing manholes and leaking sewer lines, FOLKS worked with the local municipality to correct the problem.

Data collected as part of this project as well as SCDHEC monitoring data both show improvement on these two creeks.



This fence keeps goats, sheep and other animals out of the creek and wetland area.

Cane Creek is currently meeting water quality standards. Little Cane Creek still occasionally exceeds water quality standards, but the exceedances are minimal and are just over the standard of 400. As the project ends in early 2009, all data will be fully analyzed to determine the ultimate success of this project. See more about this project in **“Project Successes – Three Projects Improve Water Quality in Ten Watersheds.”**

Tyger River TMDL Implementation Project

Clemson University staff have assisted lots of folks with both agricultural BMPs and residential BMPs. The area has stretched over a rather large area including Spartanburg, Greenville, and Union Counties. A large majority of the residential BMPs were implemented in the Greer, Lyman areas of both Greenville, and Spartanburg Counties. Many of these were septic systems that had not been installed for a long period of time, less than 10 or fewer years.



More than seventy failing septic systems were repaired or replaced in the Tyger River Watershed.

Through this project some 74 septic system rehabs were provided for people who were very appreciative of our assistance. One in particular was a low income person who needed assistance in tapping to the sewer system. She was in a situation that had caused her to be cited on two different occasions for septic system drainage on the neighbor's property and then was told that she could not repair her system as it stood at the present, so that left her with a major financial dilemma, so the 319 grant helped her to rectify the situation. This was a major accomplishment by way of correcting the situation and now not having to worry about septic drainage go onto her neighbor's yard or even in the close by stream.

As a summary of the agricultural BMPs, this project has assisted 10 producers. Presently 12,653 ft waterline and 19,015 ft of fencing have been installed, thereby limiting or excluding livestock access to waterways. 11 water troughs, 2 wells and 3 water taps, 11 heavy use areas around those water troughs, 2 stream crossings with Geoweb, 1 cattle crossing with geotextile fabric and 1 cattle watering access ramp with geotextile fabric have been placed. This is over 3.6 miles of streams that have no or limited access by livestock.



Geoweb (pictured in the middle) provides a stable base for creek crossings and limited livestock access areas. When used properly, Geoweb stabilizes the creek bed and reduces erosion.

Enoree River TMDL Implementation Project

This particular project has had more success with livestock producers than homeowners [for replacement of septic systems]. Clemson University staff have sent several letters to contractors and area churches advertising for residential cooperation with reducing fecal coli form, but presently have only repaired 4. Those that have been assisted truly needed our financial assistance as well correcting problems that could in turn contaminate nearby streams. Failed drain lines and collapsed old septic tanks have been the major issue in this watershed.

As a summary of the agricultural BMPs, this project has assisted 5 producers. Presently 8,928 ft waterline, 15,337 ft of fencing (2.9 miles) have been installed thereby limiting or excluding livestock access to waterways. 11 water troughs, 1 well and 4 water taps, 11 heavy use areas around those water troughs, 1 stream crossing with Geoweb, and 2 cattle watering access ramps with geotextile fabric have been placed.

The educational component for the Enoree River 319 TMDL grant sponsored a drain stenciling program in the downtown Clinton area, the 2nd Annual Enoree River Sweep, and a second Enoree River Adventure Camp during 2008. Staff from Clemson Extension, SC Rural Water, and Clinton Commission of Water and Sewer met several times to identify drains in the downtown Clinton area within the Enoree Watershed. These sites were identified, and on April 19, 2008, volunteers met in Clinton,



Clemson University uses the Musgrove Mill State Historic Site on the banks of the Enoree River for the base of their community education efforts. This includes annual events like the 4-H2O Classroom and River Sweep.

and applied weather resistant drain markers on certain storm drains emptying into the Enoree River.

In June, the 2nd Annual Enoree River Sweep was held along the banks of the Enoree River. Approximately 60 volunteers organized at Musgrove Mill Historic Site, and worked along five access points, from Horseshoe Falls to Keith's Bridge, in Newberry County. Twenty bags of garbage, and several un-bagged items were removed from the access points.

A second Enoree Adventure Camp was held in July, 2008. Thirty seven youth from the Enoree watershed area participated in activities such as water chemistry experiments in the Enoree River, nature activities, learning about water pollution and water quality, macroinvertebrate studies, and many other fun activities.

Watershed Characterization and TMDL Implementation for Chapel Branch Creek

The USDA Forest Service Center for Forested Wetlands Research and its cooperators (Clemson University, Santee-Cooper, Town of Santee, Santee State Park, College of Charleston, Orangeburg Soil and Water Conservation District, NRCS, SC DOT etc.) are working on a South Carolina Department of Health and Environmental Control (SC DHEC) Section 319 Grant Program funded Total Maximum Daily Load (TMDL) project for the Chapel Branch Creek (CBC) watershed draining to Lake Marion at Santee, South Carolina. This 1,555 ha watershed is small but contains a wide range of land uses, including commercial, industrial, medium and low density residential, interstate highway and roads, agricultural, and a forested state park. Chapel Branch Creek is on the SC DHEC 2008 (303d) list of impaired water bodies for excessive P, N chlorophyll-a and pH. The first goal of the project is to identify the area(s) generating the excessive non-point source nutrients, Nitrogen and Phosphorous. To evaluate the nutrient loadings and load allocations for establishing the TMDLs after the implementation of the BMPs, this project is utilizing the GIS-based Soil and Water Assessment Tool (SWAT) developed by USDA-ARS. The second goal is to implement Best Management Practices (BMPs) to decrease the nutrient loadings.

Of the nine major tasks identified in the TMDL project, the Quality Assurance Project Plan (QAPP) and field instrumentation for monitoring rainfall and flow and water quality sampling are complete. The water quality sampling and analysis is ongoing and will continue until spring 2009. Due to the regional drought, seasonal storm sampling is delayed by 18 months. The flow data and sampling analyses conducted since 2007 from discrete and composite sampling from five automatic samples, and seasonal storm event sampling data are currently being used to calibrate and validate the SWAT watershed model. Several educational activities for cooperators and stakeholders have also been carried out. Once sample collection is complete, measured data and final modeling results will be used to identify the source areas, evaluate loadings and begin BMP design for load allocations followed by TMDL implementation that may take 18 to 20 months.



To characterize the Chapel Branch Creek watershed, project staff have established multiple monitoring stations. The monitoring network contains both automatic samples as well as grab samples taken during rain events.

Middle Savannah Watershed TMDL Implementation Project

The Middle Savannah River Watershed project is making progress with septic tank repairs. To date, Clemson University staff have identified and made 40 repairs on septic tanks. This includes the repair of two septic tanks in which the residents of the property would have been evicted due to violations. Many of the repairs have been made to citizens on limited incomes. So this grant has benefited the environment as well as the citizens of Aiken County



Project staff have found several homes without operational septic systems in the Middle Savannah Watershed. Homeowners used a variety of things in place of a restroom, including this toilet covering a small pit in the ground.

The 319 grant was able to install a septic system, enabling families to use indoor restrooms.

One of the families that were we able to make a septic system repair was a family of five. They were trying to do the repairs themselves because they could not afford a new system. An Environmental Quality Manager for SCDHEC realized what they were doing would not pass inspection and referred the case to project staff. The septic system contractor grasped the plight of this family and made the repairs as cost efficient as possible with little monetary gain. So through cooperation of SCDHEC, the septic system contractor, and money from the 319 grant, the family was able to stay in their home.

Another major project which is under way is one known as the "Langley Project." An Aerial Infrared Thermographic Survey was performed and a direct discharge was found. It was investigated by Aiken County Stormwater personnel and Clemson's technician for the grant. A pipe was discovered that emptied the waste from the residence directly into a pond that flows into Langley Pond. There are five houses in this area that were built on the Horse Creek flood plain years ago. Through the cooperation of Clemson University Extension,

Aiken County, SCDHEC, and the Aiken County Public Service Authority, and Valley Public Service Authority, a project is currently in the works that will take the residences off septic systems and put them on a sewer system to alleviate the problem. This project will be cost-shared by Aiken County.

Educating adults and children on watersheds and nonpoint pollution is also part of the grant. Approximately 950 people have been educated through use of the Enviroscope model and lectures on using environmentally sound landscaping principles.

Long Cane Creek TMDL Implementation Project

The Long Cane Creek Total Maximum Daily Load Implementation Project covers the upper Long Cane Creek watershed in eastern Abbeville and western Greenwood counties. Clemson University staff are currently working with five livestock producers in the watershed, with an average herd size of 31-105 head of beef cattle. The practices implemented include fencing out ponds and streams, drilling wells and installing heavy use areas with watering stations. These practices facilitate improved grazing management and reduce fecal coliform levels in Long Cane Creek. Participation in the residential landowner septic system aspect of the project is proving to be more difficult than the



This water source allows cattle access to fresh drinking water in both pastures, eliminating the need for stream access.



The Enviroscope is a popular tool for teaching children (and adults, too!) about watersheds.

livestock producer side. However, repairs have been completed on two systems thus far.

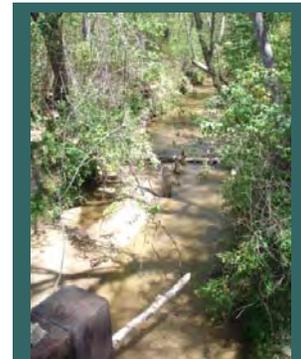
Initial project promotion was through county livestock associations and personal contacts. Radio spots have been broadcast on the Abbeville radio station. Additional outreach has been conducted through bulk mailing postcards and newspaper advertisements detailing project work and opportunities. Articles have also been published in newspapers in Abbeville and Greenwood counties. Youth educational outreach includes environmental lessons through afterschool, in-school, 4-H clubs and summer programs. The Enviroscope watershed model has been a resource to teach

residents of all ages about point and nonpoint source pollution.

Rabon Creek TMDL Implementation Project

The Saluda River Basin's Rabon Creek Watershed is located in Laurens and Greenville Counties of South Carolina's Upstate region. The Rabon Creek 319 project began in 2008 to focus on implementing a fecal coliform TMDL to reduce non-point sources of pollution from livestock, residential onsite septic systems, illicit discharges and stormwater.

The Rabon Creek implementation team of Clemson University Extension Agents has worked in cooperation with the Laurens County Water and Sewer Commission and Laurens County NRCS. While recruitment of landowners for BMP cost-share programs commenced, cooperators began to research the different target audiences in the watershed for a social marketing-based outreach campaign. Through June and July of 2008, an on-line survey gathered information on citizen knowledge and awareness of their local watershed and water quality issues. Advertised through the free weekly newspaper and monthly water bills, the survey encouraged participation by offering fishing gear to the drawing winner. As a follow-up to the on-line survey, a focus group was held to further answer the implementation team's questions about the watershed's target audiences. Local leaders and watershed area residents were invited to attend through the local newspaper, radio station and Laurens Co. Water bills. Advertisement fliers were also distributed to local feed stores, gas stations and garden centers within the watershed.



Rabon Creek drains into Lake Rabon, a drinking water source for Laurens County.

As the New Year approaches, the Rabon Creek implementation team is looking forward to continued work with the Cattlemen's Association and NRCS to install livestock exclusion BMPs. The team also plans to work on pet waste station installations along the walking trails of the Rabon Creek Reservoir. Armed with detailed information about their target audiences, the team can begin crafting an outreach campaign to encourage the adoption of water-friendly behaviors to reduce bacteria runoff pollution.

New Projects for 2008

The following TMDL implementation projects began during 2008.

Little Pee Dee River and Catfish Creek TMDL Implementation Project

The Little Pee Dee and Catfish Creek Watershed Improvement Project, led by the Pee Dee Resource Conservation and Development Council (RC&D) was kicked off by a project stakeholders meeting held in Marion County, SC in June 2008. Thirty-eight attendees were informed of the watersheds' resource concerns and project goals through a PowerPoint presentation. Watershed maps and brochures were provided to attendees to encourage their active participation in locating and catalyzing potential project participants. Local NRCS RC&D and NRCS field office staff also held a short informative meeting with septic tank companies that work in the 2 watershed areas in late June 2008. One meeting was held in Horry County and a second meeting was held in Marion County. Attendees were provided with copies of watershed maps and brochures and encouraged to direct homeowners with failing septic tanks to contact their local Soil and Water Conservation Districts for program assistance. One septic tank company owner that attended the Horry County meeting was subsequently very proactive in placing doorhangers on approximately 125 homes in one area of the Pee Dee River Watershed.



Fifty horse hobby farms are targeted for BMP installation in the Little Pee Dee/Catfish Creek Watershed.

In late June 2008 the project's first waste management workshop was held with 30 attendees. Brock Equipment, Co. demonstrated the latest waste management equipment and associated best management practices for placement of hog waste into the soil profile. Precision agriculture techniques for spreading waste specific to soil type changes in the field highlighted the potential of decreasing over application of nutrients while protecting surface water contamination with fecal coliform bacteria. Honey wagons and Aerway waste injectors were also highlighted as equipment to reduce over application of nutrients and inject waste into the soil to reduce surface water runoff. In October, two hog producers purchased honey wagons with cost/share and technical assistance provided in this project.

Spreading of animal waste is very common in the Little Pee Dee/Catfish Creek Watershed. In June, project staff hosted a Waste Management field day to showcase new technologies that reduce the amount of waste spread and, in turn, the bacteria entering the waterbodies.



Hills Creek Water Quality Improvement Project

Led by the Pee Dee Resource Conservation and Development Council, the Hills Creek Watershed Project in Chesterfield completed several months of intensive education and outreach. An educational brochure was developed for the project along with outreach posters and flyers. A survey was also developed to use as a tool to mark changes in public attitudes and knowledge throughout the project. Information and letters were mailed to all 911 addresses in the watershed. In addition, targeted outreach to all local churches, women's ministry groups, and pastors was completed, encouraging them to share information on the project with their congregations. A display was developed and presented at the Lynches River Electric Coop Fair to over 500 attendees. School presentations on water quality and the Hills Creek Watershed are being completed in local elementary and middle schools. Thirteen applications for assistance were received from producers (5 applications) and homeowners (8 septic tank applications) in the first 3 months of the project. The Chesterfield Soil and Water Conservation District and the Natural Resources Conservation Staff are meeting with applicants to determine need and to develop a conservation plan or corrective course of action.



Cattle operations throughout the Hills Creek Watershed present a challenging and unique opportunity for partnerships to improve water quality.

Turkey and Bullock Creek Fecal Coliform TMDL Implementation Project

Research Planning, Incorporated (RPI) in partnership with York County and the York County Soil & Water Conservation District has recently begun a three year effort to reduce fecal coliform bacteria in Turkey and Bullock Creeks in the Broad River Basin. This project will reduce bacteria loadings by first identifying priority areas where implementation will have the most impact. Then landowners will be targeted for the installation of agricultural BMPs and the repair/replacement of septic systems.

Pawley's Island and Litchfield Estuary TMDL Implementation Project

The Litchfield-Pawley's Island Estuary is impaired by excessive concentrations of fecal coliform bacteria. This has resulted in the shellfish beds within the watershed to be closed to all shellfish harvesting. The Santee-Wateree Resource Conservation and Development Council along with the Georgetown County Soil and Water Conservation District, Georgetown County and the Coastal Conservation Association is working to reduce fecal coliform loads to the shellfish harvesting area around Pawley's Island and Litchfield estuary. One of the methods to be used in this project is to target the cleanup of waste from pets. Plans are to educate pet owners the need for responsible management of one's pet waste by cleaning up behind pets and proper disposal of waste. The main project objective of this project is to improve the water quality resulting in the reopening of shellfish beds for harvesting. This is the first shellfish TMDL implementation project in South Carolina.



Pet waste is a major problem in the Litchfield/Pawley's Island Estuary.

Current Open 319 TMDL Implementation Projects:

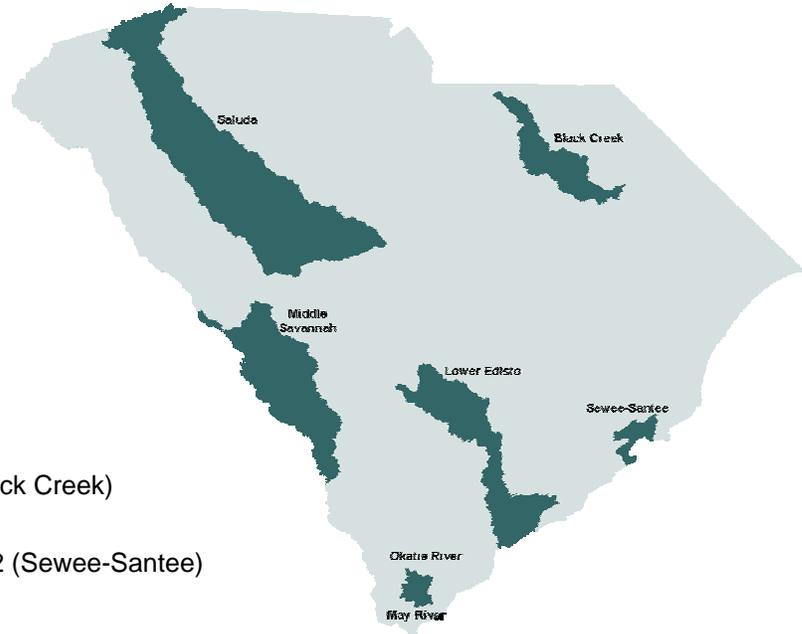
The following table includes all currently ongoing projects open in December 2008.

Watershed	Project #/ Length	Lead Agency	Cooperating Partners	Basin	County(ies)	# of TMDLs
Allison Ck/ Calabash Branch/ Brown Ck/ Beaverdam Ck	4J FY04 4/5/05-1/5/09	York Co. SWCD	York County, Clemson University, York Cattlemen's Assoc, Research Planning, Inc, York Technical College	Catawba	York	4
Big Swamp	4K FY04 4/7/05-1/31/09	Santee-Wateree RC&D	Florence SWCD/NRCS, Williamsburg SWCD/NRCS, SCDNR	Pee Dee	Florence	1
Cane Creek/ Little Cane Creek	4L FY04 2/1/06-1/31/09	Friends of Lake Keowee Society (FOLKS)	Clemson University, Oconee SWCD/NRCS, Oconee Cattlemen's Assoc, Oconee County, Entrix, Inc., Keep Oconee Beautiful Assoc, Wallhalla Police Dept	Savannah	Oconee	2
Chapel Branch Creek	4O FY06 11/7/06-11/6/09	USDA Forest Service	Santee Cooper, Town of Santee, SC PRT, Santee State Park, College of Charleston, Clemson University, Clark Management, Inc., Orangeburg NRCS/SWCD	Santee	Orangeburg	1
Enoree River	4P FY06 6/27/06-6/26/09	Clemson University	Spartanburg SWCD/NRCS, Laurens SWCD/NRCS, Union SWCD/NRCS, Cattlemen's Assoc (Spartanburg, Laurens, Union Counties)	Broad	Newberry, Laurens, Greenville, Spartanburg, Union	10
Fishing Creek	4G FY03 12/15/04-12/14/08	York Co. SWCD	Chester NRCS/SWCD, York County, Clemson University, Chester Livestock Assoc, York Cattlemen's Assoc, Research Planning, Inc.	Catawba	York, Chester	11
Hills Creek	4V FY07 11/08-11/11	Pee Dee RC&D	Chesterfield NRCS/SWCD, SCDNR	Pee Dee	Chesterfield	2
Little Pee Dee River	4T FY06 3/17/08-3/16/11	Pee Dee RC&D	Santee -Wateree RC&D, Marion SWCD/NRCS, Dillon SWCD/NRCS, Horry SWCD/NRCS, SCDNR, Clemson University	Pee Dee	Marion, Horry, Dillon	3
Long Cane Creek	4R FY03 10/24/07-10/23/09	Clemson University	Abbeville NRCS/SWCD, Greenwood NRCS/SWCD, Abbeville and Greenwood Cattlemen's Assoc. , Abbeville County Admin	Savannah	Abbeville, Greenwood	1
Middle Savannah	4Q FY03 4/17/07-4/16/09	Clemson University	Aiken SWCD/NRCS, City of North Augusta, Aiken County, Rural Development, Aiken Master Gardener Assoc	Savannah	Aiken	3
Pawley's Island & Litchfield Estuary	4U FY07 9/2/08-9/1/11	Santee-Wateree RC&D	Georgetown NRCS/SWCD, Georgetown County, Coastal Conservation Assoc	Pee Dee	Georgetown	8
Rabon Creek	4S FY05 11/7/07-11/6/10	Upper Savannah Council of Governments	Clemson University, Laurens SWCD/NRCS, Laurens Cattlemen's Assoc., Laurens County Water and Sewer Commission	Saluda	Greenville, Laurens	4
Spears Creek & Kelly Creek	4N FY05 3/16/06-3/15/09	Santee-Wateree RC&D	Kershaw SWCD/NRCS, Richland SWCD/NRCS, SCDNR	Catawba	Richland, Kershaw	3
Turkey Creek & Bullock Creek	4W FY07 10/9/08-10/8/11	Research Planning, Inc. (RPI)	York SWCD/NRCS, York County	Broad	York, Chester	6
Tyger River	4M FY05 3/27/06-3/26/09	Clemson University	Greenville, Spartanburg and Union County Government, SWCD/NRCS, Cattlemen's Assoc; Foothills RC&D, SJWD Water District, SCDNR	Broad	Newberry, Greenville, Spartanburg, Union	17

SOUTH CAROLINA'S PRIORITY WATERSHEDS

SCDHEC and EPA Region 4 have established seven priority watersheds across the state. These include the following Hydrologic Unit Codes (HUCs):

- 03050109 (Saluda)
- 03060106 (Middle Savannah)
- 03050206 (Edisto)
- 030601100301 (May River)
- 030502080606 (Okatie River)
- 0304020106, 0304020107 (Black Creek)
- 030502090201, 030502090202 (Sewee-Santee)



SCDHEC has Watershed Managers who work in the eight major SC basins. Each of these Watershed Managers also has one or more Priority Watersheds and devote additional time to recruiting 319 projects or other water quality improvement projects in these areas. During the 319 grant solicitation and review process, bonus points and priority are given to projects in these areas.

Currently, two projects are underway in priority areas – Rabon Creek in the Saluda Basin and Middle Savannah (Horse Creek) in the Middle Savannah Basin. SCDHEC anticipates awarding additional projects in priority areas following the current grant solicitation.



South Carolina Successes

Water Quality Improvements ♦ Economic Growth ♦ Educated Citizens

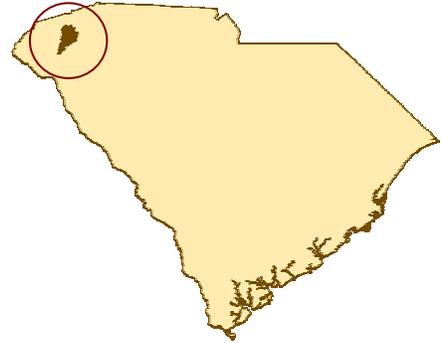
Successes can come in many forms. The ultimate goal of any environmental program is environmental improvements, in this case, specifically water quality improvements. This section outlines those successes as well as those less-quantifiable ones that are associated with water quality improvements – improved herd health, economic growth, better quality of life, aesthetics and partnership building.

Project Successes – Three Projects Improve Water Quality in Ten Watersheds

The following outlines successes seen in data collected in 2008 at three §319 project locations.

Twelve Mile Creek, Pickens County (5 Watersheds)

The Pickens County Soil and Water Conservation District (SWCD) wrapped up an effort to reduce fecal coliform bacteria in Twelve Mile Creek in June 2008. The SWCD along with Pickens County NRCS staff, Clemson University, Pickens County Environmental Services and Pickens County Cattlemen's Association cooperated on the five year project that spent just over \$600,000 in federal 319 funds in addition to more than \$370,000 in EQIP funds. With the grant funds more than 221 agricultural BMPs were installed on 31 farms. Pet waste stations at local parks were also installed.



Community education was a major component of this project as well. Realizing that their target audience was agricultural landowners, the SWCD and their partners approached this group with messages of improved herd health and economic benefits of BMP installed. This approach helped encourage participation and will ultimately enhance the sustainability of the BMPs installed.

The work from this project is already demonstrating environmental improvements. SCDHEC has five water quality monitoring stations within the watershed. All five were exceeding water quality standards at the commencement of the project. **After implementing the TMDL, three of the five stations are already meeting standards.** The remaining two stations show an improvement, but are still not below water quality standards. Monitoring will continue through 2009 and SCDHEC staff will observe for further improvements in Twelve Mile Creek.

Cane Creek and Little Cane Creek, Oconee County (2 Watersheds)

Cane and Little Cane Creeks drain into Lake Keowee in Oconee County. The Friends of Lake Keowee Society (FOLKS), along with Clemson University and Entrix, Inc. are currently implementing a fecal coliform TMDL for both creeks in an effort to restore them to water quality standards. Funded with \$291,000 in 319 grants, this project has included repair of fifteen septic systems, work on two farms and collaboration with the Town of Walhalla to inspect and repair their collection system. Though this work continues through January 2009, bacteria levels in these creeks are already responding favorably.



Monitoring data collected by the project cooperators as well as the routine monthly samples collected by SCDHEC staff indicate that the **Cane Creek watershed is meeting water quality standards. Little Cane Creek has improved**, but still has several exceedances. However, when bacteria levels exceed the standard of 400 CFU/100 mL, those levels are just over 400. Before implementation occurred, exceedances were as high as 6000-8000 CFU/100 mL. SCDHEC monitoring will continue through 2009 and so, as the project concludes, it is hoped that water quality standards will be attained at both Cane and Little Cane Creeks.

Thompson Creek, Chesterfield County (3 Watersheds)

Managed by the Pee Dee Resources Conservation and Development Council and the Chesterfield County SWCD, the Thompson Creek Project, which ended in 2007, worked to implement three fecal coliform TMDLs along Thompson Creek. This project has been highlighted repeatedly for the success of combining funding sources to achieve water quality improvements (see “**Chesterfield Conservation Partnership Combines Funding Sources to Protect and Improve Thompson Creek Watershed**” for more). Because of the combined funding, the SWCD was able to recruit a large number of participants, which resulted in the repair of 34 septic systems and the installation of 52 agricultural BMPs. This translates to 1042 cattle being fenced out of Thompson Creek.



The three SCDHEC monitoring stations in the Thompson Creek watershed are monitored monthly by SCDHEC staff. Data collected in 2008 shows that the stations are still not meeting water quality standards, but **data at the stations has improved**. Prior to 2008, exceedances of the water quality standard of 400 CFU/100 mL were as high as 8800 and were routinely greater than 2000. In 2008, exceedances ranged from 410-840. As many of the BMPs in this project were installed in late 2007, it appears that the effects of the BMPs were being realized in 2008. Data from 2009 will hopefully show continued improvement from these BMPs.

Project Participants Receive More Than Improved Water Quality

People who participate in South Carolina’s Nonpoint Source Program Projects receive a great deal of benefits – well beyond the water quality improvements that tend to be highlighted the most. There are many stories of homeowners improving their health and general quality of life, of farms increasing production and reducing costs, of citizens learning about clean water and their role in its protection, and neighbors bursting to share their accomplishments and knowledge with everyone they meet. Several individuals share these invaluable benefits in their own words below.

I was hesitant to participate; I thought it would be a waste of time. I didn’t think there would be an effect. But you have made a believer out of me because of the cleaner water and lack of bank erosion.

-Earl Thrailkill

Our entire family is very enthusiastic about this project and has worked very hard on it. We are proud of the fact that we are able to be efficient cattle producers and good environmental stewards at the same time.

-Marc Robinson



Barbed wire fencing keeps livestock out of nearby waterways and divides fields, making it possible to rotate pastures for grazing.

Keeping the livestock out of this area will improve water quality downstream by the wetlands being able to flourish undisturbed by the livestock thereby creating a natural filtration of the water. This program will hopefully have a significant impact on water quality downstream from my farm.

-Dwayne Oedewalt



In water troughs like this one, animals access fresh water by pressing down on round balls.

The “hidden” benefit is being able to water the cows without using the ponds. My ponds are not stream fed, strictly runoff. It has always bothered me that the cows drank water that they stood in and defecated. The first positive responses I see are the cows. They seem to like the well water over pond/creek water.

-Ivey Matthews

Our ponds and creek went dry the last two years and our cows would have to travel up to ½ mile to water from our other water trough. The cows perform better when they have fresh, clean water.

-Mike Allen

The water quality is better for the cows, and is more dependable, because the branch dried up during the drought.

-Mack Turner



Water troughs are attached to wells and provide clean drinking water year-round, even in drought.

Seeing is Believing

The following section contains before and after pictures within 319 project locations. Typically, these pictures depict a specific BMP that has been installed to prevent nonpoint source pollution. In each case, while monitoring data may not be available at each BMP location, these pictures illustrate that water quality improvement most likely occurred.



Cattle once had full access to this creek on the Long Farm. The creek had become shallower and wider and was filled with sediment and manure. After removing the cattle so that fence and gate for rotational grazing could be installed, the banks are already being naturally reestablished.



In the Fork Creek Watershed, poultry litter was being improperly stored uncovered. By building a waste storage facility (also known as a stacking shed), the farmer has a dry place to store the litter before spreading it. This prevents the nutrients and bacteria from being leached out of the litter and into nearby streams.



Before



At the Donahue farm in the Thompson Creek Watershed, feeding time for cattle once was a messy proposition. Not only did the cattle stand in thick mud, but their bacteria-containing waste ran down hill and into the creek.

Installation of a feeding shed with wide overhangs and concrete feeding pads has cleaned up the situation. Not only is it easier for Donahue to feed the cattle, but he can collect the manure and use it for fertilizer on his fields.

After



Chesterfield Conservation Partnership Combines Funding Sources to Protect and Improve Thompson Creek Watershed

A dynamic conservation partnership in Chesterfield County collaborated to improve and protect water quality in the Thompson Creek Watershed.

Located in the Upper Coastal Plain, the watershed occupies 192,398 acres with nearly 23 percent in agriculture. The watershed was identified by the South Carolina Department of Health and Environmental Control (SCDHEC) as impaired due to high levels of fecal coliform bacteria—the most common nonpoint source pollutant in South Carolina. A dedicated force of conservation agencies is making a positive difference in the health of this watershed. The Chesterfield Soil and Water Conservation District (SWCD), USDA - Natural Resources Conservation Service (NRCS), Pee Dee Resource Conservation and Development (RC&D) Council, and the SC Department of Natural Resources (SCDNR) joined forces with SCDHEC and the Environmental Protection Agency (EPA) to secure funding to help address the pollution problems of the watershed. Utilizing a combination of grant and federal funds (NRCS' Environmental Quality Incentives Program (EQIP) and EPA's 319 Nonpoint Source grant administered through SC DHEC), the partnership developed best management practices and established an outreach program to encourage landowners to do their part to protect water quality.

Thompson Creek was listed as impaired in the late 1990's. "A large part of our focus was on education, and informing watershed residents that their actions have a direct impact on water quality," explained Pee Dee RC&D Coordinator Lynette Savereno. "Oftentimes that impact is harmful." For example, some livestock producers were allowing their animals direct access to streams and tributaries, thus contributing to high levels of bacteria and sediment. Furthermore, failing septic systems at home sites had a huge negative impact on water quality. SC DHEC Nonpoint Source Coordinator Meredith B. Murphy said, "Our ultimate goal was to



Fencing reduces livestock access to waterways which protects water quality in Thompson Creek.

implement control measures which reduce pollutant loads like fecal coliform bacteria to a level equal to or lower than state water quality standards." This can include reducing livestock access to waterways, buffering streams, providing alternate water sources for livestock, and installing heavy use areas (HUA's). Charles Babb, NRCS District Conservationist for Chesterfield County, worked closely with all the conservation groups involved to ensure that land users and residents in the affected area were aware of the available assistance. He said he was surprised at the number of failing septic systems throughout the county. "We improved water quality by replacing these faulty systems, but we also improved the quality of life." In addition, the Chesterfield SWCD, local NRCS office, and Pee Dee RC&D educated citizens through a public information campaign that included distribution of brochures, door hangers, and a traveling display that was used at local fairs and meetings. Savereno emphasized that by combining the NRCS and EPA assistance they were able to obtain a higher percent cost share on single practices which made installing practices financially feasible.

Babb also said, "The fact that we could offer an additional 30% to assist landowners was what really enabled a lot of our producers to install these practices." Conservation measures included manure storage facilities, vegetative stream buffers, rotational grazing systems via cross fencing, and regular soil testing and reduction of the amount of litter applied to crops. "Some producers were applying poultry manure to their crops because it was what they had always done," explained Babb. "In the end, water quality is protected because excessive bacteria and nutrients are kept out of water sources, and waterbodies are filtered and protected from harmful contaminants."

One such producer who shifted his way of thinking was Ray Long. He eliminated free access to Thompson Creek so that his livestock could no longer drink and lounge in the waterway. By erecting fence along the stream bank, the eroded sides of the creek are healing and the natural vegetation is flourishing and providing an ideal buffer to protect water quality. Long also installed a well, pipeline, and water troughs to provide his animals with a clean, reliable source of water. "We helped Mr. Long install cross fencing which allowed him to implement rotational grazing," said Babb. Rotational grazing involves periodically moving livestock to fresh paddocks to optimize forage quality.



The Plyer farm in Ruby, SC is a whole farm conservation showcase in the Thompson Creek Watershed.

The Plyer farm in Ruby, SC, is a whole-farm showcase of conservation in the Thompson Creek Watershed. The operation includes 350 acres that was traditionally row-cropped in beans and corn, and is now used for grazing, forestry, and wildlife habitat. Utilizing a variety of conservation programs and practices, Evan Plyer worked with Babb to develop a conservation plan to improve and protect his operation with assistance from EQIP, the 319 grant, the Conservation Reserve Program, and as a result, was rewarded for his conservation through the Conservation Security Program. "Mr. Plyer is innovative and willing to try new techniques and practices as long as they protect soil and water quality," said Babb. "He is an outstanding steward of the land and dedicated to conservation."

Also in Ruby, SC, the 300-acre Donahue cattle operation was improved with the installation of cross fencing, ten water tanks, pipeline, and a heavy use area (HUA). The HUA protects water quality by stabilizing heavy traffic areas which reduces soil erosion and sedimentation thereby protecting and improving water quality. "Before we constructed this concrete feeding area, there was a mixture of rainwater, soil, urine and manure all concentrated in one area and polluting nearby water sources," explained Babb. Now, the cattle are spared from having to stand in the manure and urine while eating, which will reduce health problems and protect water quality.



The heavy use area at the Donahue cattle operation was designed to better manage manure and reduce runoff.

Savereno, Murphy, and Babb agree that their efforts are beneficial on a bigger scale than in just one watershed. "The installed conservation practices and the repaired septic systems are protecting the entire downstream portion of the Pee Dee River," said Savereno. "So, our work really does have a wide scale impact on water quality." DHEC monitors water quality monthly throughout Thompson Creek as part of its routine monitoring program. "It will be rewarding to analyze water quality samples and illustrate that our efforts are indeed improving water quality," said Murphy. And Babb is thankful for the coordination of the many entities that consolidated their technical and financial resources to help private landowners in Chesterfield. "We can make a difference with combined resources like EQIP and 319 grants." Murphy agrees. "EQIP and 319 grants complement each other wonderfully because they enable landowners to install environmentally beneficial practices to their home or business in an economical way."

(Article and photographs provided by Amy O. Maxwell, NRCS Public Affairs Specialist. Reprinted with permission.)

Watershed Management in the Kingston Lake Watershed: How a Section 319 Project Got the Ball Rolling

A US EPA 319 project conducted from 1999 to 2002 has led to a sustained locally-based watershed planning and management effort in the Kingston Lake Watershed (KLW). This story illustrates how SCDHEC's adaptation of the watershed approach, made in the early days of the Clean Water Act, has enabled at least one community to build local capacity for development and implementation of their own watershed management plan. Like most watershed planning and management efforts, those in the KLW took years, have had many twists and turns, and required much serendipity to bear fruit.

The KLW (HUC 0304020608) is one of thirteen watersheds that comprise the Waccamaw River subbasin. The Waccamaw is a blackwater river with naturally high oxygen demand. The source of this BOD is organic matter leached from the vegetation in the broad swamps that border the river. The KLW is the only watershed in the river's subbasin that has an urbanized area, the City of Conway. This historic town lies at the terminus of the KLW where multiple streams converge and discharge into the Waccamaw River. The watershed is 130 mi² and has three subwatersheds. As part of Horry County, the KLW lies within the Grand Strand where rapid development fueled by population growth has led to a shift in land use from agricultural to residential. The major threats to environmental quality are from polluted stormwater runoff and habitat loss.

The story begins with SCDHEC's ambient water quality monitoring program, which is used to identify water bodies that have chronic water quality impairments. The Clean Water Act requires states to formulate a list of these impaired water bodies. South Carolina's first 303(d) list was produced in the 1980s. It included all of the sites monitored in KLW for two impairments: low dissolved oxygen concentrations and elevated fecal coliform counts. To investigate the sources of these impairments, SCDHEC awarded 319 funding to scientists at Coastal Carolina University's Environmental Quality Lab (CCU's EQL) in 1999. The primary goals of this project were to: (1) quantify the scope and scale of nonpoint source contributions to the oxygen and fecal coliform impairments in KLW and (2) evaluate the effectiveness of a created wetland in mitigating nonpoint source pollution in this system. Project partners included the city of Conway, Horry County, SC DHEC-OCRM, USFWS-SC Coastal Program, the Winyah Bay Focus Area Task Force, the Waccamaw Council of Governments, USGS, Grand Strand Water and Sewer Authority, the SC Nature Conservancy, Zimmerman Development, Inc., and Castles Engineering. Supplemental funding for bacterial source tracing was provided by the SC Sea Grant Consortium.

In the case of the fecal coliform problem, data collection was designed to support eventual development of a TMDL. In the case of the dissolved oxygen, development of a TMDL was underway to enable permitting of downstream discharges from sewage treatment plants. This TMDL was approved in 1999.



Volunteer monitors analyze water samples for E. coli. The volunteers' work helps build public awareness and identifies long-term trends.

The 319 project started with an historic flood – associated with Hurricane Floyd in 1999 – and ended three years later in the midst of an historic drought. Nevertheless, the results from the work were clear – nonpoint source pollution was a serious problem in KLW and likely to worsen given the rapid pace of development. The lead partner on this project, CCU's EQL, engaged in a substantial effort to relay this information to the local municipalities, i.e., the City of Conway and Horry County. SCDHEC advised that a TMDL for fecal coliforms not be developed unless community support existed for the implementation efforts. Fortuitously, assistance in developing

community support came from two sources: (1) a new, locally-based environmental group, the Winyah Rivers Foundation, who hired the first Waccamaw Riverkeeper and (2) the start of the NPDES Phase II Stormwater Program for small municipal separate storm sewer systems (SMS4s).

The new Waccamaw Riverkeeper made a formal plea to Conway's City Council to address the water quality issues that had been thoroughly described by the 319 project. He asked that a task force be established. In response, the City Council set up a permanent Water Quality and Drainage Commission in 2003 that became instrumental in helping the City begin its NPDES Phase II stormwater program. The Riverkeeper was appointed to chair the commission. One of the most important acts of the commission was to successfully urge the City Council to hire a full-time stormwater manager who began work in 2007.

By the end of the 319 project, CCU's EQL realized that further efforts to improve water quality in the Waccamaw River required a more concerted effort at disseminating scientific information and innovative management options, such as adoption of Better Site Design and Low Impact Development principles. To address this, CCU established the Waccamaw Watershed Academy in 2003. As part of the local university, the WWA is a highly visible and stable source of scientific and educational outreach services and is viewed as a community resource. Dr. Susan Libes is the founding director with Dr. Joe Bennett heading up the state-certified EQL. Other staff includes an environmental educator and a professional watershed planner.

During its first year, the WWA conducted a workshop entitled "Coastal Development and Watershed Planning: Collaborative Problem Solving to Protect Water Resources." It was attended by 100 stakeholders who collectively identified watershed planning as a top priority for the rapidly developing Grand Strand. The external training consultant, the Center for Watershed Protection, recommended developing a single watershed plan that could be used as a model for the other watersheds in the Waccamaw basin. The KLV was selected for the model plan because it is: (1) on the 303(d) list, (2) an upstream source of a pollutant covered by a TMDL (dissolved oxygen), (3) the subject of a successful 319 project, (4) covered by an NPDES Phase II stormwater permit and (5) located in an area undergoing rapid development.



Created wetlands stormwater BMP at the Ivy Glen Development

Funding was obtained in 2005 from the USEPA's Wetland Program Development Program under the guidance of EPA Region 4 staff who have provided mentoring support. Partners on this four-year project included those from the 319 project plus SCDHEC's Watershed Manager for the Pee Dee Basin, the Waccamaw Riverkeeper, Earthworks (a locally based environmental engineering company), the Natural Resources Conservation Service, the North Inlet-Winyah Bay National Estuarine Research Reserve's Coastal Training Program, the Center for Watershed Protection, and the South Carolina Water Resources Institute.

The watershed planning effort began with an activity that galvanized Conway's Water Quality and Drainage Commission - a field survey of watershed conditions and retrofit opportunities. This work was conducted by the commissioners under the guidance of the Center for Watershed Protection. The resulting information was used to develop a baseline assessment report summarizing watershed conditions. A major finding was the existence of an extensive system of ditches that have collectively increased the natural linear stream miles by a factor of 7 in the urban subwatershed. An example is Crabtree Canal, which was created in the mid 1960s by the US Army Corps of Engineers by cutting a channel through Crabtree Swamp.

The City of Conway's Water Quality and Drainage Commission led the formation of a watershed stakeholder group by establishing a special task force, Project Klean (Kingston Lake Environmental Awareness Network). Monthly newsletters can be viewed at <http://www.coastal.edu/wwa/klean/index.html>. KLEAN's efforts have focused on restoration of the urban subwatershed. A critical outcome has been the adoption in 2007 of a Memo of Understanding (MOU) between the City of Conway, Horry County, the Crabtree Swamp Watershed Conservation District and the Horry County Soil and Water Conservation District. The MOU is an agreement that the parties will work together to remediate the impaired water bodies in the urban subwatershed, i.e., Crabtree Canal and Kingston Lake. To guide the design of restoration projects in Crabtree Canal, a sediment transport model has been developed by A. Jayakaran (Clemson) in partnership with CCU's EQL. Funding for field and modeling work was provided by the SC Water Resources Institute.

Early efforts to assess conditions in the watershed included a code and ordinance audit to identify regulatory opportunities for improvement of stormwater quality and quantity controls. The resulting recommendations have been used to update stormwater ordinances, land development regulations, comprehensive plans, and greenway, parks and open space plans in both Horry County and the city of Conway. An effort is now underway to develop regulatory mechanisms for riparian buffer protection with the WWA coordinating the efforts of Horry County's Wetlands and Rivers Protection Committee.

A volunteer water quality monitoring program was established in 2005 to increase public awareness and to assist with illicit discharge detection and identification of long-term trends. The program is being run by CCU's EQL in partnership with the Waccamaw Riverkeeper using EPA quality assurance and quality control protocols developed for volunteer monitoring groups. Twelve sites are being sampled bimonthly by 30 trained volunteers, with results provided online at the WWA's website. The local SMS4s - the City of Conway, Georgetown County and Horry County - have taken over funding of this program as it helps meet their NPDES Phase II Stormwater Program requirements.

Support for conducting educational outreach on watershed issues has been provided by the Coastal Waccamaw Stormwater Education Consortium. This group serves Horry and Georgetown Counties, providing assistance to the local communities in complying with the NPDES Phase II Stormwater Program requirements for public education and involvement. The WWA is a founding member, and this connection provides an opportunity to communicate the progress of the KLV project to people residing in the other watersheds of the Waccamaw Subbasin.

Although the watershed management plan has yet to be finalized, work has begun on several action items, most notably a floodplain restoration project along the banks of Crabtree Canal. Funding has been provided by the City of Conway and Horry County with re-vegetation covered by the USFWS-SC Coastal Program. A groundbreaking ceremony was held in October 2008.

The decision that the US EPA made in 2005 to fund a Wetland Program Development project in KLV was based on a desire to build local community capacity for watershed management. The large number and strength of partnerships between stakeholder groups that had arisen, largely as a consequence of the 319 project, was certainly a major factor in this decision. The project outcomes gave tangible evidence that the WWA was a stable and committed part of the community that had a high likelihood of bringing



local stakeholders together in a sustainable way to develop and implement a watershed management plan. **This story of a community's pathway to better water quality illustrates how SCDHEC's watershed-based approach was able to ignite a companion effort within the local municipalities and how both groups brought their unique tools to the table to improve water quality.**

(Article and photographs provided by Dr. Susan Libes, Coastal Carolina University)

Nonpoint Source Highlights

Partners in Action

Nonpoint Source Activities occur beyond the realm of 319 TMDL Implementation Project. This section highlights the work of professionals across the State whose work supports the goals of SC's Nonpoint Source Management Program. This includes programs supported with 319 grant funds.

South Carolina Coastal Nonpoint Program

The Coastal Nonpoint Program (CNP) is an extension of the statewide Nonpoint Source Management Program (319 Program) and is intended to focus on nonpoint source issues affecting the eight coastal zone counties. The CNP program is directed toward the implementation of management measures, including best management practices, in seven specific areas: public education and outreach, watershed protection, urban activities, monitoring and tracking, marinas, hydromodification, and wetlands. By fostering coordinated research, outreach and management activities, the CNP enhances state and local efforts to manage nonpoint pollution in coastal South Carolina. Given recent budget cuts for the CNP, emphasis will continue to be placed on projects and initiatives that provide opportunities to partner with other state and local entities.



SC received full approval for the Coastal Nonpoint Pollution Control Program in February 2008.

In February 2008, South Carolina received notice from NOAA and EPA that the state had satisfied all conditions placed on approval of the coastal nonpoint pollution control program pursuant to Section 6217(a) of the Coastal Zone Act Reauthorization Amendments of 1990. The coastal nonpoint program met all program requirements and was fully approved, constituting a final approval decision for the program.

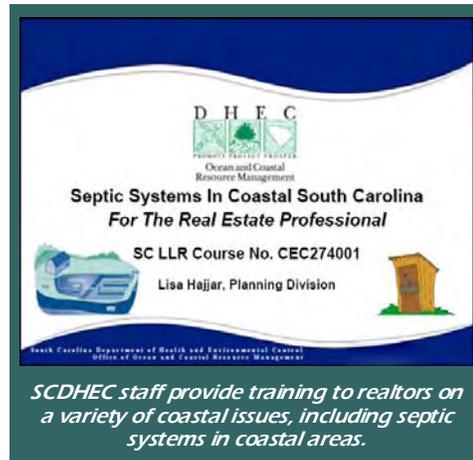
Coordination Efforts

During this reporting period, SCDHEC-OCRM's Coastal Planning Division staff, continued to coordinate with the SCDHEC Bureau of Water 319 Program staff on various projects including grant proposal reviews, and assistance with the NPS Outreach Toolbox.

Educational Efforts

A workshop for Realtors on State and Coastal Laws and Regulations continued to be provided this reporting period. This half-day class provides four Continuing Education Credits and includes, among other topics, presentations on stormwater management, wells, and septic systems. Approximately 100 participants were in attendance at the workshop which continues to receive excellent evaluations from attendees, many of who suggest that it should be a mandatory course for all Realtors.

In early 2008, the Berkeley-Charleston-Dorchester Council of Governments convened a Special Wastewater Issues Committee to look at privatized wastewater treatment facilities and other issues related to wastewater management for rural communities. The SCDHEC-OCRM CNP manager attended these meetings and gave a presentation regarding "Decentralized Wastewater Management Systems". These meetings included representatives from local governments, concerned citizen groups, developers, consultants, as well as other stakeholders.



In August, SCDHEC-OCRM co-hosted a one-day workshop with the Southeast Rural Community Assistance Program entitled "Sewage Solutions for Rural Communities." The workshop focused on the use of decentralized wastewater management systems as an alternative to central sewer systems and individual onsite septic systems. Topics included onsite wastewater technology, regulations, funding and engineering. Seventy-five participants were in attendance from the eight coastal counties and included SCDHEC personnel, representatives from city and county governments, independent contractors, engineers, and regulators.

Sustainable Management and Outreach

The project involving the sustainable management and outreach for impaired shellfish waters in rural counties was completed during 2008. This project was initiated to improve coordination and communications among state/federal agencies, county and municipal governments responsible for overseeing pollution prevention. Data collected through this project was compiled in a GIS database and included 1) study sectors, 2) point files of livestock farms including attribute information containing the number and type of animals, proximity to water body, size of parcel, and parcel owner information, and 3) ESRI shapefiles of the location of septic systems within the Charleston County study sectors. This data was made available to other areas of SCDHEC and additional state and federal agencies. Sites were evaluated based on proximity to receiving water bodies and shellfish harvesting waters. This threat analysis will allow shellfish officers to increase activities, presence and investigations in priority areas.

Two outreach documents were created under this project for use on SCDHEC-OCRM's website and for distribution to all properties identified as having the target animals in the study. In addition to these fact sheets, a "Know Your Watershed" map was produced for each study sector that was surveyed.

SC Clean Marina Program

Improvements in implementation of the SC Clean Marina Program continued during 2008. The SCDHEC-OCRM CNP coordinator presented information educational conferences held by the SC Marine Association in an effort to provide updates on program improvements. Challenges to implementation were highlighted during the talks and feedback was received for consideration in improving the process.



CNP staff also worked with SCDNR and the SC Marine Association (SCMA) on details for implementation of the SC Clean Marina Program during 2008. Responsibilities were identified and agreed to including tasks of serving as initial coordinators for marinas requesting status, identifying inspection team members, and formalizing requirements for certification. In addition to outlining details for implementing the program, the partners 1)

drafted an initial Memorandum of Agreement (MOA) to formalize partnerships and responsibilities; and 2) identified methods for providing promotional materials and opportunities to designated marinas.

SC Forestry Commission Works to Improve Water Quality

South Carolina has standards to ensure logging does not damage stream flow and water quality. The standards, called Forestry Best Management Practices (BMPs), provide specifications for logging roads and stream crossings, set parameters for harvesting activity near streams, and regulate disposal of chemicals and waste. Inspections are conducted by specially trained environmental foresters with the SC Forestry Commission.

The SC Forestry Commission implements a statewide, coordinated Best Management Practices Program for forestry related activities. The BMP program focuses on a proactive approach to preventing NPS control through the offer of voluntary courtesy BMP exams to forest landowners, foresters, and forestry operators. Forestry operations were located through aerial detection, voluntary notification, and complaint calls. Courtesy BMP exams include site-specific recommendations regarding BMP implementation. After the forestry operation is completed, a final on-site inspection will be conducted to determine if the appropriate BMPs were implemented on the site. On sites where damage has already occurred, recommendations for mitigating the damage are made. Close cooperation with DHEC was essential on sites referred for

enforcement action, and in correcting problems to ensure compliance with water quality requirements.

South Carolina's Section 319-funded program of logger training and site inspection has been touted as model for the southeast. Major mills will not accept wood from loggers who fail to train or who have a record of violations.



Foresters with the SC Forestry Commission evaluate a site during a Courtesy BMP Exam.

During 2006-2007, the SC Forestry Commission provided BMP recommendations on 562 forest operations, conducted 46 hours of aerial detection, and provided 99 hours of training for loggers, landowners, and forestry professionals.

How much impact does South Carolina's logging industry have on stream flow and water quality? Very little, according to a survey done in 2007-2008 by the SC Forestry Commission. In a study of 150 randomly selected logging sites, the SC Forestry Commission (SCFC) found 99% in compliance with

state and federal environmental protection standards. For comparison, the Southern Group of State Foresters compiled information from thirteen southeastern states and concluded that the average BMP implementation rate for the region is 87%. This demonstrates continual improvement since compliance monitoring began in 1990. Further analysis is underway to identify the most critical areas for improvement and additional outreach.

Since regular monitoring of BMP implementation began in South Carolina in 1989, overall compliance has continued to improve. Many factors have contributed to the increased compliance with and awareness of forestry BMPs:

- Educational efforts on active forestry operations through the Section 319-funded SCFC Courtesy BMP Exam program.
- Targeted training to address areas of historically low BMP implementation.
- Increased availability of training for loggers, foresters, and forest landowners.
- Support from companies that participate in the American Forest & Paper Association's Sustainable Forestry Initiative program.
- Improved cooperation between state agencies, federal agencies, and private organizations.
- Improved cooperation between SCFC and regulatory agencies for consistency when enforcement actions are initiated.
- Increased professionalism in the logging community.

SCFC has been a long-term partner with SCDHEC in abating the nonpoint source contributions from the forestry industry entering South Carolina waterbodies. The Section 319-funded courtesy exams and training have measurably improved compliance rates and, in-turn, improved water quality.

(Article and photograph provided by Guy Sabin, SC Forestry Commission.)

Champions of the Environment Program Rewards Water Quality Improvement Projects



For more than 15 years, Champions of the Environment has rewarded environmental awareness and action in South Carolina's kindergarten through 12th grade students. Champions is sponsored by Eastman Chemical Company, International Paper, WCSC-TV, WIS-TV and SCDHEC. The Champions partnership awards ten grants over two grant cycles. In the past year, the Champions Program has awarded a number of grants to projects specifically addressing water quality. The following highlights several of these projects. Clearly, these Champions are concerned about water quality and are using the environment as a learning tool.

At Lowcountry Day School on Pawleys Island, students turning a neglected campus pond into an educational asset. 12th grade students are taking the lead through water quality monitoring, cleaning up litter from in and around the pond, and helping fourth graders create an outdoor classroom around the pond. They are also deciding which best management practices would best protect the long-term health of the pond. They will present their findings to property owners, school administrators and others who have the potential to affect water quality in the pond.

Heathwood Hall Episcopal School in Columbia enhanced a large rain garden planted on campus the previous year. The central location of the garden and education efforts by the students led some families to create their own rain gardens at home. And, because of an academic bond with another private school, a rain garden is also being planted at *Colegio Ingles*, an independent school near Monterey, Mexico.

At Lake Murray Elementary in Lexington, the students participated in a project called "Take a Walk in the Wetlands." This project was designed to teach the school community and a local subdivision about the importance of wetlands. In addition, steps to protect water quality and wetland habitats were shared through signs and fliers.

In an effort to reduce energy used to water learning gardens at Oakview Elementary in Greenville, rain barrels were put in place at two downspouts. Newly installed solar panels power the pumps that send the rainwater collected in the barrels to the gardens. This is a great example of a small-scale renewable energy project that has large benefits for the environment as well as the school's orchard and gardens. Using rain barrels to collect and store rainwater until needed for irrigation reduces stormwater runoff and returns water to the local environment.



The Champions program continues to actively recruit environmental awareness and protection efforts across the state. To find out more on this program, visit the Champions Web site at: <http://www.scdhec.gov/champions>, or call Lynne LaSalle, Champions Coordinator, at (803) 898-4394.

South Carolina Hosts EPA Region 4 Nonpoint Source Conference

In September 2008, SCDHEC hosted the state, federal and tribal staff from EPA Region 4 at the biennial Nonpoint Source Conference. Convening at the Springmaid Beach Resort in Myrtle Beach, more than thirty participants from the eight state area met to discuss 319 grant management across the Region. The packed agenda included updates from each state or tribe's program and talks on funding prioritization, working with MS4s, monitoring, documenting success and updated outreach efforts. EPA Region 4 also provided updates related to new

guidelines and issues related to the 319 Program at a regional and national level. To get a better feel for coastal SC, the group toured the nearby Murrell's Inlet Estuary where SCDHEC Shellfish staff discussed shellfish management in regards to water quality. This conference allowed states to share ideas and transfer successful methods for improving water quality in the region.



The conference was sponsored by SCDHEC, EPA Region 4, Grand Strand Water and Sewer Authority, Horry County Soil and Water Conservation District, the Lake and Watershed Association of South Carolina, Santee Cooper and the Santee-Wateree Resource Conservation and Development Council.

Public Notification of Potential Swimming Hazards

It has been a warm summer in South Carolina and many folks have turned to our local rivers and lakes for a chance to escape the stifling heat. But some would-be swimmers have noticed that their favorite swimming hole now sports a sign from the Department of Health and Environmental Control advising "swimming here may make you sick."

DHEC began posting swimming advisory signs in March of this year. Regional staff identified locations that are heavily used for swimming and readily accessible to the public. Of those locations, signs are posted in places that exceed the South Carolina fecal coliform bacteria standard for swimming. A site has exceeded the standard when more than 10% of samples have over 400 counts of bacteria for every 100 milliliters of water. To date, DHEC has placed signs at 20 locations across the state.



Swimming Advisory signs like this one have been posted at twenty location across SC.

Fecal coliform bacteria, found in the intestines of warm-blooded animals, including humans, are not harmful themselves but rather point to the presence of harmful pathogens. Since potential disease-causing agents are difficult to list and require specialized equipment and training to test for individually, fecal bacteria indicate the number of harmful agents that may be present in lakes and streams.

The fecal coliform standard for swimming is not absolute as there is always some risk associated with swimming in a natural waterbody, not just ones that have exceed the standard. However, advisory signs point to waters where swimming increases the likelihood of illness.

The most common water-related illnesses are gastroenteritis, which often causes nausea and diarrhea, and infections of the skin, ears, nose and throat. If you do swim, you can reduce your risk of illness by not swallowing the water and washing your hands before touching your face or preparing food.

Sources of fecal bacteria include old, leaky or overflowing sewer systems, animal waste from livestock, pets and wildlife and failing septic systems. Stormwater runoff often carries fecal bacteria from these sources into waterways. Therefore, causes of increased runoff such as lack of buffers along stream banks, loss of wetlands and inadequate or absent stormwater facilities also worsen bacteria counts in waterbodies.

Many of these pollution sources are not easily regulated or controlled and reducing their levels in our waters will take time and community involvement. You can help limit pollution in our recreational waters by:

- Complying with sewer and stormwater permits
- Properly maintaining septic and wastewater systems
- Applying best management practices for agriculture
- Maintaining forested zones along waterways, and
- Properly disposing of pet waste.

DHEC also helps reduce polluted runoff by:

- Developing Total Maximum Daily Loads (TMDLs) for bacteria
- Funding restoration activities while implementing TMDLs
- Providing educational materials to the public, and
- Maintaining a permitting, compliance and enforcement program for wastewater and stormwater dischargers.

If you have questions or would like more information, please call the Swimming Advisory Hotline: 1-800-360-5655.

SCDHEC Nonpoint Source Outreach Update

SCDHEC Bureau of Water's Outreach & Education Section work on a variety of issues designed to assist in water quality improvements through the deployment of effective outreach techniques. This may include providing assistance to program areas, advice to 319 grantees or advisories to the general public. The following two items describe major program highlights for this year.

Nonpoint Source Resource Development and Outreach Assistance

The 319 outreach program has been working primarily on the Nonpoint Source (NPS) Outreach Toolbox (Toolbox) and on compliance assistance for the South Carolina NPDES General Permit for small municipal separate storm sewer systems (sMS4s). This program has also provided outreach strategy assistance to 319 grantees, including advising in general campaign strategy, reviewing developed materials, and setting up a trial partnership between new 319 grantees and senior public relations students in a capstone project course at the University of South Carolina School of Journalism and Mass Communications.

For the Toolbox, the program first reviewed the needs assessment prepared so far and determined MS4s had not been included as a stakeholder group. The program then interviewed 8 representative MS4s, confirming a general need for a searchable clearinghouse of outreach materials useful in South Carolina and resources for learning how to do outreach (see below for outreach process manual). To meet the need for a clearinghouse, a system for cataloguing NPS outreach material was developed. Using this system, all NPS outreach materials currently at hand were catalogued. Additional materials will be catalogued once the web design process is complete and the Toolbox website has been submitted for approval. The catalogue is currently being used to develop a searchable web-based database. The website is also currently under construction. The basic lay out has been designed. Both static webpage and database content is now being added. Once the website has been approved and launched, stakeholders will be solicited for feedback. The website might be revised depending on feedback.



In addition to the Toolbox, the outreach program has been working on MS4 compliance assistance. A draft checklist was developed to help the compliance section evaluate whether

MS4s are in compliance with the general permit Minimum Control Measures 1 - Public outreach and education (MCM 1) and 2 - Public involvement and participation (MCM 2). A draft workbook for small MS4s to document their MCM 1 & MCM 2 planning process was also developed. The workbook includes worksheets for MS4s to record their plan and instructions for those worksheets. Finally, a draft checklist instruction manual for the compliance section was also developed. This instruction manual shows where to find information for the checklist in the draft workbook. A pilot test of the checklist, instructions and workbook is now being set up with 3 small MS4s. The drafts will be revised based on the pilot. Because the requirements for MCM 1 and MCM 2 are based on the outreach process, the worksheets can act as a template for other stakeholder groups who wish to develop a NPS outreach campaign. As such, the outreach program is in the process of converting the workbook into a more generalizable form that will also be available as an Outreach Process Manual as part of the Toolbox.

Swimming Advisory Outreach

DHEC began posting swimming advisory signs in March of this year (see above article) and established a hotline for the citizens to call. Regional staff identified locations that are heavily used for swimming and readily accessible to the public. To help the public understand what the advisories mean and how they can locally reduce their contribution to runoff pollution, the Bureau of Water's Outreach program is designing and implementing the Swimming Advisory Campaign, "Smart Choices for Healthy Swimming".



To assess what would be the most beneficial in terms of outreach; staff have gathered data from EQC's regional monitoring staff, conducted interviews with citizens and developed an online Swimming Advisory Awareness survey. Based on responses, regional office needs, and objectives of the Bureau to inform the public, the Outreach program and the GIS program have developed online Swimming Advisory informational resources. These resources soon to be released include:

- User-friendly website with an embedded Google map overlaid with GIS files of the Swimming Advisory sites, thus allowing easy, pinpoint searches for addresses and locations. The website features FAQs in English and Spanish, downloadable postcards and brochures, and pertinent links. Also, tips on what the citizen can do to reduce bacteria contributions to local waterways.
- Online survey used to gauge awareness levels and behaviors.
- Informative brochure and postcards

Pathogen Indicator Study – a Closer Look at Bacterial Water Quality Standards

One of SCDHEC's responsibilities involves monitoring our freshwater resources. DHEC monitors over 1,300 locations statewide, and performs approximately 101,500 water quality tests a year in order to determine long-term water quality trends and to identify locations in need of additional attention. Ambient monitoring data are also used in formulating permit limits for wastewater discharges in accordance with the goals of the Clean Water Act. A part of this monitoring involves analyzing samples for the presence of bacteria.

Bacteria are naturally found in lakes, rivers, and streams. The majority of these bacteria do not cause diseases and are necessary for ecosystems to function properly. Microbial species that do cause diseases are called pathogens. Presently SCDHEC uses fecal coliform bacteria concentrations as the recreational water quality indicator species.

*SCDHEC is evaluating
freshwater classifications and
water quality standards
relating to the recreational use
of waterbodies.*

While fecal coliforms themselves do not make people sick, they may be associated with pathogens that do cause illnesses in humans. Coliform bacteria are present in the digestive tract and

feces of all warm-blooded animals, including humans. As fecal coliform levels increase, the risk of contracting certain illnesses becomes higher, especially when they come from human sewage. The levels of fecal coliform bacteria can be used to indicate the presence of fecal waste.

In 1986, EPA recommended that states change from fecal coliform to *Enterococcus* or *E. coli* as their recreational water quality indicator species since they are more consistently associated with illnesses such as gastroenteritis.

SCDHEC is beginning a multi-year evaluation of our freshwater water quality standards, classifications, and uses as they relate to recreation. The goal of this effort is meaningful and realistic protection for recreational uses of the fresh waters of our state. Recreational uses include activities with frequent full-body immersion (swimming, water skiing, other whole-body water sports) and those with a low chance of total body immersion or likelihood of water ingestion (wading, boating, fishing).

In 2009 we plan to collect samples for fecal coliforms, *Enterococcus*, and *E. coli* statewide in streams and lakes of varying sizes. We will also evaluate other states' programs and studies. For more information about this endeavor, please visit our website: www.scdhec.gov/environment/water/fwater.htm.

Building Greener Schools: Collaborative Effort on Stormwater Controls

The Coastal Waccamaw Stormwater Education Consortium (CWSEC) partnered with a county government, a public high school and a national retail store to create a demonstration and educational site showcasing stormwater best management practices (BMPs) on the high school's campus. This unique private-public partnership supports CWSEC's mission to develop and implement effective, results-oriented stormwater education and outreach programs to meet federal requirements and satisfy local environmental and economic needs. More specifically, the Consortium helps SMS4s in northeastern South Carolina meet the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Program's General Permit Minimum Control Measures 1 (Public Education and Outreach) and 2 (Public Involvement and Participation). CWSEC consists of six regional agencies that jointly serve as core education providers for eight member coastal municipalities.



Wal-Mart employees assisted students with the installation of rain gardens in the Grand Strand area of the state.

This project featured students, teachers, employees of Wal-Mart and Horry County Stormwater Department, and CWSEC members installing an infiltration swale and bioretention cell, or rain garden, at Socastee High School in Myrtle Beach. Funding for the project was provided by Wal-Mart in the form of a grant. Information on stormwater pollution and innovative solutions was incorporated into the science curriculums. In addition to installing the stormwater treatment techniques, the classes use water quality monitoring equipment purchased with grant funding to conduct monitoring and data analysis to determine the effectiveness of the treatment practices.

Objectives for this project include the following: reduce stormwater runoff into surrounding water bodies; improve drainage on the school's athletic fields via an infiltration swale; promote community involvement in a school project; serve as a model of stormwater best management practices for other local schools; provide educational and research opportunities for Socastee High students using hands-on activities; and enhance the aesthetic quality of the school grounds.

Following the success of this collaborative effort, Wal-Mart requested that CWSEC and Horry County Stormwater partner on three additional bioretention cell installation projects at public

schools during fall 2008. Wal-Mart also requested a similar project expansion into Georgetown County in a partnership with the public schools and Georgetown County Stormwater, and plans are already underway. Moreover, municipalities and neighborhood communities have requested technical assistance from CWSEC education providers for rain garden projects. These demonstrations will serve as educational tools to a wide audience as examples of stormwater BMPs, resulting in a greater number of stormwater control BMPs across the region and promoting their use among residents and businesses.

(Article and photograph provided by Karen Fuss, Coastal Waccamaw Stormwater Education Consortium and Environmental Educator, Coastal Carolina University. Reprinted with permission.)

To Be Continued

Directions For The Future

South Carolina is making significant progress toward attaining the goals set forth in its NPS Management Program. Since 2002, most Section 319 grant program resources have been focused on implementing Total Maximum Daily Loads (TMDLs) in watersheds where TMDLs have been developed. By definition, these efforts will reduce the pollutant load to a level that meets the state standard for that pollutant, thus meeting one of the most important goals of the NPS Management Program. **Eleven TMDL implementation projects covering 27 TMDLs have been completed. Fifteen more implementation projects implementing 76 TMDLs are currently underway.** Through this effort, SCDHEC has already shown measurable reductions in nonpoint pollutant loads of sediment and nutrients and has previously documented water quality improvements in six watersheds. This year, current data demonstrates that multiple waterbodies across that state have been improved. As projects draw to a close, South Carolina continues to record water quality improvements and anticipates many more waterbodies meeting water quality standards. Money becomes the limiting factor however, and the challenge arises to find the financial resources to continue the implementation projects at the needed level. Efforts will continue to build capacity, including seeking USDA NRCS funding through EQIP for funding within implemented watersheds.



This year, South Carolina continues to show measurable water quality improvements. Ten waterbodies are now showing partial improvement.

The 2002 US Department of Agriculture Farm Bill included a provision to greatly expand conservation and land retirement programs and emphasizes on-farm environmental practices. Specifically, this law greatly increased funding for the Natural Resources Conservation Service Environmental Quality Incentive Program (EQIP). The purpose of the EQIP program is to cost share with producers to implement water quality BMPs on their farm. These expanded programs will undoubtedly help to reduce nonpoint source impacts due to agricultural related activities. The SC NPS Management Program cooperates closely with the NRCS and other USDA agencies, and pledges to continue cooperative efforts. Because of this coordination, 319 projects have been incorporated into the priority ranking tool for USDA funding programs. This has already provided resources for NPS projects and promises to encourage additional resource cooperation between Section 319 and USDA funding sources.



South Carolina received full Coastal Nonpoint Source Program approval in 2008.

Resolving NPS problems in South Carolina's coastal watersheds is an ongoing challenge because of the sensitive ecosystems that are so easily damaged by pollution and because of the tremendous growth and development that is occurring in the coastal counties. SC has prepared what it believes to be an effective and implementable Coastal Nonpoint Pollution Control Program (CNP) under Section 6217 of the Coastal Zone Act Reauthorization Amendments. To obtain full program approval, SC investigated the vertical separation distances between drain fields and the high water table required under SC law. Results of the study were supportive and initial EPA and NOAA review indicated that this study should settle the only outstanding CNP issue. SCDHEC has received official approval from EPA and NOAA for the SC CNP.

The SCDHEC Municipal Stormwater Separate Sewer System (MS4) permit program was expanded in March 2003 to include an additional 50 to 60 urban jurisdictions. The state's largest jurisdictions of Richland and Greenville counties, which include the cities of Columbia and Greenville, already had permits. This means that most of the state's medium sized towns and other urban places (50,000 to 100,000 population) are required to implement a stormwater permit issued to them by SCDHEC. Under the terms of the permit, urban stormwater pollution must be addressed through source monitoring, BMP implementation, and public education.

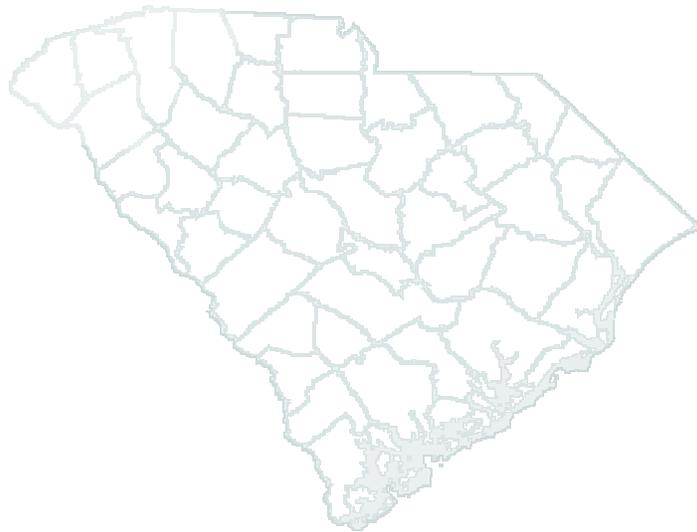


Implementing South Carolina's MS4 permit program should reduce runoff pollution from urban sources across the State.

SCDHEC staff are working closely with these municipalities to build capacity and ensure proper implementation of all permit requirements. It is anticipated that implementation of these requirements will dramatically reduce runoff pollution from urban sources statewide.

SCDHEC clearly recognizes that it is crucial to show quantifiable improvements in water quality and reduction of nonpoint source loads as a result of NPS program implementation, especially Section 319 funding. SCDHEC staff have developed a clear method for collecting, calculating, and reporting quantifiable load reduction estimates. South Carolina believes that this methodology will streamline the reporting process and yield higher quality results. The Grants Reporting Tracking System (GRTS) that SCDHEC uses to report to EPA includes features that make it feasible to report quantifiable reductions in pollutant loads. South Carolina is making full use of these features. Also, the focus of funding resources on implementation of watershed-based plans for impaired waterbodies will produce *additional* measurable water quality improvements in the state's waterbodies.

SCDHEC aims to build upon its successful NPS management program, always seeking additional resources and technology to reduce nonpoint source pollution in the State's waterways so that the mission of the SCDHEC Bureau of Water may be realized: *"Our mission is to ensure that all water resources of South Carolina are of a quality suitable for use by all citizens and that all surface waters are of a quality suitable to support and maintain aquatic flora and fauna."*



Special thanks to Guy Sabin, Amy Overstreet Maxwell, Susan Libes, Karen Fuss, Chris Boring, Elizabeth VonKolnitz, Lynne LaSalle, Anne Rone, Anne Marie Johnson, Victoria Kramer and Rebecca Spratlin for their contributions to this report.

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A report by the South Carolina Department of Health and Environmental Control on progress toward meeting the goals of the State Nonpoint Source Management Program.

Submitted to EPA in fulfillment of the requirements of Section 319 of the Clean Water Act.

Printed January 2009
Total Print Cost: \$217.50
Total Number Printed: 75
Cost Per Unit: \$8.70