

Turning the Tide

on runoff pollution

SC DHEC's Bureau of Water

Summer, 2004

Green roofs by their nature contribute to the management of stormwater by minimizing runoff...

USC's Green Dorm Means Cleaner Stormwater

By Michael Komanis, USC

West Quad, also known as the Green Dorm, is the University of South Carolina's newest residence hall. The hall is a 500- bed apartment style facility that will be certified as a LEED (Leadership in Energy and Environmental Design) green building by the U.S. Green Building Council. It will be among the first green residence halls in the country and the first certified green living and learning center in the world. Scheduled to open in August, the complex addresses environmental concerns in the areas of sustainable site selection, energy conservation, water efficiency, building materials and resource use and indoor environmental quality. West Quad also addresses stormwater management.

sedimentation basins and a turf roof. The site is located on a southern pointed slope with four buildings on the perimeter creating an interior courtyard (see image). This insures that all the rainwater that falls on the roofs and landscaping can be directed into the system and allows the property to act as a giant bio-filtration and retention system.

The interior courtyard has islands throughout the landscaping that contain a mixture of local soils and sand. These islands include special plants that can live in dry conditions throughout the year, but absorb high amounts of water when it rains. The

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Green Buildings typically address major issues such as erosion and sedimentation control and stormwater management concerns, but West Quad has gone a step further. The planning and current construction of the site is based on an integrated design that includes phytoremediation techniques, plant selection,



Plans for USC's West Quad include a green roof.

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Graham Creek Restoration Project

By Mike Pearson, SCDHEC

The South Carolina Department of Health and Environmental Control's Nonpoint Source Monitoring Team, in conjunction with the Shellfish Sanitation Section, has initiated the Graham Creek Restoration Project in an attempt to reopen the creek to shellfish harvesting. Graham Creek is currently classified as *Restricted* by the Shellfish Sanitation Section, due to elevated bacteria levels.

The Shellfish Sanitation Program is responsible for the classification of 570,304 acres of shellfish growing waters. Each month, staff from three coastal offices routinely sample 463 monitoring stations located throughout the state's estuaries. Samples are analyzed for fecal coliform bacteria, and the data generated is used to determine the classification of the respective waters.

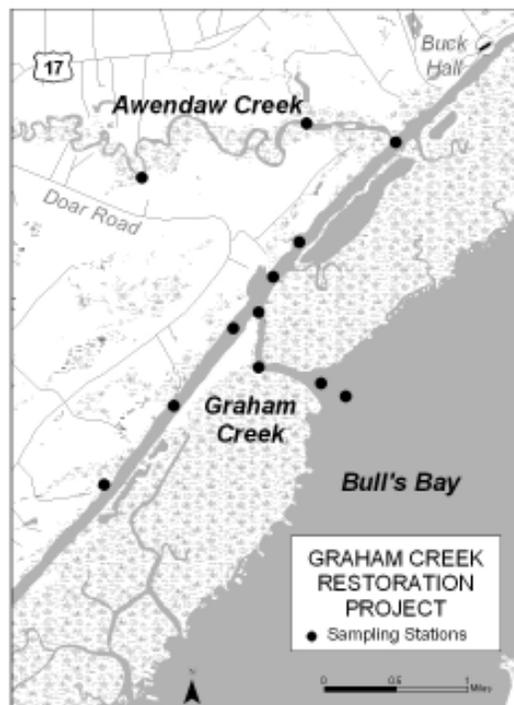
Graham Creek, a small creek in the northeastern corner of Charleston County, connects the Atlantic Intracoastal Waterway with Bulls Bay. The restoration project is currently in the monitoring phase, which will continue for at least one year. Sample collection is conducted once per month during ebb tide to isolate the potential sources of the bacteria in the watershed.

Some of the potential bacterial sources include malfunctioning septic tanks,

runoff from livestock pasture-lands, illegal sewage discharges from boats, and waste from domestic animals kenneled within the water-shed. If sources of these bacteria can be determined and controlled, the area could potentially be reopened for shellfish harvesting.

For information on shellfish harvesting and required licenses, please visit the SCDNR website at www.dnr.state.sc.us. And, for information on the Shellfish Sanitation Program, please visit www.scdhec.net/water/html/shellfish.html.

To learn more about the Graham Creek Restoration Project please contact Mike Pearson at 803-898-4397.



map courtesy: BOW GIS Lab

USC Green Dorm

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plants and islands will act as giant filter and help with stormwater runoff by absorbing as much water as possible, keeping it out of the stormwater system and streams.

The amphitheatre located in the center of West Quad's courtyard allows water to flow down through the site without causing erosion problems. Additional islands located on the ends of each terrace also help with absorption and filtration. Any water that is not absorbed is directed by underground piping to the lower portion of the site to a sedimentation basin. The basin will contain additional phytoremediation plants and therefore help to absorb the extra water. Any water that is allowed to flow to the nearby stream will be minimal but at the same time filtered through the site and therefore be as clean if not cleaner than when it fell out of the sky. All runoff from maintenance parking areas, loading docks and trash collection areas will also be directed through the system to allow for removal of any possible contaminants.

West Quad's learning center includes a turf roof that consists of twelve inches of soil over concrete decking. The soil depth allows for a variety of plants including shrubs and small trees to be planted on the roof. The park like setting will be open to students to enjoy and experience the benefits of the green roof. Green roofs have been used throughout history and have been very popular in Europe over the past decades. This proven technology is being implemented into West Quad not only for its aesthetic contribution but for its many environmental and conservation benefits.

Green roofs by their nature contribute to the management of

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Newest Scenic Rivers in the Pee Dee Basin

By Mark Giffin, SCDHEC

Rivers provide many desirable uses, including recreation and aquatic life habitat, which enhance our quality of life. The South Carolina Scenic Rivers Program is designed to designate and protect unique and outstanding river resources in the State. Scenic rivers are designated when concerned citizens make a request, an eligibility study is conducted, and after gaining local support, SCDNR proposes a bill, which must be passed by the South Carolina General Assembly.

To date, four scenic rivers segments have been designated in the Pee Dee Basin. The Little Pee Dee and Lynches Scenic River segments were designated in 1990

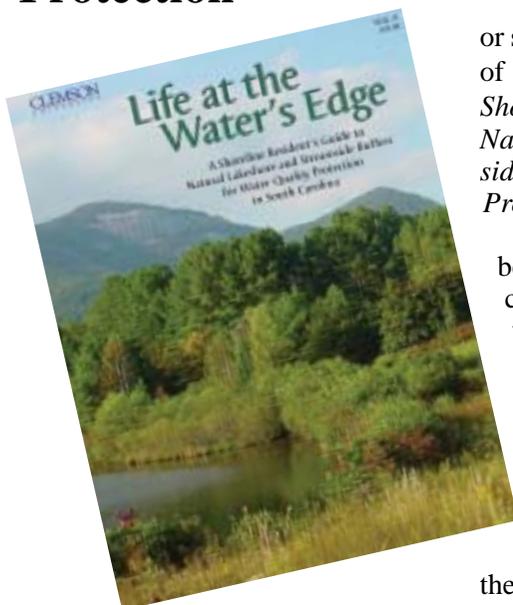
and 1994, respectively, and have established management plans. The Black and Pee Dee Scenic River segments have been established more recently and their respective advisory councils are currently in the process of developing management plans based on member interests.

The Black Scenic River segment, established in 2001, begins at county road #40 in Clarendon County and extends 75 miles southeast to Pea House Landing in Georgetown County. The newest Scenic River is the Pee Dee, designated in 2002. The Pee Dee scenic river segment is approximately 70 miles, extending from the US 378 bridge between Florence and Marion Counties to the US 17 bridge in Georgetown.

DHEC's role in developing management plans for the Black and Pee Dee Scenic Rivers involves chairing a water quality committee, and writing the water quality section of the management plan. The water quality management goals include that water quality standards be met (or exceeded) to provide for designated uses such as fishing, swimming and aquatic life support. Specific recommendations will be included to achieve these water quality goals. Other committees are formed to address such topics as recreation, wildlife, and cultural resources, with the overall goal being the protection of scenic river resources through interagency/stakeholder cooperation.

News to Use

New SC Shoreline Guide Excellent Tool for Water Quality Protection



Even if you don't live on a lake or stream, you will still want a copy of *Life at the Water's Edge, A Shoreline Resident's Guide to Natural Lakeshore and Streamside Buffers for Water Quality Protection in South Carolina*.

This interesting to read, and beautiful to look at guide contains chapters on the importance of watersheds in understanding waterbodies, a guide to South Carolina shoreline plant and animal life, the ecology of healthy and stressed aquatic systems, advantages and functions of shoreline buffers, the design of buffer strips, and the establishment and maintenance of shoreline vegetation. The

appendices provide resources for further reading, regional lists of plant species for buffers, and an index to terms used in the text. Use this guide to implement shoreline management practices that are truly solutions to runoff pollution.

Life at the Water's Edge is the result of a collaboration among Clemson University Faculty, Clemson Extension, and private landscaping professionals. It was supported with USEPA funding via a SCDHEC 319 grant.

The guide is available from Clemson University for \$20 by calling 1-888-772-2665, or it can be purchased on the web at <http://cufan.clemson.edu/olos/cu4.htm>. Refer to publication WQL 24.

Dollars In the Dirt

The Economic Value of Living Trees

By Betty Joyce Nash

Engineered efficiently by nature to produce a superb building material, a felled tree's worth has been well documented — the United States produces \$230 billion in wood products annually. But it has taken awhile for the silent contributions of living trees to be quantified.

Trees are now recognized for performing all sorts of environmental services. They trap carbon dioxide, a chief culprit in global warming. They absorb and filter water. And, they clean the air we breathe, trapping particles believed to cause respiratory diseases. As the boundaries between urban and rural areas blur, the economic benefits of living trees are coming into sharper focus.

Pollution Prevention

A tree behaves like an elaborate pollution control device. Its leaves absorb and filter rainwater, while its roots cleanse stormwater runoff before it reaches waterways and reservoirs, the source of most peoples' drinking water.

In an effort to quantify the pollution control benefits of forests for policymakers, American Forests, a Washington, D.C., nonprofit group established in 1875, used satellite data to document tree cover in urban areas. Then, the group analyzed the effects of tree cover on stormwater runoff, air quality, carbon storage, and other factors.

American Forests calculated the value of a tree's air pollution removal by estimating the amount of certain pollutants deposited on tree canopies, then multiplying by the dollar values assigned by state public service commissions to those pollutants. The

group derived stormwater control amounts by calculating runoff volume in varying land covers.

American Forests analyzed the 351,000 acres that comprise the Charlotte, N.C., metropolitan area. In Mecklenburg County, which encompasses Charlotte and a few small towns, 22 percent of urban forest disappeared between 1984 and 2001. The county has grown by 72 percent since 1980 and is one of the 10 fastest growing areas in the nation.

Still, the county's tree canopy provides \$1.9 billion dollars annually in stormwater retention services, money that would otherwise have been necessary for infrastructure to handle runoff. It also absorbs about 17.5 million pounds of air pollutants each year, a value estimated at \$43.8 million, plus nearly 62,000 tons of carbon.

"The more forest cover in an urban environment, the less water runs off and the more money you save," says Ed Macie of the U.S. Forest Service. It's not rocket science. "What happens is ... we have three inches of rain, it fills our creeks and we have flooding. To compensate for that, we widen the creeks and pave them with concrete. That has a cost."

That's why Charlotte paid \$150,000 from state, city, and private funds to assess its tree cover, says Rick Roti, chairman of Charlotte's tree commission. The information will allow planners to consider tree canopy as a "green layer" in decisionmaking.

"There's also a huge benefit from a water quality perspective," adds Roti. The rapidly growing

Southeast faces water quality issues in a big way because of excessive sedimentation caused by land clearing.

Somebody's paying attention. When Ford Motor Company renovated its historic Rouge assembly plant on the banks of the Rouge River in Dearborn, Michigan, the \$2 billion project included the world's largest "living roof." About 500,000 square feet of vegetation will hold several inches of rainfall. The factory complex also includes massive tree plantings and porous paving as well as shallow ditches seeded with indigenous plants to filter 10-20 million gallons of rainwater annually. The natural roof cost \$15 million, compared to the estimated \$50 million cost for a conventional tar roof, gutters, pipes, sewers, and water treatment systems.

Leveraging Mother Nature to save money is still in its infancy. Businesses will likely find other ways to extract economic value from trees. For example, shade trees next to a building reduce the need for climate control in the summer, cutting electricity demand and carbon dioxide emissions from power plants.

"If you shade your house, you use less air conditioning," says Macie. "Even the cows know that, but as humans we have to remind ourselves."

This article originally appeared in the Winter 2004 issue of Region Focus, a quarterly publication of the Federal Reserve Bank of Richmond. The views expressed are the author's and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System.



A Closer Look at Stormdrain Tagging

By Meredith Barkley, SCDHEC

The Water Watch program recommends storm drain tagging as a good project for groups of all sizes. This is an excellent tool for protecting water quality as well as reaching out and educating the community about nonpoint source pollution.



The question is, should you use a stencil and spray paint or curb markers and adhesive? The following chart looks at a few of the deciding factors. Look over your resources and determine which method may be best

for you. Remember that the real advantage to storm drain tagging is the education given to the community, not just the drain messages themselves. Whatever you decide, visit the Water Watch website (www.scdhec.gov/wwatch) for

more information on starting a storm drain tagging project as well as specific instructions for carrying one out.

For more information contact Meredith Barkley at 803-898-4211 or e-mail barklemb@dhec.sc.gov.

	Stencils	Curb Markers
Materials needed	Stencils, traffic marking spray paint, cardboard to shield paint	Curb markers, heavy duty adhesive
Cost	Inexpensive. Stencils may be purchased for \$10-15 each and may be reused many times (and can often be borrowed from organizations like Water Watch). Spray paint is the only additional cost (\$3-5 per can)	Expensive. Prices for markers vary greatly (\$0.50-15 each) on the quantity and quality ordered, as well as the size. Adhesive must also be purchased (\$5-10 per tube)
Durability	Depends on the location of the stencil, but message will most likely become unreadable in 1-2 years	Manufacturers claim the markers will last up to 30 years. A more realistic estimate is 5-7 years
Ease of application	Simple, but be sure your stencil is secure and that a paint guard is in place. Multiple paint coats may require additional time	Very simple and fast - apply adhesive and attach to surface
Appearance	Message can be blurry or faint, depending on method of spray painting; often inconsistent appearance	Uniform, clear message, though usually smaller than a stencil
Supply Manufacturers	Earthwater Stencils - www.earthwater-stencils.com	ACP International - www.acpinternational.com or das Manufacturing - www.curbmarker.com

Need Help with Your Storm Water Outreach Program?

Do we have the perfect workshop for you! If you are a Phase II community, watershed organization, stormwater utility, or any other entity that provides water outreach and education you will want to attend the *Getting In Step Workshop*, October 13, 2004, in Columbia.

Getting In Step, is a nationally recognized and EPA endorsed, six-step program for designing and conducting effective outreach that addresses Phase II minimum control measures on public education and involvement.

You'll learn:

- ◆ How to develop and build on the six steps starting with identifying goals to evaluating success
- ◆ How to work with the media
- ◆ What it takes to change your public's behaviors
- ◆ Lessons learned from two SC communities
- ◆ Program resources

For more information on the workshop contact Anne Marie Johnson at 803-898-4187, or johnsoam@dhec.sc.gov. Workshop information and registration will be available online in mid-July at www.scdhec.gov/water/.

USC Green Dorm

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stormwater by minimizing runoff and therefore lessen the burden on the stormwater sewer system and eliminate any contribution for potentially flooding a local stream. It also contributes to the overall design of the site by working with the phytoremediation system to absorb and filter water and keep sediment and contaminants out of local waterways. Green roofs also minimize heat islands. Traditional roofs contribute to increased temperatures in urban areas by as much as ten degrees. Green roofs absorb the rainwater then release it through evaporation creating a natural cooling effect.

The green roof also provides a cost savings for the University by reducing energy requirements. The slow transfer of heat through the turf roof reduces cooling needs. In colder

months, the roof acts as natural insulation to keep the building warmer. The use of plants on the roof as well as throughout the site contribute fresh oxygen and help to control and minimize dust issues therefore improving air quality. These are all contributions and savings that will continue year after year for the life of the building.

USC has taken a major step towards controlling stormwater runoff and improving the quality of life in an urban setting by the use of this integrated design system. The site will serve as a teaching tool and an example for the rest of campus and the Southeast, encouraging others to construct green buildings and utilize green roofs.

For more information contact Michael Komanis, University Housing Environmental Programs Manager, at 803-576-5696 or komanmd@gwm.sc.edu.

Coming Events



- * **Dealing with Dirt, Erosion and Sediment Control in the Upstate, Sept. 24, 2004, Greenville, SC.** See: www.upstateforever.org/trips.htm
- * **Building for Greener Communities, National Conference, Oct. 4-6, 2004, Nebraska City, NE.** See: www.arborday.org/shopping/conferences/conferencelist.cfm
- * **24th International Symposium of the North American Lake Management Society, Nov. 3-5, 2004, Victoria, BC Canada.** See: www.nalms.org

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