Ashley Cooper
Stormwater Education Consortium

Annual Report of Activities Year 3

(July 1, 2010-June 30, 2011)

ASHLEY COOPER
STORMWATER EDUCATION CONSORTIUM

Final

Executive Summary

The Ashley Cooper Stormwater Education Consortium (ACSEC) partnership took another step forward in year three, providing a wide variety of outreach activities to the Tri-county region. Approximately 1.1 million educational impacts were recorded, including 1,108,519 and 29,002 reached through indirect and direct outreach methods, respectively. Year three was also a time of transition for mass media, as the original goldfish-themed campaign was phased out. Likewise, there were no television or radio public service announcements, and the billboards were removed. The new mass media campaign began in August 2011 and will be reflected in the next ACSEC annual report.

The ACSEC continued to grow in year three, welcoming six new education partners: Keep Dorchester County Beautiful, Keep Charleston Beautiful, the South Carolina Aquarium, the South Carolina Native Plant Society, the Charleston Chapter of Surfrider Foundation, and the USDA Natural Resources Conservation Service (NRCS). These organizations bring a wealth of experience, talents, and excellent programs that will continue to expand and enhance the existing regional education efforts. The addition of these organizations also strengthens the consortium partner network, which significantly improves the capacity of the ACSEC to reach an even wider group of audiences.

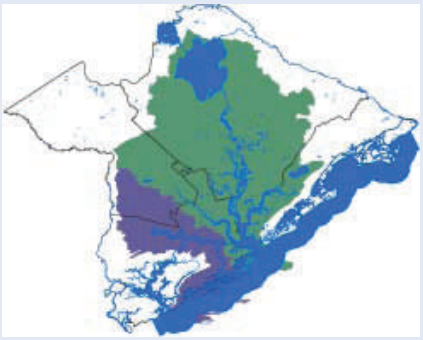
Some of the highlights of year three include the addition of Ms. Kimberly Counts to the Clemson Carolina Clear team in the Tri-country region. Ms. Counts will serve as a regional Natural Resources Agent and co-coordinator for the ACSEC. Having worked with the ACSEC at her previous job as Stewardship Biologist for the South Carolina Department of Natural Resources, she brings a great deal of experience developing successful education programs for both adult and youth audiences. Also in year three, four new permanent exhibits were developed and a stormwater BMP was added to an existing site with ACSEC support. The sites are serving as "educational infrastructure" and they continue to demonstrate and educate the region on both structural and non-structural stormwater BMPs. Also in year three, the SC Sea Grant Consortium developed the Seeds to Shoreline wetland restoration program for area youth, in partnership with the SC DNR-SCORE program and the Clemson Extension and Carolina Clear programs. See the highlight for more details on this new involvement effort.

Although year three can be considered a year of growth and transition, the ACSEC continues to reflect and refine its outreach programs to better serve the public. During the 2010-11 year, the consortium meetings focused on developing a new strategic plan which will go into effect in 2012. This new long-term plan will be used as a roadmap to focus and prioritize efforts in the years ahead.

We continue to learn how much each of us impacts our environment and our water quality. Stormwater runoff into our lakes, rivers and oceans is one of those issues where our individual actions make a difference. What we know now is that each one of us has a role to play in cleaning up this form of pollution.

Mayor Joseph P. Riley Jr.,

City of Charleston



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ACSEC Community Partners

The majority of designated SMS4 communities in the Charleston-North Charleston urbanized area, representing approximately 90% of the population, have committed to the ACSEC regional collaboration. These communities are represented by a dedicated group of public servants who have been engaged for many years in building the partnership.

Local SMS4 Consortium Representatives

SMS4	Consortium Representatives
Berkeley County	Frank Carson, Clint Busby, Sonia Shahnaj
Charleston County	Charles Jarman, Nilesh Desai, Stuart Ruelle
Dorchester County	Jack Ellis, Kelly Billbrough
City of Charleston	Fowler Del Porto, Laura Cabiness, Steve Kirk
City of Folly Beach	Steve Robinson Inter-Governmental Agreement (IGA) with Charleston County
City of Hanahan	Larry Sturdivant, James Frink
City of Isle of Palms	Represented by Charleston County via IGA
Town of Lincolnville	Represented by Charleston County via IGA
City of North Charleston	Mike Dalrymple, John Peckham, Merry Barton
Town of Sullivan's Island	Represented by Charleston County via IGA
Town of Summerville	Russ Cornette

ACSEC Education Partners

Partner collaboration is key in developing and delivering a successful watershed-scale outreach program that reaches diverse audiences, and the ACSEC is fortunate to have a variety of organizations in the Tri-County region that have joined the effort. Education partners include universities, state and local government agencies, utilities and non-profits, and each brings unique expertise, resources, ideas and programs to the ACSEC. The ACSEC is fostering communication among organizations, and programs are being created or enhanced through this cooperative effort. Six new partners joined the consortium in year three, including USDA-Natural Resources Conservation Service, Keep Charleston Beautiful (KCB), Keep Dorchester County Beautiful (KDCB), South Carolina Aquarium, South Carolina Native Plant Society (SC NPS), and the Charleston Chapter of the Surfrider Foundation.

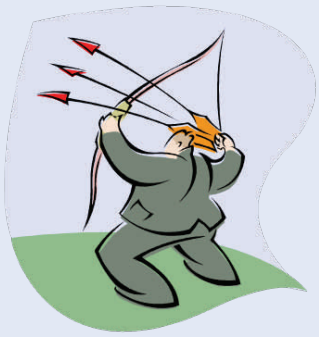
ACSEC Mission and Goals

ACSEC Mission:

Improve water quality within the Ashley and Cooper River basins by providing educational opportunities on stormwater impacts and our community roles in supporting healthy, fishable, and swimmable waterways

Consortium Goals:

- Develop and implement an education plan that defines a cohesive education strategy which outlines target audiences and associated target pollutants relevant to the region using a prioritized approach
- Facilitate compliance with existing and future educational regulatory requirements by capitalizing on local resources and service providers
- Foster citizen involvement in stormwater management through Ashley Cooper Consortium education and participation programs
- Encourage behavioral change towards environmental quality improvement through stormwater education
- Utilize mainstream and developing technologies and tools to maximize citizen exposure to ACSEC stormwater goal and objectives
- Create an interactive reporting process to facilitate information exchange and dissemination among member entities



The goal of an organization can be thought of as the strategic target. The objectives are the arrows we use to reach that target.

ACSEC Annual Report of Activities Format

The third annual report is utilizing the same general format as first two reports and the other regional stormwater consortia in South Carolina. The goal of the report is to provide a detailed outline of the activities that took place in the region over the last year. The reporting period for year three is from July 1, 2010 to June 30, 2011. The report is organized by outreach methods (i.e. media, workshops, public events, etc.). Each activity is briefly described, along with lead provider, supporting partners, date, number of impacts, and target audiences. This report delineates activities into public education and public involvement categories, with education activities further sub-divided by indirect and direct methods.

Clemson University-Carolina Clear program developed an online database in the first reporting cycle to record detailed information on activities conducted by consortium partners. The data collected in the online database includes information on target audiences, pollutants, activity type, lead service providers, supporting partners, number of impacts, location, and several others categories. This annual report provides a condensed version of the information contained the online database The activities in the report are listed in a table format:

Target Audiences Abbreviations

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)

GP	**General Public**
R	**Residential-Homeowners and Renters**
YT	**K12 Youth and Teachers**
HE	**Higher Education**
T	**Technical-Engineers, Contractors, Developers, Staff**
EA	**Elected and Appointed Officials and High Level Staff**
B	**Boat Owners, Operators, and Marinas**
P	**Pet Owners**
PO	**Pond Owners and Managers**
C	**Commercial**

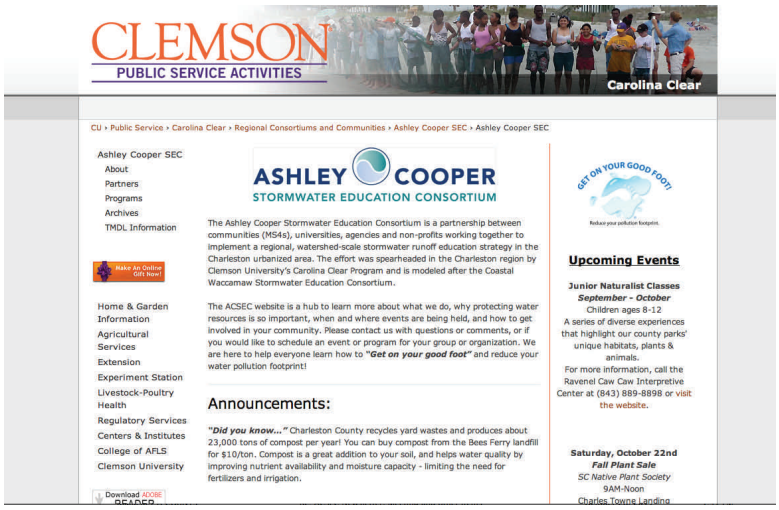
Public Education

Public education activities are classified into two broad categories, direct and indirect outreach methods, to express the mechanisms by which information has been communicated to the public. Direct and indirect outreach methods refer specifically to forms of contact with individuals. Direct methods include activities that are implemented via direct personal contact, such as workshops, presentations, trainings, and public involvement activities. In contrast, indirect outreach methods refer to indirect contacts through traditional media channels, such as television, radio, print, and billboards. Indirect methods generally reach a much greater portion of the population because of their mediums, but are often more challenging to determine specific impact, whereas direct methods usually reach smaller numbers of people, but are targeted to more specific audiences and provide a forum for direct evaluation. Each method is important in the overall education campaign, and are part of the educational strategy for the ACSEC. The document includes parenthetical abbreviations for indirect (I) and direct (d) methods.

Program Update on Mass Media Effort in Year 3: The goldfish-themed mass media campaign that defined the first two years of the statewide public awareness initiative was phased out in year three. There were no television and radio public service announcements, and the last remaining billboards were removed. Likewise, indirect impacts are lower in year three than in the previous years, primarily with respect to the billboard impacts. The phasing out of the original mass media campaign is being replaced with a new statewide and regional mass media campaign that is taking effect August 2011 and will be reflected in the year four. ACSEC annual report of activities.

INTERNET (I)

Clemson Carolina Clear	INTERNET: Carolina Clear and ACSEC website expanded tools and resources in FY 10-11. Impacts based on Google Analytics results from Tri-County area.	Continuous	1,071 (ACSEC Home Page); 26,248 (Carolina Clear)	GP, R, PO, P, T, B, C



WEBSITE: The ACSEC website is part of the Carolina Clear website, which continues to add new features and resources for the public. The ACSEC website also included several updates with respect to archived information (annual reports, meeting minutes, education plans) and program updates. Both the Carolina Clear and ACSEC websites are significant components in the overall public awareness and education effort, especially considering the public's increasing use of digital media as a primary source of information. Efforts will continue to be focused on increasing utilization of the websites and improving them to best serve the public in the coming years.

Public Education

Television (I)

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Public Service	SC ETV	TELEVISION: Making It Grow: award-winning weekly one-hour TV program on PBS. Live call-in show airs Tuesday evenings from 7-8 PM and answers home gardening and landscape questions from around South Carolina.	Continuous	156,000 (approx. 3,000 weekly viewers in Tri-County)	GP, R
Charleston County: CARE	Multiple ACSEC partners	TELEVISION: Charleston County's *Living Green* 30 min TV Program focuses on public education of water and air pollution. *Stormwater: The Good, The Bad, The Runoff* aired on MyTV Charleston and local FOX affiliate. Multiple presenters discussed stormwater issues and ways the public can help in their everyday actions.	September 2010	~50,000	GP, R
Clemson-Carolina Clear		TELEVISION: *Focus on the Palmetto State* program interview with Clemson Carolina Clear's Terasa Young on Stormwater Issues and Homeowner Solutions. Aired on MyTV Charleston.	4/19/11	1,000	GP

RADIO (I)

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Public Service		RADIO: *Your Day*, One –hour weekly radio program on NPR. Recurring programs on horticulture, entomology/pesticides, and natural resources. Specific program on stormwater issues and homeowner solutions on 12/9/10.	Continuous M-Th Noon-1PM	30,000 statewide each week	GP

Your Day is a radio magazine produced as a public service of Clemson University Radio Productions, featuring a wide range of topics of interest to South Carolina residents and visitors alike. Each Monday through Thursday at noon, Your Day provides programming in the NPR tradition, but with a South Carolina flavor.

Year 3 Highlights

Welcome Kimberly Counts!

Clemson's Carolina Clear Program hired Kimberly Counts in May 2011 to serve as a regional Natural Resources Agent for the Tri-county, where she will co-coordinate the ACSEC alongside David Joyner. Kim formerly worked for the South Carolina Department of Natural Resources from August 2006 to April 2011 as the Stewardship Biologist for the Ashepoo, Combahee, Edisto River (ACE) Basin National Estuarine Research Reserve. During her time at the SCDNR, Kim created and facilitated the popular SCDNR's Coastal Exploration Series, which highlights the managed lands, projects and personnel of the agency, while also focusing on take-home natural resource stewardship messages. As a SCDNR employee, Kim was also involved with a variety of monitoring and management projects within the ACE Basin Reserve including shorebird surveys, invasive species eradication efforts, native plant propagation, and visitor use impact studies. Kim became involved with Clemson Extension and the Carolina Clear Program during the establishment of the Fort Johnson Community Garden located at the Fort Johnson Marine Center on James Island. The Garden is a product of partnership between SCDNR and Carolina Clear and was created through a series of workshops open to the public, which focused on rain gardens, rainwater harvesting, gardening for wildlife, and the benefits of gardening with native plant species. To date, the Fort Johnson Community Garden serves as an important ACSEC demonstration site featuring two rain gardens, a 1550 gallon cistern, two bog gardens kept damp with condensate from a nearby ice machine, native plant highlights and butterfly plantings.

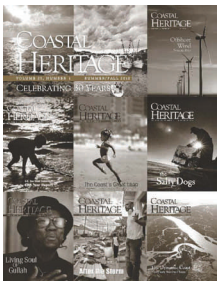
Kim is a native of James Island and experienced a Lowcountry childhood heavily influenced by the ebbs and flows of the daily tide cycle. In 2002, Kim graduated from Presbyterian College where she played soccer for the "Blue Hose" and received her Bachelors of Science in Elementary Education with an emphasis in Biology. In 2008, she graduated from the College of Charleston with a Masters of Science in Environmental Studies with an emphasis in Community Outreach and Environmental Biology. Between Undergraduate and Graduate School, Kim gained a variety of work and life experiences working in the environmental field. Kim was a naturalist for Barrier Island Environmental Education Center located at Camp St. Christopher on Seabrook Island where she learned a plethora of knowledge pertaining to coastal ecology and environmental education. Afterwards, Kim left South Carolina to work on Mount Dessert Island, Maine, home of Acadia National Park. Here, she became a Registered Maine Sea Kayak Guide leading day and multi day sea kayak trips in the Gulf of Maine with diverse clientele ranging from Elderhostel Trips to Camp Groups. While living in Maine, Kim also worked for the non-profit organization Friends of Acadia on an effort to reduce visitor impacts in Acadia National Park and teach Leave-No-Trace outdoor ethics. Kim's travels also took her to work at Whiskeytown Environmental School, located in Redding, California where she coordinated the education component of a stream restoration project involving school groups in invertebrate sampling and water quality testing.

Kim and David Joyner will coordinate the ACSEC and work with Consortium partners to communicate and promote Stormwater Best Management Practices to youth, commercial and residential audiences.

PUBLICATIONS (I)

ARTICLES

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Post and Courier		ARTICLES—NEWSPAPER: *Get Motivated to start using native plants in the landscape* article by Tony Bertauski, as part of his regular Home and Garden column.	Aug. 29, 2010	90,000	GP, R, C
SC Sea Grant		ARTICLES—MAGAZINE: *Coastal Heritage* quarterly publication. *Celebrating 30 years*. Feature highlighted coastal growth and stormwater issues from increasingly urbanized landscapes.	Summer/Fall 2010	5,500	GP, R, T, C, EA
College of Charleston	Clemson Carolina Clear	ARTICLES—NEWSLETTER: College of Charleston Master of Environmental Studies Program newsletter highlighted several sustainability efforts the college is involved with, including the cistern project with ACSEC.	Fall 2010	1,500	GP, HE, C
Clemson Public Service	Clemson Carolina Clear	ARTICLES—MAGAZINE: *Clemson Impacts* seasonal magazine highlighted Clemson programs including Carolina Clear resident and commercial trainings, master naturalist, and youth programs.	Fall 2010	5,500	GP, R, C, YT
Michaux Conservancy	Clemson Carolina Clear, CCSD-School of Arts	ARTICLES—NEWSPAPER: The Post and Courier reported on the *Save Noisette Creek* mural project painted by Mary Nicols' art class at the North Charleston School of Arts. The project was organized by Michaux Conservancy and supported by the ACSEC.	10/21/2010	90,000	GP, YT
SC Sea Grant	Michaux, Clemson Carolina Clear, CCSD-School of Arts	ARTICLES—MAGAZINE: SC Sea Grant quarterly *Coastal Heritage* reported on the *Save Noisette Creek* mural project as example of the issue's theme of *The Art of Science: A Search for Visual Ecology*.	Winter 2010/11	5,500	GP, YT



Coastal Heritage is a quarterly publication of the S.C. Sea Grant Consortium—a university based network supporting research, education, and outreach to conserve coastal resources and enhance economic opportunity for the people of South Carolina.

CONNECTIONS. *Marie Nichols, an art teacher at the Charleston County School of the Arts, and her students assemble this 8-by-20-foot mural of Noisette Creek. The mural was commissioned by the Michaux Conservancy and the Ashley-Cooper Stormwater Education Consortium to help students combine their artistic skills with knowledge of local ecology. The mural is mounted outside at the former Charleston Navy Yard, Building Number 25.*
PHOTO/MADE SPEES

PUBLICATIONS (I) continued

ARTICLES

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Charleston Water Systems		ARTICLES—NEWSLETTERS: *Water Wise,* quarterly newsletter by CWS.	Dec 2010	116,000	GP, R, P, B

Water Wise
The Quarterly Newsletter of Charleston Water System
Volume 5, Issue 4 December 2010

2011 water and sewer rates
Rate increases to fund replacement of aging infrastructure

Water and sewer rates increased by an average of five percent on December 1st, and the increase will appear in your January bill.

The increases will fund the replacement of failing and undersized infrastructure, including the $50 million West Ashley Sewer Tunnel replacement, as well as operation and maintenance of existing infrastructure.

This is the first in a three-year series of rate increases, which were approved by Charleston Water System's Board of Commissioners in September, along with CWS's 2011 budget and three-year Capital Improvements Program. Rates will increase by an average of five percent again next December and once more in December 2012. For more information, visit www.charlestonwater.com.

How much will my bill go up?
It depends on where you live and how much water you use. The table below shows the monthly increase for the typical residential customer, who uses 5,200 gallons of water a month, and a residential customer who uses the monthly minimum of 1,500 gallons.

Where you live	Service from CWS	Increase for typical customer	Increase for min. bill customer
Inside the City of Charleston	Water & sewer	$2.87	$2.29
Outside the City of Charleston	Water only	$1.38	$0.35
	Water & sewer	$3.52	$2.35

Project Profile: New filter building

This new filter building at the Hanahan Water Treatment Plant (above) houses four filters and a pipe gallery underneath the building (inset). Filtration removes microscopic particles in water and is a critical part of the treatment process. The project was part of Charleston Water System's 2006 Capital Improvements Program and cost $18.2 million.

New! View your bill online
Paperless billing option coming in 2011

In response to customer requests, our online bill payment system, Epay, now allows you to view your bill.

If you're already registered for Epay, log in and click *View Most Recent Bill* to download a PDF of your bill. If you're not registered for Epay, visit www.charlestonwater.com to sign up.

The new Epay improvements is a paperless billing option, which will be available next year.

Schedule a speaker!
We want to share our knowledge and passion for water with your group! If your class or civic group is interested in learning more about drinking water or wastewater, contact us. We can tailor the talk to your group's needs. Call (843) 727-6800 or send us an e-mail at info@charlestonwater.com.

Charleston Water System associate Lynne Dilliard gets ready to talk to a third-grade class about water.

Charleston Water System

Water Wise
The Quarterly Newsletter of Charleston Water System

Water Whys
My water has a rotten egg smell. What's causing this and how do I get rid of it?

This is likely caused by your water heater. If you don't use enough hot water to regularly flush the tank, then hydrogen sulfide-producing bacteria can begin to thrive in the tank, resulting in a harmless but unpleasant rotten egg odor when you use warm or hot water.

To eliminate this, follow the manufacturer's instructions to drain and flush your water heater. Most manufacturers recommend flushing your tank at least once a year for routine maintenance.

Have a question? Send it to info@charlestonwater.com.

Protecting our water sources

Clean drinking water starts with you!

Water pollution isn't just harmful to the environment, it can also affect sources of drinking water and make water treatment more difficult.

The most common source of pollution for surface water is contaminated runoff. Runoff is rainwater or irrigation water that flows over land and into storm water collection pipes that empty directly into water bodies. Runoff can carry pollutants such as motor oil, fertilizer, and bacteria from pet waste.

The good news is that you can help reduce pollution from runoff by taking a few simple steps.

How you can help
- Never pour anything into a storm drain.
- Properly dispose of household hazardous materials such as used motor oil, paints, pesticides, and other solvents and chemicals by taking them to a designated disposal center.
- Pick up after your pet.
- Follow the manufacturer's instructions for the proper use of fertilizers and pesticides. Overuse contributes to runoff pollution.

Where does my drinking water come from?
The Bushy Park Reservoir and the Edisto River. It's treated at the Hanahan Water Treatment Plant to remove contaminants and make it safe to drink.

Does Charleston Water test source water for pollution?
Yes, remote monitors continually measure water quality variables in our source water and at various stages in our treatment process. This allows us to quickly detect changes in water quality and adjust the treatment process accordingly. We also draw water samples manually and test them in our lab.

Visit www.charlestonwater.com to learn more about how your water is treated and water quality.

Our Mission: to protect public health and enhance the environment of our service community by providing clean water services of exceptional quality and value.
103 St. Philip Street • PO Box 8 • Charleston • SC 29402 • phone (843) 727-6800 • www.charlestonwater.com

Charleston Water System

Charleston Water System

Water Wise is Charleston Water System's (CWS) quarterly customer newsletter, featuring updates, tips, and information about water and sewer service. The newsletter is sent out to all CWS customers, over 100,000 in the Tri-County region, in their water bill. In the Winter 2010 edition, sent out in December bills, CWS provided tips on Protecting our Water Sources. The article highlighted that the regions drinking water can be polluted by stormwater runoff, and provided recommendations including: never pouring anything in a storm drain, properly disposing of HHM's, picking up after pets, and proper use of fertilizers and pesticides. (Appendix A).

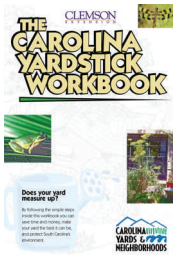
Clemson Extension	Master Gardeners	ARTICLES—NEWSLETTER: The *Taproot* is a quarterly newsletter for the Clemson Extension Master Gardeners in the Tri-County area. The first quarter 2011 edition highlighted rain garden installation at Bowen's Island restaurant	Winter, 2011	500	GP, R
Post and Courier	Sustainability Institute, SC DNR, TTC, Clemson Carolina Clear	ARTICLES—NEWSPAPER: *Harvest rainwater to use at your home* article by Tony Bertauski, as part of his regular Home and Garden column. Column highlighted demonstration sites at Sustainability Institute and SC DNR Fort Johnson	May 1, 2011	90,000	GP, R, C
Post and Courier	Clemson Carolina Clear, CCSD-School of Arts	ARTICLE—NEWSPAPER: Post and Courier article: *Tribute to Teacher* on proposed garden project tribute to former dance teacher Cecilia Slowinski, which includes several stormwater BMPs.	May 15, 2011	90,000	GP, YT

OUTREACH MATERIALS (I)

Brochures, Booklets, Manuals

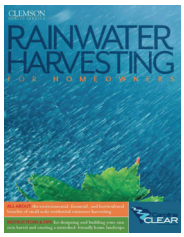
Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Extension	SC DHEC	BOOKLET: Carolina Yards and Neighborhood (CYN) Yardstick Workbook.	Continuous	500	GP, R, PO

The Carolina Yardstick Workbook provides a guide to the nine principles of the Carolina Yard and Neighborhood (CYN) program. This statewide program provides guidance on environmentally friendly home landscaping to minimize impact on SC's natural resources. The program focuses on techniques for water resource management, including stormwater runoff, and continues to be one of the primary outreach methods to reach residential audiences. Workbooks were distributed at public events, as well as individual workshops and presentations.



Clemson Carolina Clear		MANUAL: Rain Gardens-Green Solutions to Stormwater Pollution. Provides overview and procedures for installing a rain garden in the landscape.	Continuous	50	GP, R

NEW: Carolina Clear produced a new Residential Rainwater Harvesting manual for South Carolina in the Spring of 2011. The new manual is designed to assist homeowners with designing and installing small-scale rainwater harvesting systems, primarily rain barrels. The manual also provides a variety of techniques for building your own rain barrel.



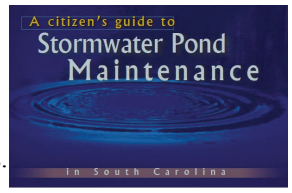
Clemson Carolina Clear		MANUAL: Rainwater Harvesting for Homeowners.	Continuous	50	GP, R
SC Sea Grant	NOAA HML, Clemson-Strom Thurman Inst.	BOOKLET: *Tidal Creek Habitats: Sentinels of Coastal Health*. The booklet highlights the ecological services and economic value of tidal creek ecosystems and threats to their health, specifically from non-point source stormwater runoff.	Continuous	100	GP, EA, T
SC Sea Grant		BROCHURE: *Polluted Stormwater*. Part of SC Sea Grant's stormwater series. Brochure provides overview of stormwater runoff pollution, and provides specific actions for individuals to reduce pollution.	Continuous	100	GP, EA, T

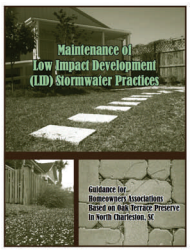
OUTREACH MATERIALS (I) continued

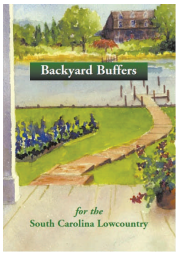
Brochures, Booklets, Manuals

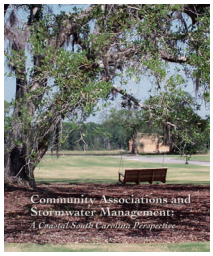
Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
SC Sea Grant	USC, City of North Charleston, Noisette	BROCHURE: *Low Impact Development* provides overview of LID practices, how they function, and why they are important stormwater management features.	Continuous	200	GP, R, T
SC Sea Grant	Multiple	BOOKLET: Maintenance of Low Impact Development (LID) Stormwater Practices. Provides guidance for homeowners associations based on Oak Terrace Preserve in North Charleston.	Continuous	100	R, T, C

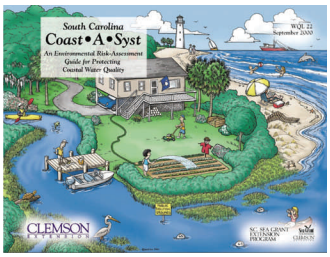
Outreach materials that are displayed at events and distributed on a limited basis, covering a variety of specific topics.





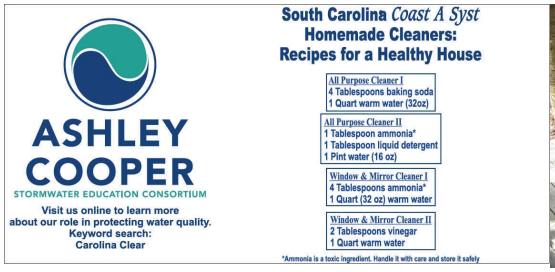






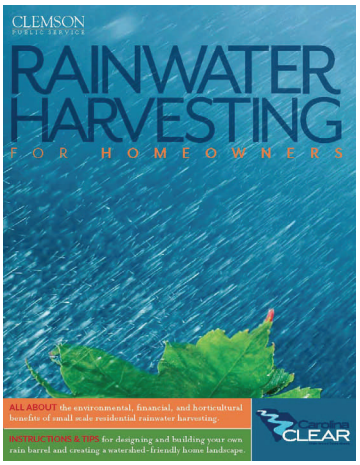
Promotional Items

Clemson Carolina Clear		PROMOTIONAL ITEM: Clip-on bag dispenser (for pet waste, diapers, litter, etc.).	Continuous	100	GP, P, B
Clemson Carolina Clear		PROMOTIONAL ITEM: Water bottle with information about stormwater, watersheds, drinking water source printed on bottle.	Continuous	50	GP
Clemson Carolina Clear		PROMOTIONAL ITEM: Rain Barrels both sold (at cost $70 w/tax) and donated to promote practice.	Continuous	40	R, YT
Clemson Carolina Clear		PROMOTIONAL ITEM: Water drop magnets.	Continuous	30	GP
Clemson Carolina Clear		PROMOTIONAL ITEM: Rain gauges printed with tips on irrigation practices.	Continuous	20	GP, R
Clemson Carolina Clear		PROMOTIONAL ITEM: Spray bottle with Coast-a-syst recipe for natural cleaners printed on bottle.	Continuous	20	GP



Year 3 Highlights

Rainwater Harvesting Education



Rainwater harvesting (RWH), although an ancient practice, has many modern applications. With respect to stormwater, harvesting rain is not only a stormwater best management practice, it is also a potential avenue to educate homeowners, youth, and businesses about stormwater runoff. From simple rain barrels to larger and more complex cistern systems, RWH provides a greater awareness of the volume of water generated by impervious surfaces, such as rooftops, as well as an opportunity to utilize harvested rain for a number of household demands, primarily irrigation. Interest in rainwater harvesting has increased nationwide in the last several years, and locally Extension Agents have noted an increase in public inquiries. The ACSEC is utilizing this topic as an opportunity to help capture attention and integrate a larger message with respect to educating the public about stormwater runoff. The ACSEC has implemented several strategies to help promote the practice of RWH over the last three years.

The use of demonstration sites provides an opportunity to showcase a variety of stormwater best management practices, train individuals and groups, and provide a permanent site for public visitation and education. Rainwater harvesting systems have been installed at various scales around the region through the consortium partnership. Rain barrels were installed at the Carolina Yard Living Classroom, the Sustainability Institute's Green Home, and several schools in the region have installed barrels with assistance from the ACSEC. Several larger cistern systems have also been installed in the region with support from the ACSEC, including: the College of Charleston (2 sites; 1,100 gal and 1,500 gal); Ladson Exchange Park (300-gal); Sustainability Institute (two 300-gal); and the SC DNR's Ft. Johsnon Community Garden (1500-gal). Plans are to install two systems at the Clemson Coastal Research and Education Center site.

Trainings, workshops, and presentations have also been provided to the region, including build your own rain barrel workshops for homeowners, presentations to local organizations, public events, and hosting the American Rainwater Catchment System Association (ARCSA) 100– and 200-level workshops, which included a professional accreditation. In the spring of 2011, Carolina Clear also provided a new residential RWH manual for South Carolina. The manual provides guidance on installing small-scale RHW systems, as well as instructions for creating your own rain barrel. Rain barrel kits, retrofitted from former pickle containers, were also made available for purchase at cost, or for donations. Over 80 barrels have been either sold or donated to a variety of organizations and causes around the Tri-County. Painting rain barrels has also proven popular, and another way to get youth involved. A new rainwater harvesting display was also developed in the summer of 2011 for exhibit at public events.

Building on public interest in rainwater harvesting and promoting the practice will continue to be a method utilized to educate the public about how to successfully harvest rain. Using rainwater harvesting as a platform to educate people about the larger issues the region faces with respect to managing stormwater runoff is proving successful, especially in terms of reaching audiences with limited awareness of the subject.

PERMANENT EXHIBITS (I)

Four new permanent exhibits were developed in year three, which add to the previous permanent exhibits developed in cooperation with the ACSEC. An additional feature, a pervious paver walkway, was also added to an existing permanent demonstration site at the Sustainability Institute's Green Home. A stormwater best management practice site was also started at the Clemson Coastal Research and Education center, which will house a wide variety of features for future educational efforts, including pervious hardscapes (pavers, gravel pave, and concrete), rainwater harvesting systems, rain gardens/bioretention, native plants, a constructed wetland, and pond management features.

Illustrating landscape-level stormwater management techniques at residential and commercial scales helps promote practices in a variety of ways and has garnered a great deal of positive feedback. Several sites have been developed in partnership with the ACSEC, most through public involvement installation workshops, and include techniques such as pervious paving, rain gardens/bioretention, rainwater harvesting, composting, and native plants. Permanent exhibits allow the public to learn at their convenience how these features function, what they look like, and why they are important. The sites also help generate ideas, address potential concerns, and serve as physical reminders of stormwater managment and good stewardship. These and other stormwater BMPs can now be viewed at the new SC LID atlas on the Carolina Clear website. Number of impacts is based on estimates of public visitation at each site.

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear	SC Native Plant Society, Charlestown Landing	PERMANENT EXHIBIT: A rain garden was installed at Charlestown Landing State Historic Site in Charleston during a Native Plant Sale hosted by the SC Native Plant Society.	Oct. 23, 2010-present	~5,000	GP, R

The Legare-Waring House at Charlestown Landing was chosen as the home of a new rain garden exhibit in the Fall of 2010. The historic home is currently used as an event facility, primarily for weddings. As such, the home is visited frequently by the public both walking the grounds of Charlestown Landing, as well as by those visiting for weddings and other events. The rain garden was installed during a workshop associated with the Fall Native Plant Sale by the SC Native Plant Society and represents a typical size for a residential application.

PERMANENT EXHIBITS (I) continued

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear	Clemson Extension Master Gardeners	PERMANENT EXHIBIT: A large-scale (900 sq. ft.) rain garden was installed at Bowen's Island Restaurant, near Folly Beach, SC	Feb, 2011-present	1000	GP, R,C

The Bowens Island Restaurant near Folly Beach rebuilt in 2009-10 after a fire destroyed their former building. The new building was planned to include sustainable techniques with a goal of achieving LEED certification. The owner contacted Clemson Extension about guidance on managing stormwater and implementing best management practices. The restaurant had previously installed a green roof to exhibit the practice to the public. Bowens Island Restaurant's owner agreed to serve as a demonstration site for public education, and a rain garden was planned to manage runoff from about half of their 4,000 square foot roof. Clemson helped design the rain garden, which is made up primarily of marsh grasses (*Spartina bakeri*) and Sweetgrass. The project also served as a training for Master Gardeners, who completed the planting in February 2011.

College of Charleston	Clemson Carolina Clear	PERMANENT EXHIBITS: The College of Charleston installed a cistern at the Grice Marine Lab on Fort Johnson, James Island.	May 2011	500	GP, HE, R

COLLEGE of CHARLESTON

In May of 2011, the College of Charleston added another cistern to it's campus. A 1500-gallon cistern was installed by the College with the support of Clemson Extension. The installation was a component of Jeff Swatkowski's internship with the Masters of Environmental Studies Program. Jeff's internship focuses on rainwater harvesting and developing a rainwater harvesting feasibility study for the College. The installation of the cistern and associated features, including raised bed gardens and a rain garden were conducted by students in the Master's programs in Environmental Studies and Marine Biology programs. The project was the vision of Ms. Sarah Oakes, the lab manager at Grice, who was instrumental in its organization and management.

PERMANENT EXHIBITS (I) continued

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear	Charleston Children's Garden Project	PERMANENT EXHIBIT: A rain garden installed at Mt. Zion Elementary School on Johns Island.	May 11, 2011-present	200	GP, YT

Mt. Zion Elementary School on John's Island participates in the Charleston Children's Garden Project. The school includes several raised beds, a greenhouse, compost bins, and a variety of vegetables and native plants. In May 2011, the school added a rain garden to receive overflow from two new rain barrels collecting water for the garden. Clemson Extension agents Kim Counts and David Joyner educated the second grade class on the importance of water and protecting water quality.

Clemson Extension Master Gardeners, Carolina Clear	Exchange Club	PERMANENT EXHIBITS: The Exchange Park in Ladson hosts the Carolina Yard Living Classroom, as well as other stormwater management features including pervious pavers, cistern, vegetative buffers, and rain garden.	Continuous	50,000	GP, R

The *Carolina Yard Living Classroom* was developed in the Fall 2008 in time for the Coastal Carolina Fair with support from many organizations. The exhibit has garnered positive feedback from visitors, and has also served as a model at statewide and national levels for developing a permanent demonstration site. The Carolina Yard continues to mature and serve as a site for workshops, trainings, and videos as well as visitors to the park that use informational signs to guide them through the 9 principles of the program.

In March 2010, the *Carolina Yard Experience* event included additional stormwater best management practice (BMPs) demonstrations that became permanent exhibits in the center of the park. Stormwater BMPs installed as permanent exhibits include: pervious paver walkway, 300 gallon cistern with overflow to a rain garden, pond vegetative buffer and floating wetland. Through the partnership with the Exchange Club, the park continues to be a showcase for stormwater best management practice retrofits, centrally located in the Tri-County.

For the 2010 Coastal Carolina Fair, the theme was the Carolina "Wild" Yard and the demonstration site showcased a variety of techniques for installing native plants in the landscape, as well as retrofitted rainwater harvesting systems.

PERMANENT EXHIBITS (I) continued

Lead Provider	Supporting	Activity	Date	Number of	Target
Clemson Extension Master Gardeners	Clemson Carolina Clear	PERMANENT EXHIBIT: Clemson Extension Master Gardener Urban Research and Demonstration Area (URDA) at Clemson Coastal Research and Education Center, including a rain garden (installed Fall 2008) and native plants.	Continuous	1000	GP, R

The Clemson Extension Master Gardener Urban Research and Demonstration Area (URDA) on US 17 in Charleston County is part of the Clemson Coastal Research and Education Center campus. The permanent rain garden exhibit, installed in Fall 2008, is open to the public and receives visitors from the area both informally and formally during garden club and other organizational tours. Plans are currently underway to incorporate additional water conservation and stormwater BMPs on site that include pervious hardscapes, rainwater harvesting, pond vegetative buffers, bioretention cells, and a constructed wetland.

SC DNR	Clemson Carolina Clear	PERMANENT EXHIBIT: *Ft. Johnson Community Garden*. SC DNR, in partnership with Clemson Carolina Clear, developed a demonstration garden adjacent to the outdoor classroom. The project includes two rain gardens, a 1500-gallon cistern, native plants, and drip irrigation. The rain gardens and cistern were installed	Continuous	5000	GP, R, C

The SC Department of Natural Resources partnered with Clemson Carolina Clear to deliver two workshops on rain gardening and one on commercial-scale rainwater harvesting in FY 09-10. The workshops included installing two rain gardens (Fall-part shade, Spring-full sun) and one 1500 gallon cistern (Fall 09). The rain garden workshops were part of SC DNR's Coastal Exploration Series and the rainwater harvesting technical workshop was part of SC DNR's ACE Basin NERRS Coastal Training Program workshop series. The site also hosts native plants rescued from the Boeing footprint by the SC Native Plant Society, a bog garden and a Carolina Fence Garden. The Fort Johnson community garden area has continued to inspire area residents and local natural resource organizations at the Ft. Johnson complex. SC DNR's outdoor classroom hosts a variety of activities year-round, from school group visits to professional conferences.

PERMANENT EXHIBITS (I) continued

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
College of Charleston	Clemson Carolina Clear	PERMANENT EXHIBIT: Rainwater harvesting cistern and pump on College of Charleston Campus.	continuous	500	GP, R, YT, C

The College of Charleston, in partnership with Clemson Carolina Clear, installed a 1100 gallon cistern on a Political Science building in June 2010. The office building in the style of typical Charleston single ca. 19th century historic home in the heart of downtown Charleston. One of the goals of the ACSEC partnership with the College of Charleston is to demonstrate stormwater management practices on the campus to illustrate retrofitting in a highly urbanized area. The project also helps address aesthetic concerns often expressed by the public, especially with respect to historic districts. The cistern was installed in concert with American Rainwater Catchment Systems Association (ARCSA) workshops. It is located next to an existing native species garden, which is irrigated with the rainwater, as well as a series of raised beds maintained by College of Charleston students. The cistern is also serving as a research site for graduates and undergraduates.

Sustainability Institute	Clemson Carolina Clear	PERMANENT EXHIBIT: Sustainability Institute's *Green Home*. Home landscape features several sustainable practices, including rainwater harvesting systems, native plants, pervious hardscapes, including a new pervious paver walkway installed in the winter 2010.	continuous	1,000	GP, R, YT,C

The Sustainability Institute of SC, in partnership with Clemson Carolina Clear, installed two 300-gallon cisterns and one 55 gallon rain barrel on their Green Home near Park Circle in North Charleston. Plans are to complete renovation of the landscape to represent the Carolina Yards and Neighborhoods nine principles, which will be the second Carolina Yard site in the region. The site is toured regularly by the public to educate homeowners on sustainable practices that can be implemented in the home landscape. In the winter of 2010, a new pervious paver walkway was installed to add a new stormwater BMP element to SI's Green Home landscape.

Michaux Conservancy	Clemson Carolina Clear	PERMANENT EXHIBIT: *Save Noisette Creek Mural*. The mural project was organized by the Michaux Conservancy and created by students at the North Charleston School of Arts High School with support from ACSEC (see highlight).	Completed Fall 2010; views continuous	5,000	GP, R, YT,C

Year 3 Highlights

Charleston School of Arts Mural Project

After six months of designing, planning and painting; The Save Noisette Creek mural was unveiled on October 11, 2010. The Save Noisette Creek Mural was made possible through partnership of multiple organizations including The Michaux Conservancy, The Charleston County School District School of the Arts, AmericCorps VISTA (Volunteers In Service To America), City of North Charleston Cultural Arts Department and the Ashley Cooper Stormwater Education Consortium. The effort was coordinated by Mary Neal, an AmeriCorps VISTA member who works with the Michaux Conservancy. The mural was designed and painted by The Charleston County School of the Arts eighth-grade students. The students were under guidance of the visual arts teacher Marie Nichols. The City of North Charleston's Artist-in-Residence, Rob Maniscalco also contributed to the artwork of the mural. Funding to purchase materials was provided by The City of North Charleston's Cultural Arts Department as well as The Ashley Cooper Stormwater Education Consortium.

Standing 8 feet tall by 20 feet wide, the painting depicts an iconic Lowcountry scene. The objective of The Save Noisette Creek mural is to visually encourage the public to appreciate and protect South Carolina's natural resources. In particular, the mural aims to appeal to the onlookers emotional attachment and familiarity of area waterways to promote the environmental stewardship of Noisette Creek.

The mural unveiling ceremony took place on October 11, 2010 at the Rose Maree Meyers Theater at The Charleston County School of the Arts. Speakers included Mary Neal with the Michaux Conservancy, Marie Nichols with the Charleston County School of the Arts, David Joyner from the Ashley Cooper Stormwater Education Consortium, and Marty Besancon from the City of North Charleston Cultural Arts Department. Attendees of the ceremony applauded and cheered as School of the Arts students unveiled the painting. The exterior wall mural will remain on permanent display at the Navy Yard on North Hobson Avenue in North Charleston. The "Save Noisette Creek" mural project uniquely combines art, environmental education and community service.

PUBLIC EVENTS (I)

Fairs and Festivals

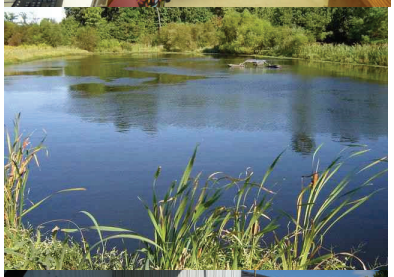
Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Charleston Green Fair	Multiple	EXHIBITS: *Charleston Green Fair*, 2nd annual, Downtown Charleston, Marion Square-ACSEC Booth Distributed Education Materials and Promotional Items	Sept. 26, 2010	4,000	GP, R, YT
Charleston Soil and Water Conservation District	Clemson Carolina Clear, SC Sea Grant, SC DNR, SC NPS	EXHIBITS: *Ashley Scenic River-Close Encounters of the Natural Kind.* Booths displayed at Ashley Scenic River event held at Charlestown Landing. Educational materials distributed. Rain Barrel donated to event for raffle.	Oct. 21, 2010	140	GP, R, EA
Exchange Club of Charleston	Clemson Extension Master Gardeners, Carolina Clear	EXHIBITS: *Coastal Carolina Fair*, Ladson, SC. Carolina Yard Living Classroom. Backyard provides display of the 9 principles of the CYN program, which focus on environmentally friendly home landscaping and water resource management.	October 28-November 6, 2010	200,000	GP, R
Clemson Carolina Clear	Keep Dorchester County Beautiful	EXHIBITS: *Flowertown Festival* in downtown Summerville. The ACSEC provided exhibits, including enviroscape, and distributed educational and promotional materials .	April 2, 2011	100,000	GP, R, YT, B,C
SCMF-Spirit of South Carolina	Multiple	EXHIBITS: *Charleston Harborfest* in downtown Charleston at the Maritime Center. ACSEC sponsored Education Tent, which included several partners and displays.	May 12-15, 2011	5,000	GP, R, YT, B,C

DIRECT CONTACTS (D)

In-Person, Phone, Email

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Extension, Master Gardeners		In-Person, Phone, Email: Clemson Extension Agents and Master Gardeners answered questions relating to a variety of home landscaping issues at public events ("Ask-a-Master Gardener"), at the B,C,D offices via in-person, phone and email.	Continuous	Approx. 5000	GP, R, C
Clemson Extension		In-Person, Phone, Email: Clemson Extension Agents answered questions and provided services, such as weed identification and water sampling, to a variety of pond owners and managers throughout the Tri-County.	Continuous	68	PO, R, C
Clemson Extension		Soil Samples: Clemson Extension, in cooperation with Clemson's Agricultural Service Lab processed soil samples for Tri-County residents and commercial audiences.	Continuous	Berkeley 416, Charleston 1564, Dorchester 445	R, C

Throughout the year, Extension Agents and Master Gardeners in the Berkeley, Charleston, and Dorchester County Extension offices respond to calls, walk-ins, and emails from the public, as well as field questions during public events. The types of information requested by individuals representing both private and commercial interests are diverse, ranging from home landscaping, horticulture, and pond management, to agriculture and forestry. Each question is addressed by a dedicated group of Master Gardener volunteers and Extension Agents. Master Gardeners are also being educated to better understand the landscape-water quality connection via internal trainings. The public is given an opportunity to learn more about the wealth of resources available to them, such as the Home and Garden Information Center website, or specific publications such as *Life at the Water's Edge: A Shoreline Resident's Guide to Natural Lakeshore and Stream Side Buffers for Water Quality Protection in South Carolina*. Offices also provide services in concert with the university, including processing soil samples, non-potable water samples, plant and weed identification, and identification of plant problems. These direct contacts with the public yield some of the most positive results in addressing specific concerns and problems, most of which relate to water quality at some level. From soil testing and proper application of fertilizer and pesticides, to plant disease identification and tree maintenance, the public is receiving sound, scientifically-based recommendations that collectively represent a significant public service. These good stewardship practices directly and indirectly benefit the health of South Carolina's waterways.



PRESENTATIONS AND WORKSHOPS (D)

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
SC Marine Association	Clemson Carolina Clear	PRESENTATION: Overview of stormwater impacts and measures marinas can implement as part of the SC Clean Marina program.	Aug. 20, 2010	17	B
College of Charleston	Clemson Carolina Clear	PRESENTATION: Provided tour of cistern project at College of Charleston to prospective students.	Sept. 25, 2010	28	HE
SC Marine Educators Association	Clemson Carolina Clear	PRESENTATION: Presentation at SCMEA annual conference in Charleston on new online watershed-based lessons.	Oct. 2, 2010	7	YT
SC Marine Educators Association	SC DNR	PRESENTATION: Presentation at SCMEA annual conference in Charleston on native wildlife gardening: ":Gardening in your own schoolyard".	Oct. 2, 2010	12	YT
Michaux Conservancy	CCSC-School of Arts, Clemson Carolina Clear	PRESENTATION: Mural unveiling at Charleston School of Arts. Highlighted efforts of consortium to educate public about stormwater runoff pollution.	Oct. 11, 2010	30	GP, YT
Clemson Public Service	Multiple	PRESENTATION: Presentation on statewide survey and poster presentation on new online resources at SC Water Resources Conference in Columbia.	Oct. 13-14, 2010	350	GP, YT
SC Native Plant Society	Clemson Carolina Clear	PRESENTATION: Stormwater issues and use of native plants in best management practices, with focus on rain gardens for retrofit in home landscape.	Oct. 19, 2010	19	R, C
Charleston Soil and Water Cons. District	SC DNR, SC Sea Grant, Clemson Carolina Clear	PRESENTATIONS: Ashley Scenic River Event included several presentation on water quality issues in river and protection methods, including Carolina Friendly (CYN) home landscaping and use of natives.	Oct. 21, 2010	21	R, C
City of Charleston	Sustainability Institute, Clemson Carolina Clear	PRESENTATION: Stormwater issues and water smart landscaping techniques for commercial applications at Charleston Green Business Challenge.	Nov. 10, 2010	21	R, C
Clemson Carolina Clear		PRESENTATION: Stormwater issues and implementing rain gardens and rainwater harvesting in home landscape for Lecture Series at Edisto Beach State Park.	Nov. 16, 2010	7	R
Sierra Club of Charleston	Clemson Carolina Clear	PRESENTATION: Stormwater and water quality issues in the region and structural and non-structural BMPs.	Dec. 2, 2010	20	R

PRESENTATIONS AND WORKSHOPS (D) cont.

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear		PRESENTATION: Carolina Yards and Neighborhoods program presented to the Magnolia Garden Club.	Feb. 10, 2011	24	R
Clemson Extension Master Gardeners	Clemson Carolina Clear	PRESENTATION: Carolina Yard Garden School, series of presentations on CYN program principles, including: native plants, rainwater harvesting, rain gardening, and integrated pest management (IPM).	Mar. 26, 2011	67	R
Trident Technical College	SC DNR, Clemson Carolina Clear	PRESENTATION: Trident Tech's Sustainability Class visited the Ft. Johnson community garden for tour of stormwater best management practices.	April 13, 2011	12	HE
Charleston Chapter of Surfrider	Multiple	PRESENTATION: Presentation to Surfrider on water quality and stormwater runoff pollution.	April 13, 2011	15	R
College of Charleston	Clemson Carolina Clear	PRESENTATION: Water quality issues and stormwater management with a focus on policy to Master's of Environmental Studies class.	April 18, 2011	16	HE
Clemson Carolina Clear		PRESENTATION: Water quality issues and stormwater management presented to Lowcountry Utilities Coordinating Committee	June 1, 2011	12	T
Clemson Carolina Clear		PRESENTATION: Water quality and stormwater issues presented to National Active and Retired Federal Employees Association.	June 10, 2011	28	R
Environmental Education Association of SC	Clemson Carolina Clear	PRESENTATION: Presentation at EEASC annual conference on new online watershed-based lessons available for teachers.	June 11, 2011	8	YT

PRESENTATIONS AND WORKSHOPS (D) cont.

Youth Presentations

SC DNR-SCORE		PRESENTATION-Youth: SCORE program conducts in -class and field trips to local school groups (total) with focus on oyster habitat, including impacts from poor water quality.	Throughout School Year	444	YT
Keep Charleston Beautiful	Palmetto Pride, CCSD Schools	PRESENTATION-Youth: KCB's *Clean City Clara* Pelican mascot visits area schools throughout the year to educate youth about litter prevention and recycling in grades K-3rd.	Throughout School Year	2654	YT
Clemson Carolina Clear		PRESENTATION-Youth: Carolina Clear developed a series of watershed and stormwater-related lesson plans and accompanying whiteboard lessons available for free download on their website in year three.	continuous	880	YT
SCMF-Spirit of SC		PRESENTATION-Youth: Watershed-related themes presented in Spirit of SC youth programs, including day -sails, after-school, and summer enrichment	continuous	1,365	YT
SC Sea Grant	Clemson Public Service, SC DNR-SCORE	PRESENTATION-Youth: In-Class presentations to schools participating in Seeds to Shoreline Program. Topics included the importance of wetland ecosystems,	Winter-Spring 2011	588	YT
Berkeley County Kids Who Care About Our Environment	Old Santee Canal Park, Clemson Extension 4-H	PRESENTATION-Youth: Enviroscape activity for K-5th graders conducted during Backyard NatureScope Annual Environmental Field Day at Old Santee Canal Park in Moncks Corner, SC.	April 7-8, 2011	1,792	YT
Lowcountry Earth Force	Multiple	PRESENTATION-Youth: LEF's annual Youth Environmental Summit features a variety of partners exhibits on environmental themes. Enviroscape presentation, groundwater, and raindrop plinko (pervious-impervious theme) among exhibits.	May 24, 2011	250	YT

PRESENTATIONS AND WORKSHOPS (D) cont.

Workshops

Clemson Carolina Clear	SC DNR, Univ. of New Hampshire Stormwater Center	WORKSHOP: *Beyond Pipe and Pond*. University of New Hampshire Stormwater Center, in cooperation with NOAA, CICEET and NERRS program. Workshop was hosted by ACSEC.	Aug. 6, 2010	41	T, C

The ACSEC, Carolina Clear and SC DNR NERRS ACE Basin CTP hosted the University of New Hampshire's Stormwater Center (UNHSC) Beyond Pipe and Pond (BPP) workshop. The BPP training was the product of a collaborative effort between UNHSC, the Cooperative Institute for Coastal Estuarine and Environmental Technology (CICEET) and the NOAA Coastal Service Center (CSC). This training module targets the critical gap in science-based information in designing state-of-the art treatment practices for Stormwater Management. BPP is a one-day workshop featuring science based, technical information and research results related to the design and performance of stormwater treatment systems. It has been developed for engineers and other professionals involved in the development or review of stormwater treatment designs, such as individuals from private consulting firms, public works departments, and planning boards. The training goal is to improve participant's ability to choose the stormwater treatment system or combination of systems that can achieve water quality targets in compliance with current and impending regulations, while at the same time effectively matching peak flows and reducing runoff volume.

SC DNR-NERRS ACE Basin CTP	Clemson Carolina Clear, SC Sea Grant,	WORKSHOP: *South Carolina Low Impact Development (LID) Manual: Needs, Use, and Lessons Learned.* Charleston workshop part of coastal workshop series. Information gathering workshop to gain stakeholder insights on needs related to development of LID manual.	Jan. 26, 2011	38	T, C
Clemson Carolina Clear	College of Charleston, ARCSA	WORKSHOP: *Pond Management*. Overview of pond management issues, including case studies from Kiawah Island, detention pond sediment contamination research, and pond weed and fish management.	April 28, 2011	42	R, T, C
SC DNR-NERRS ACE Basin CTP		WORKSHOP: *Assessing Bacterial Contamination through Stormwater BMPs*. Workshop provided overview of issue and performance data from specific BMPs	May 3, 2011	58	T, C

TRAININGS AND CERTIFICATIONS (D)

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Extension		TRAININGS: Master Gardener training in Tri-County. They will join over 300 in the region, providing 1000s of hours of volunteer community service.	Fall 2010	38	GP, R

The Master Gardener program annual trains approximately 40 new students to become certified Master Gardeners (MG) once their initial volunteer hours are achieved. For the last four years, each MG class has been educated about home landscaping issues and programs relevant to protecting area water quality. Advanced trainings have also educated existing MG's in the region. Training topics includes the Carolina Yards and Neighborhoods program, native plants in the landscape, rainwater harvesting, rain gardening, and others. Each class receives a presentation during their training on area water quality and stormwater issues. These skills prepare them to translate that information to the thousands of people they educate during the year with home landscaping and related questions.

Charleston County Parks and Rec	Clemson Extension, CofC, DNR, Citadel	TRAININGS: Master Naturalist Certification Programs for Fall, Spring, and an 8-month Saturday Series.	Fall 2010, Spring 2011, Sat Series	34	GP, R

Charleston County Parks and Recreation Commission is the host site for the Charleston Master Naturalist program. Master Naturalists receive training in a 14-week course and then become certified once volunteer hour requirements have been met, similar to the Master Gardener program. Water resource education is a fundamental component of the program, and Master Naturalists likewise help translate that information to the public.

SC DNR-SCORE		TRAININGS: SCORE program trained volunteers to monitor water quality parameters in the Charleston Harbor Area.	2010-11	14	GP

SC Department of Natural Resources SCORE (SC Oyster Restoration and Enhancement) program annually trains volunteers to monitor water quality at designated sites around the region. In 2010-11, SCORE trained 14 new water quality monitoring volunteers, which join 44 other trained volunteers to monitor 18 sites around the region. Water quality data is available online through the SCORE website at: www.score.dnr.sc.gov Voluteers monitor temperature, pH, salinity, turbidity, and dissolved oxygen.

TRAININGS AND CERTIFICATIONS

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson		TRAININGS: Clemson's Department of Pesticide Regulation provides materials and testing for Commercial and Private Pesticide Applicators Licenses. Number of impacts reflects those that have been certified and are maintaining recertification credits in the tri-county area.	Exams given quarterly	700+ (commercial and non-commercial)	C, R, PO
Clemson		TRAININGS: The CEPSCI recertification course was taught in Charleston in June, 2011.	June 8, 2011	45	C, T

CLEMSON PUBLIC SERVICE ACTIVITIES

CEPSCI

Construction and land disturbing activities have significant potential to adversely impact water quality. In 2004, Clemson University initiated the development and implementation of a program designed to inform individuals about important construction-related best management practices. The purpose of the **Certified Erosion Prevention and Sediment Control Inspector Program** is to educate field personnel on the proper installation, maintenance, and inspection of erosion prevention and sediment control measures.

The series of one-day workshops teaches attendees the latest techniques for erosion prevention and sediment control. It also introduces a variety of erosion control practices including the most environmentally effective techniques for different terrain. Instructors demonstrate how to review grading and drainage plans, as well as BMP details. Each participant is provided an opportunity to meet others involved in land disturbing activities and taught how to conduct a field inspection of erosion prevention and sediment control practices.

Over 3,500 people have participated in the classes and over 3,000 completed the certification examination. CEPSCI was developed through the cooperative effort of the Clemson University Cooperative Extension Service, SC Department of Transportation, Greenville County Soil and Water Conservation District, SC Department of Health, and Environmental Control, SC DHEC – Office of Ocean and Coastal Resource Management, Transportation Technology Transfer Service, the SC Sea Grant Extension Program, and Woolpert, Inc.

LITTER SWEEPS

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Sea Grant	SC DNR	LITTER SWEEPS: Beach Sweep/River Sweep. 1,621 individuals participated, cleaning 104.7 miles of beach and riversides. 17,848 pounds of debris were removed .	September 18, 2010	1,621	GP, YT, R

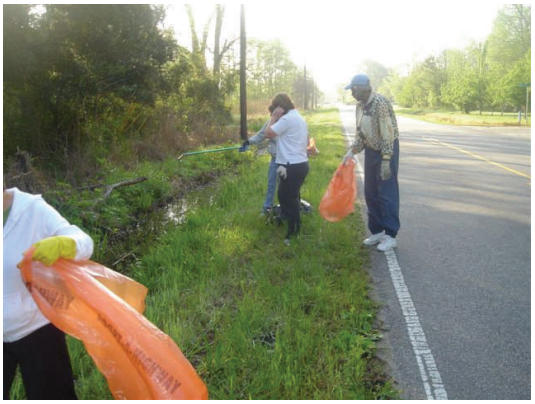
Beach Sweep/River Sweep is South Carolina's largest one-day volunteer cleanup event of its kind. Every 3rd Saturday in September, from 9 a.m. to 12 p.m., thousands of South Carolinians clear beaches, rivers, lakes, marshes, and swamps of aquatic debris. The cleanup, organized by the S.C. Sea Grant Consortium and S.C. Department of Natural Resources, has taken place annually since 1988 - when Sea Grant first started it. The Sweep takes place in conjunction with the International Coastal Cleanup, coordinated by the Ocean Conservancy. Appendix C lists individual sites, volunteers, pounds of debris removed from

Charleston Naval Weapons Station Team

Adopt-a-Highway, Community Pride, Inc, Clemson Extension	SC DOT	LITTER SWEEPS: Adopt a Highway conducts four sweeps seasonally each year. Volunteers adopt a 2-mile stretch of highway. In 2010-2011, 75,256 pounds of debris were removed from roadsides and ditches	Quarterly	2,871	GP, R, C

In 1988, the Adopt-a-Highway program began in South Carolina, and has been one of the most successful programs in combating litter along highways ever enacted. The program not only eliminates thousands of pounds of debris from roadsides, which can end up in nearby waterways, but it also improves the scenic beauty of South Carolina, which also helps support the economy. These volunteers are dedicated to improving and protecting the beauty and environment of South Carolina and are the reason the program is such a success.

2010-11 Adopt-a-Highway Totals for Tri-County				
County	**Total Pounds Collected**	**Total Miles Adopted**	**Total Groups Participating**	**Total Volunteers Participating**
Berkeley	10,545	100	30	425
Charleston	53,726	268	156	2,336
Dorchester	10,985	60	28	110
TOTALS	**75,256**	**428**	**214**	**2,871**



LITTER SWEEPS continued

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Keep Charleston Beautiful	Palmetto Pride	LITTER SWEEPS: KCB coordinates volunteers to support a variety of litter sweeps throughout the year.	continuous	3,784	GP, R, YT, C

Keep Charleston Beautiful (KBC) is dedicated to promoting the cleanliness and beautification of the City of Charleston through education, public awareness and community involvement. KBC strives to teach litter prevention and waste responsibility through their education programs and public awareness campaigns, all of which are offered free of charge to the community. KCB organizes volunteers who participate in a variety of litter sweep events annually. In 2010-11, 3,784 citizens volunteered 7,754.75 hours of community service to remove litter and promote KCB events. Their efforts resulted in the removal of 2318 bags of trash from area streets, parks, neighborhoods, marshes, and waterfront areas.

Charleston Chapter of Surfrider		LITTER SWEEPS: Surfrider conducts biweekly beach sweeps on Folly Beach during the summer and several marsh sweep events in the winter.	Summer-Biweely; two winter events.	140	GP, R, YT

The Surfrider Foundation is dedicated to the protection and enjoyment of the oceans, waves, and beaches. The Charleston Chapter of Surfrider implements that mission to protect water quality and keep area beaches and waterways clean through a variety of programs and initiatives, including organizing beach and marsh sweeps. The Surfriders host biweekly beach sweeps during the summer months, from May to September, at the Folly Beach washout and pier areas. An average of 15 volunteers per beach sweep clean a variety of debris for about an hour during each event. During the winter months, Surfrider hosts two separate larger marsh sweep events, which gain additional volunteer support and typically experience closer to 30 to 40 volunteers and last roughly two hours.

STORM DRAIN MARKING

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear	Michaux Conservancy	STORM DRAIN MARKING: Storm drains were marked (approx. 30) in Horizon's Village neighborhood in North Charleston by youth from community.	Aug. 5th, 2010	25	YT
Clemson Carolina Clear	Boy Scouts of America	STORM DRAIN MARKING: Storm drain were marked in (approx. 50) Summerville neighborhood by group led by boy scout as part of his Eagle Scout project.	Aug. 27, 2010	7	YT

Storm drain marking occurred at two locations in 2010-11. The first took place at Horizon's Village neighborhood in North Charleston, where approximately 30 storm drains were marked. The second storm drain marking event was conducted by a Boy Scout as his Eagle Scout project to inform the public about water quality. Approximately 50 storm drains were marked in the Quail Arbor neighborhood in Summerville.

RAIN GARDEN INSTALLATIONS

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Carolina Clear	SC Native Plant Society, Charlestown Landing	PERMANENT EXHIBIT: A rain garden was installed at Charlestown Landing State Historic Site in Charleston during a Native Plant Sale hosted by the SC Native Plant Society.	Oct. 23, 2010	8	R
Clemson Carolina Clear	Clemson Extension Master Gardeners	RAIN GARDEN INSTALLATION: A large-scale (900 sq. ft.) rain garden was installed at Bowen's Island Restaurant, near Folly Beach, SC by Master Gardeners as part of training.	Feb. 9, 2011	9	R
Clemson Carolina Clear	Charleston Children's Garden Project	RAIN GARDEN INSTALLATION: A rain garden installed at Mt. Zion Elementary School on Johns Island.	May 11, 2011	16	YT

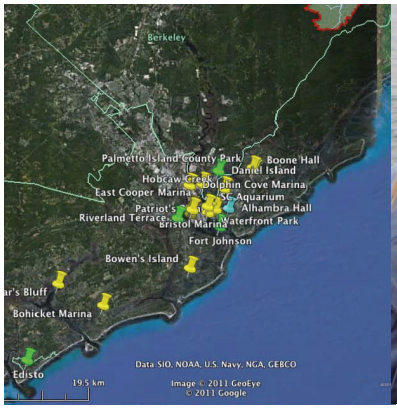
OYSTER REEF CONSTRUCTION

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
SC DNR-SCORE	Multiple	OYSTER REEF CONSTRUCTION: Five oyster reefs were constructed in year three, with 1,446 volunteers (579 bagging shells; 887 building reefs)	Continuous	1,446	GP, R, YT

In 2010-11, volunteers with the SCDNR SC Oyster Restoration and Enhancement (SCORE) bagged thousands of pounds of recycled oyster shell from restaurants and oyster roasts, and constructed five oyster reefs in the Charleston region (see green pins on mapbelow). Shell was bagged by 579 volunteers over the course of the year, and 887 individuals helped build the oyster reefs. The Daniel Island oyster reef is the largest oyster reef constructed to date by SCORE, with approximately 4500 bags on 6200 square feet (0.15 acre). The Fort Johnson oyster reef contains approximately 600 bags of shell. Each oyster filters approximately 50 gallons of water per day, and the reefs are needed to provide structure for new oysters, as well as to help stabilize shorelines. The SCORE program not only involves the public and provides awareness of water quality and the need to recycle oysters, but the reefs themselves also help improve water quality in the region as new oysters inhabit them. Fifty-eight SC DNR SCORE volunteers also monitor water quality at various locations around the region (see map-yellow pins).

WATER QUALITY MONITORING

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
SC DNR-SCORE	Multiple	MONITORING: SCORE program, multiples sites around Charleston (see map).	Weekly-Monthly	58	GP, R
SCMF-Spirit of SC		MONITORING: SCMF-Spirit of SC students from area middle and high schools learn about estuarine systems and monitor water quality during educational sails.	Continuous	1,365	YT



YOUTH INVOLVEMENT EVENTS

Lead Provider	Supporting Partner (s)	Activity	Date	Number of Impacts	Target Audience (s)
Clemson Extension 4-H	Multiple	YOUTH SUMMER CAMP: 4-H20 Summer Camps. Campers age 10-12 visit a variety of sites on land and water to learn about river systems , and stewardship.	July 26-30, 2010 (18); June 20-24, 2011 (19)	37	YT
Clemson Carolina Clear	Clemson Youth Learning Institute	YOUTH SUMMER CAMP: *Carolina Clear Week at Camp Sewee.* Special week at Camp Sewee provided additional water quality related educational events.	July 12-16, 2010	33	YT

In year three, a new 4-H2O summer camp was provided for the region, *Exploring the Ashley River and Beyond*. The 4-H2O Pontoon Classroom is a summer day camp designed to teach students about the importance of our water resources through hands-on, experiential learning. Activities include water quality sampling, cast and dip netting, invertebrate identification, ocean seining, phytoplankton trawls, and historic interpretations, and includes visiting with local scientists. These activities are aligned with South Carolina state curriculum standards. The two 4-H2O summer camps were also joined by a Carolina Clear sponsored Camp Sewee event in July.

SCMF-Spirit of SC	Multiple	YOUTH SUMMER PROGRAM: Spirit of SC's 2nd annual 21st Century Spirit Ocean Adventure summer program. Students learned about a variety of environmental issues, including watersheds, water quality, and stormwater pollution.	May-July 2010	40	YT
SC Sea Grant Consortium	Clemson Carolina Clear, SC DNR-SCORE	WETLAND RESTORATION SCHOOL PROGRAM: SC Sea Grant initiated Seeds to Shoreline wetland restoration program for area youth. See Highlight.	2010-11 School Year	350 (8 schools)	YT

Year 3 Highlights

Seeds to Shoreline Wetland Restoration

From Seeds to Shoreline: Engaging Students in Salt Marsh Restoration is a pilot project launched in October 2010 by the South Carolina Sea Grant Consortium, Clemson University Cooperative Extension Service, Carolina Clear, South Carolina Department of Natural Resources' SCORE (SC Oyster Restoration and Enhancement Program), and the Ashley Cooper Stormwater Education Consortium. *From Seeds to Shoreline* is a school program in which students learn about the saltmarsh ecosystem and actively contribute to saltmarsh restoration efforts. Students engage in hands-on science education that includes seed collection, germination, cultivation and planting of *Spartina alterniflora*, commonly known as Smooth Cordgrass. *Spartina alterniflora* is the focus as it is the dominant plant in a South Carolina saltmarsh and is an important wetland plant providing a variety of ecosystem functions and services, including providing habitat, stabilizing shorelines, and protecting water quality. The Seeds to Shoreline program creates an opportunity for students to learn about the importance of saltmarsh ecosystems while participating in a community service-learning project with emphasis on environmental stewardship.

Due to the nature of Seeds to Shoreline, activities within the program are seasonally dependent. In fall, Smooth Cordgrass seeds are collected and stored. In winter, the seeds are germinated and planted in germination trays at the schools and transported to greenhouses for additional care. In spring, a restoration site is selected and continued maintenance allows young seedlings to survive planting. Beginning in mid-April through June, students transplant young seedlings as part of a Restoration Day. Project Partners identify areas for restoration, based on the need for additional shoreline stabilization; several of the sites are located behind oyster reefs built by the SCNDR SCORE program volunteers. During the summer season, Seeds to Shoreline restoration sites are monitored for progress.

Between January 2011 and June 2011, more than 10,000 *Spartina alterniflora* plants were seeded as part of the Seeds to Shoreline effort, with eight Charleston and Dorchester County schools participating in the pilot year. The project aligns with state science standards and encourages student-driven science investigations to test different variables such as exposure to varying level of light, water, and temperatures. The From Seeds to Shoreline program is the first student-action salt marsh restoration project in South Carolina. The Program is offered for free to Berkeley, Charleston, and Dorchester County schools. Seeds to Shoreline remains in the pilot phase with the long-term goal being to increase participating schools and offer a teacher workshop in the summer of 2012. Stay tuned as this project continues to grow!

Participating Schools

Murray LaSaine Elementary School

Mitchell Elementary School

William Reeves Elementary School

James Island Middle School

Cario Middle School

James Island High School

Ashley Hall

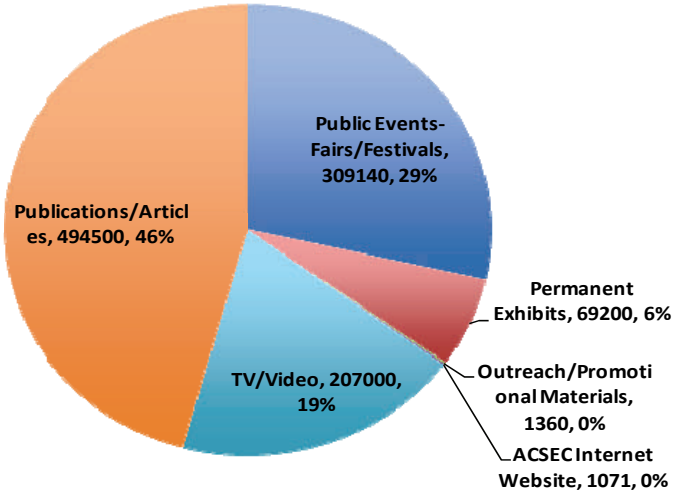
Homeschool Association

ACSEC Year 3 Summary

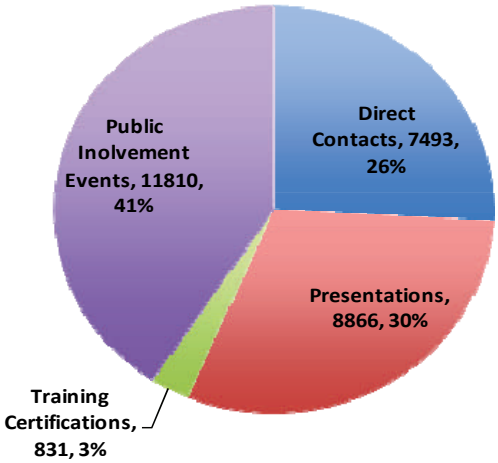
The ACSEC events from both direct and indirect outreach methods reached 1,137,521 people in the Tri-County area in year 3. Indirect methods reached 1,108,519 through television, radio, print mass media. Although the first mass media campaign was phased out, numbers remained similar to previous years (not including billboards), primarily due to an increase in the number of publications and articles to almost a half million.

People reached through direct methods increased to 29,002, approximately 30% (31.6) from year 2 (19,832). This increase was primarily due to the inclusion of two new partners with additional litter sweeps, Keep Charleston Beautiful and Surfrider. The ACSEC also included the new Seeds to Shoreline wetland restoration involvement program for youth. Residential audiences continue to lead all audiences in total outreach impacts, which focus on home landscaping practices. Youth followed by commercial audiences followed closely, with primary themes for youth focusing on general awareness of the regional environment through presentations and involvement activities. Commercial audiences were primarily reached through direct contact and public involvement activities. As in previous years, litter sweeps dominated public involvement activities

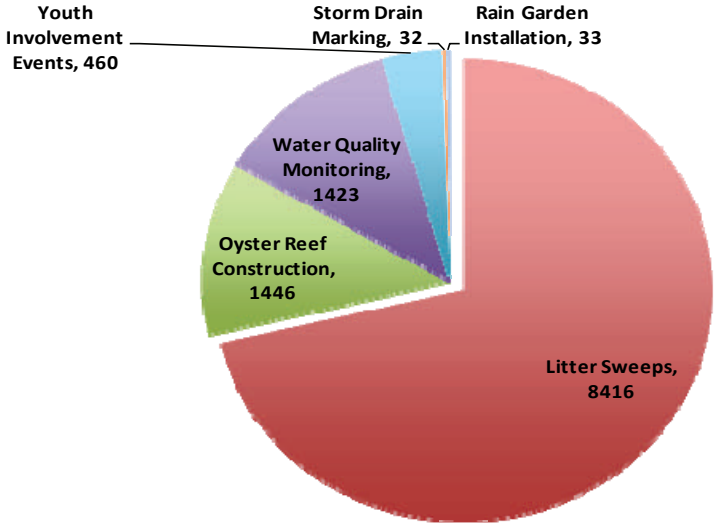
INDIRECT METHODS SUMMARY

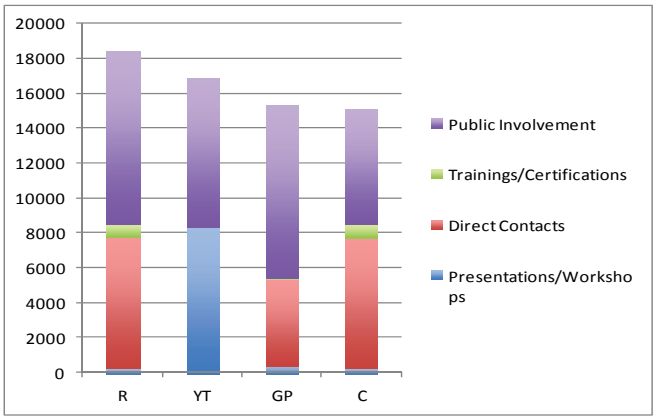


DIRECT METHODS SUMMARY



PUBLIC INVOLVEMENT SUMMARY





The Post and Courier

Get motivated to start using native plants in the landscape

By Tony Bertauski
Sunday, August 29, 2010

My grandpa was a Ninja.

There's no other way to explain his toenails. They were sharp enough to cut holes through his slippers. I'm not kidding. Maybe he used them to climb walls. Like a Ninja. Maybe he used them as switchblades. Like a Ninja.

He used to sit on the porch as still as a stump, moving only to raise a Budweiser to his lips, ever so slowly. He chewed tobacco without spitting. Not very Ninja-like, I know, but if you've ever chewed tobacco, it seems quite impossible not to spit. Almost superhuman.

He didn't look like much of a threat, but I suppose that was the point. Like a Ninja.

Invasive plants have the same effect. They look harmless, even beautiful, but can be quite troublesome. Some invasive species have been purposely introduced into our ecosystem because they are fast-growing and pest-free, and that's precisely why they've become a problem. Not all plants introduced from another continent, referred to as exotics, are invasive. Native plants, however, rarely are.

Provided

Virginia sweetspire (Itea virginica) is a native, deciduous shrub with spectacular flowers in the spring.

Natives are well-adapted to our environment. However, finding an exact definition for a native

plant is difficult. You could say that it's a plant that's been growing here a long time, but that's vague. Some people suggest at least 500 years. If we use 500 years as our measuring stick, that means plants introduced from another continent before that time could technically become native. There are a lot of variables.

Native plants are not immune to insects. The fact that insects feed on them is precisely why we should use them. However, many of our most popular landscape plants are pest-free exotics. I was never really motivated to use native plants versus a noninvasive exotic, but Doug Thallamy's book, "Bringing Nature Home," has given me reason to reconsider. His reasoning goes something like this:

Plants are the first trophic level in our ecosystem. They capture sunlight and convert it into energy. In order to pass this energy to the higher levels of our ecosystem, plants are consumed by herbaceous organisms. Insects make up a critical link in this energy transfer. Pound for pound, they contain more protein than beef. As insects consume foliage, they are eaten by birds and other organisms. Up the food chain the energy goes.

The biodiversity of an ecosystem is a balancing act between insects and other organisms that keep plants from becoming invasive and plants that limit their attackers' ability to spread. Plants don't like to be eaten. They produce chemical compounds to ward off insects. The majority of insects are specialists that feed on only a few hosts by producing digestive enzymes that can break down certain plant toxins. However, the evolution of this ability takes a long time to develop.

However, even if exotic plants are not invasive, they're less likely to feed as many insects as natives. They will use sunlight, water and nutrients but limit the amount of energy shared with the rest of the ecosystem by hosting fewer insects. Eventually, insects will evolve to feed on exotic plants, but this could take thousands of years.

Thallamy goes on to present this effect on birds.

While birds feed on berries, they rely almost exclusively on earthworms, caterpillars and various insects to feed their young. This highlights the importance of insect availability to birds during nesting and the presence of natives in our landscape.

It's difficult to persuade someone to plant stuff that's going to get eaten, but consider a naturalized area in your yard and use various native plants that can sustain insect damage.

Reduce your turf and plant more beds with a variety of plants, such as ground cover, trees and shrubs.

To get a list of native plants, visit www.wildflower.org or www.plantnative.org.

Or e-mail me for a list at tbertauski@sc.rr.com.

My grandpa slept silently, too, and in the same position every night. Looking at the evidence, I'm guessing he slept with one eye open.

College Installs Rainwater Collection System

On June 11th and 12th, the College of Charleston installed a 1,000-gallon cistern and pump to harvest rainwater. The new system, installed at 26 Coming Street, is expected to result in savings of about $1,000 a year and to reduce irrigation demands on the city water supply. The pump will provide water for washing equipment and for maintaining an urban garden.

The installation of the system turns the problems of excess stormwater runoff and flooding into a feasible solution. In addition to monetary saving from reduced water consumption, the cistern allows for public education and environmental protection.

The **College of Charleston** collaborated on the cistern project with **David Joyner** of the **Clemson Extension** office (and MES alumnus), as a member of the **Ashley Cooper Stormwater Education Consortium (ACSEC)**. The ACSEC provided the equipment and installation as part of an **American Rainwater Catchment System Association (ARCSA)** workshop that was held on campus at the time of installation. The College, therefore, did not have to pay for either the equipment or the installation, a savings of about $2,250. Additionally, the project should save the College 15,000 gallons of water per year.

In a release from the College of Charleston, Dr. Callahan, project coordinator, said that "the College continues to take real steps toward becoming more environmentally responsible." Callahan will oversee a graduate assistant, who will monitor the system for two years. The graduate assistant will track the amount of rainwater collected and the amount of city water saved in order to analyze the effectiveness of the system.

www.cofc.edu/~environ

MES PROGRAM

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Appendix A

Articles

Environmental Conservation

Stormwater compliance workshop held in the Pee Dee

By Peter Hull

Navigating the maze of construction and post-construction stormwater compliance can be difficult.

Carolina Clear and the Florence/Darlington Stormwater Consortium hosted a summer workshop that addressed stormwater management issues through all phases of construction.

The workshop, tailored to contractors, subcontractors, registered landscape architects, professional engineers and Tier B surveyors, included presentations on permit requirements, best management practices and a question and answer session with a representative from the S.C. Department of Health and Environmental Control.

Photo by Peter Hull

"Clemson University has been involved with water quality issues for more than 50 years through teaching, research and extension," said Cal Sawyer, associate director of Clemson's Center for Watershed Excellence.

"This experience working with a broad cross-section of groups, from engineers and developers to local governments and the general public, provides Clemson with a sound foundation to work with people in the Pee Dee," Sawyer said.

For more information: www.clemson.edu/public/carolinaclear/.

Carolina Clear sponsors programs across the state

By Peter Hull

South Carolinians are becoming more aware of the effects of their homes and yards on nearby water bodies. Carolina Clear, Clemson's stormwater education and awareness program, teaches homeowners, youth, builders and government officials about responsible water management.

Recent rain garden workshops were held in Pickens and Georgetown counties, and included instruction on local water quality, stormwater management and the principles of rain garden design.

Correctly constructed rain gardens allow stormwater runoff to slowly infiltrate the groundwater table. Rain gardens absorb excess nitrogen and phosphorous in stormwater and trap sediment while biological processes filter out other pollutants.

Rain barrel workshops, held in Columbia, Sumter and Hartsville, provided information on water pollution, water harvesting, and rain barrel function, design and construction. Each participant built a rain barrel to take home. More workshops are planned in the fall.

Photo by Peter Hull

Rain barrels reuse rainwater to irrigate gardens and lawns, water plants and wash cars. They benefit the environment by reducing stormwater flow, which causes erosion and can carry pollutants from yards and streets into streams. A 1,000-square-foot roof catches more than 600 gallons of water from just an inch of rainfall.

For more information: Katie Giacalone, 843-554-7226 x 115, kgiacal@clemson.edu or www.clemson.edu/carolinaclear/.

6

Researchers launch firefly watch program

By Alex Chow

Fireflies – an icon of South Carolina summers – are fewer and harder to find in some communities along the coast lately because of urban development and changes in forestry practices.

A field survey in May was conducted at Hobcaw Barony near Georgetown by entomologist Juang-Horng Chong and biosystems engineer Alex Chow. They enlisted the help of citizen scientists – including students from Georgetown High School and Waccamaw High School – to study the impacts of human activities and environmental factors on the abundance and distribution of fireflies.

The firefly watch progr
field survey and a nighttim
firefly biology, methods for
firefly counting and identifi
cation, methods for soil an
litter sampling, safety in
the field, and environmenta
impacts from coastal deve
opments. In the daytime fie
survey, volunteers visited t
field survey sites to collect
soil and litter samples. The
returned at night to identif

Clemson scientists wi
tial relationships between
ity, and firefly abundance.
volunteers again next sprin

For more information:
achow@clemson.edu.

Appendix A

Articles

Environmental education program reaches statewide

By Donna Bowen

Last year, Master Naturalist volunteers provided 4,500 hours of service removing invasive species such as beach vitex, monitoring water quality, and assisting state park rangers.

Directed by ethnobotanist Karen Hall, the Master Naturalist program trains and coordinates a statewide corps of volunteers who provide education and service to support natural resources management.

"The Master Naturalist program does a great job providing opportunities for environmental education because they teach individuals who teach others," said Jody Childs, Environmental Education Association of South Carolina awards director. "It's a multiplying effect to increase environmental literacy across the state."

Photo by Karen Hall

Because of this, the Environmental Education Association selected the Master Naturalist program to win the 2010 award for outstanding leadership in environmental education.

For more information: Karen Hall, carlson@clemson.edu, or www.clemson.edu/public/naturalist/.

New timber and management pr

By Peter Kent

A new research and demonstration p
Clemson's Experimental Forest to showca
improved for wildlife and also managed

"The project will serve as a model fo
across the Southeast," said Greg Yarrow,
professor. "It will provide an excellent tea
for our students as well as provide new i
and innovative approaches to integrate w
improvement practices into timber mana

With more than 75 percent of the sta
resources on private lands, Clemson prov
information to help landowners, foresters
professionals manage forest for timber p
habitat.

This research is funded by a grant fr
Forestry Initiative Inc.
2010 Conservation and
Community Partnerships
Grant Program.

For more information: Greg Yarrow, 864-656-7370, gyarrow@clemson.edu.

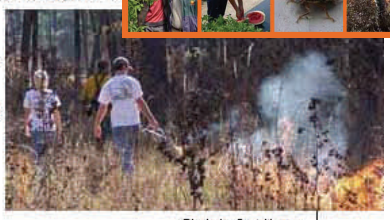


Photo by Greg Yarrow

Camps teach youth about state's natural heritage

By Peter Hull

More than 120 children from across the state learned about protecting the state's water resources during camps this spring and summer in the Lowcountry, Midlands and Upstate.

At Camp Sewee in Awendaw, youth age 8 to 14 learned about the state's natural heritage and the role rivers play. Hosted by Clemson's Youth Learning Institute and sponsored by Carolina Clear, the camp included a trawl of marine life in Charleston Harbor, as well as lessons on tidal creeks, Carolina bays, estuaries and the importance of the state's barrier islands.

In Lexington County, 10- to 12-year-olds learned the history of Lake Murray, the role of watersheds and about aquatic insects in a 4-H2O Pontoon Classroom led by Bill Blackston, coordinator for the Lexington Countywide Stormwater Consortium.

At Harbison State Forest in Columbia, 12- to 14-year-olds studied the forestry aspects of wetlands and learned about the cold-water stream below Lake Murray's dam and the flood plains of the Congaree National Park in an advanced 4-H2O camp directed by Mary Nevins, coordinator for the Richland Countywide Stormwater Consortium.

Photo by Peter Hull

On Lake Keowee, 8- to 12-year-olds in a 4-H2O camp collected water samples, observed microscopic and macroscopic life, conducted water quality experiments, and learned about enhancing and preserving aquatic ecosystems. Another camp was held for 9- to 12-year-olds at Piedmont Forestry Center where they completed a stream assessment and collected stonefly and dragonfly nymphs. Marguerite Porter, coordinator of the Pickens Countywide Stormwater Consortium, led both camps.

"Thanks to the many partnerships that make these camps possible, children across South Carolina can learn about the state's natural resources, and hopefully become environmental stewards," said Katie Giacalone, Carolina Clear's statewide coordinator.

For more information: Carolina Clear www.clemson.edu/carolinaclear/, Youth Learning Institute www.clemson.edu/yli/.

Clemson Impacts • Fall 2010 7

The Post and Courier

Mural promotes protecting creek

By Almar Flotildes
aflotildes@postandcourier.com
Thursday, October 21, 2010

Photo by Almar Flotildes

Charleston School of the Arts students recently unveiled an 8-by-20-foot mural dedicated to the protection of the Noisette Creek Preserve. Under the guidance of visual arts teacher Marie Nichols (center), freshmen Abby Rumph (from left), Caroline Cash, Amanda Kasman and Mando Smoak completed the painting within six months.

Charleston School of the Arts students recently unveiled a mural at the school to promote the protection of Noisette Creek.

Freshmen at the school worked for six months on the 8-by-20-foot painting titled "Save Noisette Creek," which depicts the local waterway. It will be permanently on view at the Navy Yard on North Hobson Avenue in North Charleston.

The collaborative project combines art, environmental education and community service to visually encourage the public to protect the Lowcountry's natural resources, said Mary Neal, an AmeriCorps VISTA member who works with the Michaux Conservancy that organized the project.

The Michaux Conservancy acts as the steward of the Noisette Creek Preserve and works with the city of North Charleston to restore the nearly 160 acres of marshland.

"The message of the piece is that we need to take care of the Earth so that future generations can have the same experience that we have or better," said Amanda Kasman, one of the student painters.

The project was under the guidance of visual arts teacher Marie Nichols. Rob Maniscalco, North Charleston's artist-in-residence, also contributed to the work.

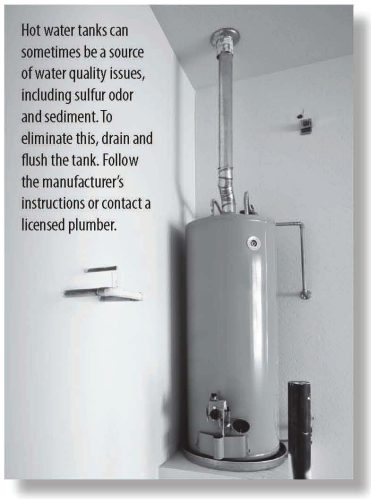
Neal added they would like to thank the Ashley Cooper Stormwater Education Consortium and the city of North Charleston Cultural Arts Department, which paid for project supplies.

CONNECTIONS. *Marie Nichols, an art teacher at the Charleston County School of the Arts, and her students assemble this 8-by-20-foot mural of Noisette Creek. The mural was commissioned by the Michaux Conservancy and the Ashley-Cooper Stormwater Education Consortium to help students combine their artistic skills with knowledge of local ecology. The mural is mounted outside at the former Charleston Navy Yard, Building Number 25.*
PHOTO/WADE SPEES

Coastal Heritage, Winter 2010-11, *The Art of Science: A Search for Visual Ecology*

Water Wise

The Quarterly Newsletter of Charleston Water System



Hot water tanks can sometimes be a source of water quality issues, including sulfur odor and sediment. To eliminate this, drain and flush the tank. Follow the manufacturer's instructions or contact a licensed plumber.

Water Whys

My water has a rotten egg smell. What's causing this and how do I get rid of it?

This is likely caused by your water heater. If you don't use enough hot water to regularly flush the tank, then hydrogen sulfide-producing bacteria can begin to thrive in the tank, resulting in a harmless but unpleasant rotten egg odor when you use warm or hot water.

To eliminate this, follow the manufacturer's instructions to drain and flush your water heater. Most manufacturers recommend flushing your tank at least once a year for routine maintenance.

Have a question? Send it to info@charlestoncpw.com.

Protecting our water sources

Clean drinking water starts with you!

Water pollution isn't just harmful to the environment, it can also affect sources of drinking water and make water treatment more difficult.

The most common source of pollution for surface water is contaminated runoff. Runoff is rainwater or irrigation water that flows over land and into storm water collection pipes that empty directly into water bodies. Runoff can carry pollutants such as motor oil, fertilizer, and bacteria from pet waste.

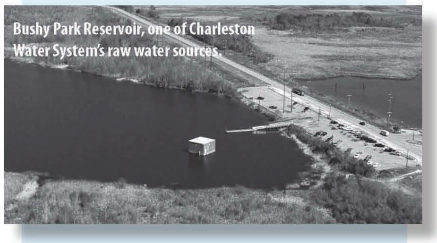
The good news is that you can help reduce pollution from runoff by taking a few simple steps.

How you can help

- Never pour anything into a storm drain.
- Properly dispose of household hazardous materials such as used motor oil, paint, pesticides, and other solvents and chemicals by taking them to a designated disposal center.
- Pick up after your pet.
- Follow the manufacturer's instructions for the proper use of fertilizers and pesticides. Overuse contributes to runoff pollution.

Where does my drinking water come from?

The Bushy Park Reservoir and the Edisto River. It's treated at the Hanahan Water Treatment Plant to remove contaminants and make it safe to drink.



Bushy Park Reservoir, one of Charleston Water System's raw water sources.

Does Charleston Water test source water for pollution?

Yes, remote monitors continually measure water quality variables in our source water and at various stages in the treatment process. This allows us to quickly detect changes in water quality and adjust the treatment process accordingly. We also draw water samples manually and test them in our lab.

Visit www.charlestonwater.com to learn more about how your water is treated and water quality.

Our Mission is to protect public health and enhance the environment of our service community by providing clean water services of exceptional quality and value.

103 St. Philip Street • PO Box B • Charleston • SC 29402 • phone (843) 727-6800 • www.charlestonwater.com

Charleston Water System

Master Gardeners Install A Rain Garden

Photos by: Mary Lee Kirkland '02 Text by: Dorothy McFalls '10

On a chilly February morning, eight master gardeners attended a workshop on the purpose of rain gardens and then lent a hand in the installation of a permanent exhibit on Bowen's Island.

The hands-on workshop was part of Clemson's Carolina Clear program and the Ashley Cooper Stormwater Education Consortium (ACSEC), who's mission is to educate the public about stormwater runoff. The new rain garden is the most recent addition to the growing number of stormwater structural best management practices developed through ACSEC partnerships.

Ferry Landfill was amended into the soil.

The master gardeners, led by David Joyner of Clemson University and Sam Gilpin of Charleston Green Roofs, planted the 900-square foot rain garden with native and drought-tolerant species, including sweetgrass, sand cordgrass (*Spartina backeri*), yaupon holly, and dwarf saw palmettos.

These plants were selected for their drought-tolerance and ability to withstand periodic flooding that would saturate the soil.

The "rain garden" or bioretention cell installed at Bowen's Island Restaurant will collect runoff from the restaurant's roof to provide natural filtration before the stormwater reaches the adjacent tidal creek.

Prior to the workshop, the site was prepared for the rain garden by creating a shallow depression. The square footage of the roof and a calculated rain event dictated the garden's size and design. A swale allows for overflow of rainwater should the storm event exceed calculated amounts.

After constructing the site's large, shallow depression, compost from the Bee's

Master Gardeners Install a Rain Garden continued...

The installed rain garden is part of a larger effort at the restaurant to illustrate sustainable practices.

Master gardeners pose with Dave Joyner, Clemson Extension, after completing the garden's installation.

The Post and Courier

Harvest rainwater to use at your home

By Tony Bertauski
Special to The Post and Courier
Sunday, May 1, 2011

Summer is about water.

When my kids were two years old, all they needed was a water hose. When they were five, jumping through a sprinkler lasted an hour.

At 10, all we needed was a wet sheet of plastic and a little dish soap. Sure, they'd slide across the yard like a runaway train over sticks and rock and mud, but fun like that has no boundaries.

But water certainly isn't free. Rainwater harvesting conserves water that could otherwise end up in wastewater treatment plants.

Collecting rain from our roofs can be stored and put to use, saving us money and resources. Here are some tips:

Gutters

Some homes don't have gutters because of the cost and maintenance. However, diverting water away from the foundation can reduce moisture problems, especially where door frames are susceptible to rot.

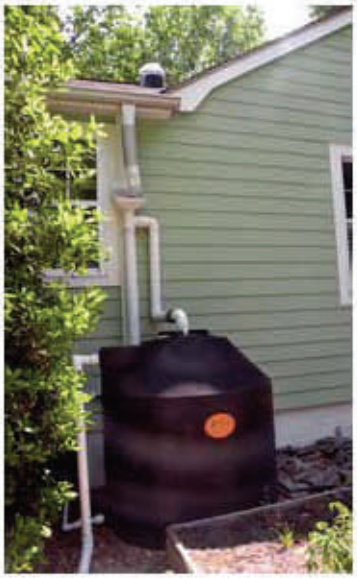
You can save money by installing gutters in 10-foot sections yourself, but they often drip at the couplers. Another option is to have a contractor install extruded seamless gutters.

There are numerous leaf guards that keep debris from clogging the gutters. Recently, we installed screen covers at Trident Technical College's horticultural facilities that helped, but have noticed debris settles on top of the screens and occasionally needs to be cleared.

We also installed solid gutter covers that keep them very clean but don't collect all the water during heavy rainfall. Some people have experienced covers blowing off in storms.

Provided

A cistern is a larger alternative to a rain barrel.



Rain barrel

The Charleston area averages 52 inches of annual rainfall.

The easiest way to collect rainwater is directing the downspout into a 50-gallon barrel. The openingshould be screened to keep out mosquitoes and debris. Elevating the barrel makes access to the spigot near the bottom of the barrel easier.

Cisterns collect larger amounts of water. This may be a couple hundred gallons or several thousand.

They typically have a first flush device that diverts to waste the initial surge of rainwater containing high amounts of bird feces and debris. Additional screening keeps the water clean.

While the water can be accessed from a port at the bottom of the cistern, a hose inside floats at the water's surface to take the cleanest water.

Pumps are often used to move the water from a cistern.

Rainwater uses

Rainwater is considered greywater, which is not potable unless you want to invest in sterilization equipment. But it can be used to irrigate trees and shrubs.

Drip lines with emitters can disperse water without a pump at the base of desired plants as long as they are not uphill from the rain barrel.

Elevating the barrel can ensure sufficient performance. However, gravity is usually not enough for a soaker hose. Pumps can be used when gravity isn't enough. A hose-end battery-powered timer can water on a schedule.

Fort Johnson Community Garden at the Fort Johnson Marine Center Campus has an excellent display that features a rain garden and a 1,500-gallon cistern providing water for drip irrigation. It also directs condensation from an ice machine to keep a bog wet.

Another option is to run a drip line to a bird bath and allow the water to drip throughout the day. Again, a hose-end timer can be used to open the drip line for a set period of time.

Rainwater also can be diverted to your toilet. In this case, a pump is needed to drive the water from the cistern to your toilet whenever it is flushed. However, the toilet also needs to be connected to your potable water source in order to operate during periods of drought.

Charleston's Sustainability Institute's Green House displays many sustainable practices, including rainwater that flushes the toilets.

My kids don't entertain as cheaply as a hose anymore. If you don't believe me, sign your kid up for lessons or a camp.

***Tony Bertauski** is a horticulture instructor at Trident Technical College. To give feedback, email him at tony.bertauski@tridenttech.edu.*

The Post and Courier

Tribute to teacher

School of the Arts garden planned as memorial for longtime dance educator

By Brenda Rindge
brindge@postandcourier.com
Thursday, May 12, 2011

A small project started last fall to remember a beloved North Charleston teacher has bloomed into a major effort to build a sustainable garden that will be held up as a model for other schools and businesses.

"What has happened with the memorial garden project has been nothing short of amazing," said Tara Snyder, president of the Charleston County School of the Arts dance boosters.

Cecilia Slowinski, who taught dance at the school from the time it opened in 1995, died of cancer Aug. 31, and the school community wanted to memorialize her.

Senior visual arts major Joey Dixon of West Ashley was inspired by photos of Slowinski to create a sheet-metal sculpture, which the dance booster club decided to use as the centerpiece for a garden in Slowinski's memory. Slowinski, who was married to School of the Arts social studies teacher Alan Brehm, loved the outdoors, so a garden was a natural fit.

The club started raising money and targeted a location: a grassy courtyard often saturated with stormwater runoff from the surrounding high school building and the administration building the School of the Arts shares with Academic Magnet High School.

"As you might imagine, we are in a new school, so there wasn't a lot of money left over for landscaping," Snyder said.

Visual arts teacher Marie Nichols started talking about planting a garden soon after the school's January 2010 move.

"After Cecilia died, I knew that the dancers were raising money and wanted to do a garden," said Nichols, who worked closely with Slowinski on school productions and other projects for 13 years. "We decided to join forces and come up with a plan."

A gardening hobbyist, Nichols said she didn't have the know-how to proceed, but "I knew enough to find the experts," starting with David Joyner, a natural resources agent for Clemson Extension, whom she met when her students painted a mural about preserving Noisette Creek.

She told him about the storm-drainage issues in the courtyard.

"Dave started looking at it, and he thought there was a way to fix the problem naturally with plants and make it into a beautiful garden," Nichols said. "He came in and really believed in the project. He's the one who made the whole thing blossom."

Joyner works with the extension's Carolina Clear program, whose mission is to educate the public about stormwater runoff and pollution. Carolina Clear also is administrator of the Ashley Cooper Stormwater Education Consortium, which consists of 11 counties and municipalities and community partners.

The consortium has created permanent exhibits to showcase best management practices and thought "it sounded like an ideal place to do another demonstration site," Joyner said. "Schools are wonderful platforms to educate not only students but their parents and the region in general."

In addition to the stormwater problem, the project had many requirements. It needed an area for the Slowinski sculpture, 12th-grade students wanted a senior lawn and teachers wanted an outdoor classroom.

Joyner decided the project needed a designer.

He involved Elias Deeb, project manager of the nearby Oak Terrace Preserve neighborhood, who has an interest in sustainable design and low-impact development. Deeb, in turn, suggested landscape architect J.R. Kramer, who works out of his home in Oak Terrace.

"We live here. We work here," said Kramer, who owns Remark Studio with his wife, Holly. "We have a vested interest in this. North Charleston really wants to be a green city. That's why we moved here in the first place."

Kramer's plans call for a winding path surrounded by indigenous plants that soak up water but are also drought resistant. The path, made of pervious pavers and bridges, will allow water to soak through and redirect runoff. River rock will help with drainage, and because Slowinski liked to paint rocks, "to a degree, it is a canvas for the students to add their own artwork," Joyner said.

A gathering area will provide space for seniors to hang out during lunch.

"It can be used for so many things," Nichols said. "It can be an outdoor lab for science classes, artists can draw there, creative writers can write. It will be nice for the whole school."

The project will take two to three years and cost as much as $50,000.

"We are trying to get the cost down to a more manageable level," Joyner said.

Kramer, for instance, has worked at a steeply discounted rate, he said. "Ultimately, we are optimistic, but we still have a ways to go."

About $6,000 has been collected from booster club fundraisers and donations from the school's PTSA and the North Charleston Beautification Committee. Several school clubs also are raising money, and organizers have applied for grants.

When finished, the garden will be a model project as well as a memorial, organizers said.

"We have a design for a beautiful project, and it sounds like something Ms. Slowinski would have been 100 percent behind," Joyner said.

Reach **Brenda Rindge** at 937-5713.

APPENDIX B
Event Data

2010 ICC Beach Sweep/River Sweep
ICC Coordinator Report Form
People, Pounds, and Miles

South Carolina--Coastal, reported data

Coordinator Name: Susan Ferris Hill, S.C. Sea Grant

Clean up Date	Zone Name	Site Name	Land Cleanups		
			Number of People	Weight of Debris Collected lbs	Distance Cleaned mi
9/18/10	County	Berkeley County Adopt-A-Landing/Island	275	8,000	5
9/18/10	County	Old Santee Canal Park, Biggin Creek	24	25	3.5
9/17/10	County	Nucor Steel port, Cooper River	9	50	1
9/17/10	County	Charleston Naval Weapons Station	25	800	3.4
9/18/10	County	Ashley River	4	30	3
9/18/10	County	Historic Site, Bacon's Bridge Road Fishing Hole	168	580	3.5
9/18/10	County	Sawmill Branch Greenway/Luden Road	45	25	3
9/18/10	County	Givhans Ferry State park	32	900	1.5
9/25/10	County	McClellanville, Jeremy Creek in the village	29	700	2
9/18/10	County	Isle of Palms	140	150	6
9/18/10	County	Sullivan's Island	153	841	5
9/18/10	County	Ben Sawyer Causeway	75	50	2
9/18/10	County	Noisette Preserve (Noisette Creek/Riverfront Park, North Charleston)	18	105	0.25
9/18/10	County	Cooper River (FLETC to Marina)	16	350	0.5
9/18/10	County	Waterfront Park, Downtown Charleston	45	300	0.5
9/18/10	County	Colonial Lake Park	5	60	1
9/18/10	County	Alberta Long Lake	85	300	0.25
9/18/10	County	Brittlebank Park, Downtown Charleston	5	75	0.3
9/18/10	County	Island)	57	300	6.5
9/25/10	County	James Island Connector on Harborview Rd	12	300	0.25
9/18/10	County	Lake Francis - James Island	3	5	0.5
9/18/10	County	Fort Johnson	64	364	0.7
9/18/10	County	Charleston (West Ashley), Cosgrove Bridge at Ashley River	27	800	0.4
9/18/10	County	Folly Island/Beach	173	425	6
9/18/10	County	Folly Beach County Park	19	80	1.2
9/18/10	County	Mariner's Cay Marina	20	165	0.5
10/2/10	County	Chadwick and Confederate Circle	3	40	0.25
9/18/10	County	West Ashley Greenway	4	35	1.25
9/25/10	County	Longbranch Creek, West Ashley	10	217	0.25
9/18/10	County	Limehouse Boat Landing	8	200	1
9/18/10	County	North End of Kiawah Beach - Stono Inlet	3	90	1.2
9/18/10	County	Landing	3	1	5
9/19/10	County	Dawhoo Boat Landing, Russell Creek, St. Pierre Creek	5	45	7.75
9/18/10	County	Store Creek	3	300	1
9/18/10	County	Botany Bay Wildlife Preserve - Ocella Creek	11	60	1
9/18/10	County	Botany Bay Wildlife Preserve	40	1060	28
9/19/10	County	Steamboat Landing	3	20	0.25
		TOTALS	1621	17848	104.7

The Ocean Conservancy

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