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Stormwater Outreach Strategic Plan

2012-2017



Prepared by:

David F. Joyner
ACSEC Co-Coordinator
Water Resources Agent
Clemson University Cooperative Extension Service
Clemson Public Service Activities-Carolina Clear
djoyner@clemson.edu

Kimberly A. Counts
ACSEC Co-Coordinator
Water Resources Agent
Clemson University Cooperative Extension Service
Clemson Public Service Activities-Carolina Clear
kcounts@clemson.edu

With contributions by:

Katie A. Giacalone
Natural Resources Coordinator-Carolina Clear
Clemson Public Service Activities
Clemson University Restoration Institute

Rebekah J. Walker
Ph.D. Candidate
Medical University of South Carolina

And

Ashley Cooper Stormwater Education Consortium Representatives

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Kim Counts at kcounts@clermson.edu

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Executive Summary

The Ashley Cooper Stormwater Education Consortium's (ACSEC) 5-year (2012-2017) stormwater outreach strategic plan is the result of more than a year of meeting, surveying, researching, and analyzing issues, audiences, pollutants, and geography in the tri-county area and five years of educating and involving the region's citizens in improved stormwater awareness and management. The primary goal of the ACSEC stormwater outreach strategic plan is to provide a framework for prioritizing regional issues, developing targeted outreach methods, and determining program evaluation metrics to improve the delivery and impact of efforts. It is considered a "living" document to allow for refinement, supplementation, and flexibility as regional efforts evolve over the next five years. A complementary goal is to increase clarity of outreach endeavors for all parties involved in the ACSEC to better utilize resources and coordinate efforts. Objectives of the document are:

- 1) Prioritize three residential and three commercial issues identified as most significant to the region over the next five years (2012-2017);
- 2) Analyze the issues and develop messages and effective methods to reach target audiences;
- 3) Develop timelines and evaluation methods to guide and measure effectiveness.

The ACSEC was created to coordinate and implement a regional, watershed-scale education strategy to assist communities address US Environmental Protection Agency (EPA) Phase II Small Municipal Separate Stormwater Sewer System (SMS4) general permit mandates for public education and involvement regarding stormwater runoff. As the first two minimum control measures (MCM) of EPA's Phase II program, public education and involvement are fundamental in the national effort to reduce non-point source stormwater runoff pollution. EPA recommends a partnership-based regional education approach, identifying the multiple benefits of collaboration to achieve common goals: "Partnerships have many advantages, including providing access to resources; increasing effectiveness, efficiency, and public influence; allowing for creativity and innovation; and improving communication between typically adversarial parties" (EPA, 2003). The strategic education plan seeks to provide a blueprint for conducting an effective outreach campaign that maximizes program partnerships and resources to achieve defined goals and objectives in the regional effort to inform, educate, and involve the public in protecting and preserving area waters.

The document is organized into four major sections. Section One provides an introduction and background, Section Two reviews the core messages of the ACSEC and provides an audience analysis based on recent public surveys and overview of *Thank You!* campaign, Section Three identifies regional issues and core programs, and Section



Four defines priority issues and education strategies. Prioritization of three residential and three commercial issues most relevant to the region were developed with ACSEC representative input, which took into account available data and personal experience. The priority residential and commercial audiences identified by the ACSEC are listed below.

Residential Audience Priorities	
Issue	Goal
Home landscaping nutrient management	Proper application of fertilizer, use of low or no-phosphorus fertilizers
Residential stormwater pond management	Proper maintenance, homeowner association responsibilities, and neighborhood awareness
Home Auto Repair hazardous materials	Proper management and disposal of oil, grease, and other automotive fluids

Commercial Audience Priorities	
Issue	Goal
Landscapers and pond management company nutrient management	Proper application of fertilizer, use of low or no-phosphorus fertilizers, post construction BMP (pond) maintenance
Restaurants and hospitality fats, oil, and grease (FOG) management	Proper disposal of fats, oil and grease
Automotive businesses oil, grease and hazardous fluids management	Proper management and disposal of petroleum and hazardous materials

Section four outlines the priority issue, education strategy, and a timeline for program implementation. The priority issues identified for targeting over the five-year period will not exclude other awareness or education efforts. They will form the core of efforts by consortium administrators over the period. The education strategies also define timelines and metrics that will be used to evaluate the effectiveness of the outreach campaign. Appendix A contains a directory of ACSEC education partners, including their mission, audience(s), and programs.



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1. Introduction and Background

1.1. Document Goals and Objectives

This document serves as a blueprint that outlines the Ashley Cooper Stormwater Education Consortium's (ACSEC) 5-year stormwater outreach strategy (2012-2017). It is considered a "living" document to allow for refinement, supplementation, and flexibility as regional efforts evolve over the next five years. The ACSEC stormwater outreach strategic plan will also serve as reference during planning and development of annual action plans. This strategic plan is the result of more than a year of meeting, surveying, researching, and analyzing issues, audiences, pollutants, and geography in the tri-county area and five years of educating and involving the region's citizens in improved stormwater awareness and management. The primary goal of this plan is to provide a framework for prioritizing regional issues, developing targeted outreach methods, and determining program evaluation metrics to improve the delivery and impact of ACSEC outreach efforts. A complementary goal is to increase clarity of outreach endeavors for all parties involved in the ACSEC to better utilize resources and coordinate efforts. Objectives of the document are:

- 1) Prioritize three residential and three commercial issues identified as most significant to the region over the next five years (2012-2017);
- 2) Analyze the issues and develop messages and effective methods to reach target audiences;
- 3) Develop timelines and evaluation methods to guide and measure outreach efforts.

The ACSEC was created to coordinate and implement a regional, watershed-scale education strategy to help communities address US Environmental Protection Agency (EPA) Phase II Small Municipal Separate Stormwater Sewer System (SMS4) general permit mandates for public education and involvement regarding stormwater runoff. As the first two minimum control measures (MCM) of EPA's Phase II program, public education and involvement are fundamental in the national effort to reduce non-point source stormwater runoff pollution. EPA recommends a partnership-based regional education approach, identifying the multiple benefits of collaboration to achieve common goals: "Partnerships have many advantages, including providing access to resources; increasing effectiveness, efficiency, and public influence; allowing for creativity and innovation; and improving communication between typically adversarial parties" (EPA, 2003). The strategic education plan seeks to provide a blueprint for conducting an effective outreach campaign that maximizes program partnerships and resources to achieve defined goals and objectives in the regional effort to inform, educate, and involve the public in protecting and preserving area waters.



1.1.1. EPA Phase II-NPDES Stormwater Permit

The following program overview is from the [EPA website](#):

Polluted stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it is often discharged untreated into local waterbodies. To prevent harmful pollutants from being washed or dumped into an MS4, operators must obtain a NPDES permit and develop a stormwater management program.

- *Phase I, issued in 1990, requires medium and large cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges.*
- *Phase II, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. Generally, Phase I MS4s are covered by individual permits and Phase II MS4s are covered by a general permit. Each regulated MS4 is required to develop and implement a stormwater management program (SWMP) to reduce the contamination of stormwater runoff and prohibit illicit discharges.*

Stormwater management programs must include the development and implementation of the following six minimum control measures:

- **Public education and outreach**
- **Public participation/involvement**
- **Illicit discharge detection and elimination**
- **Construction site runoff control**
- **Post-construction runoff control**
- **Pollution prevention/good housekeeping for municipal operations.**

1.1.1.1. MCM's 1 and 2

The ACSEC focuses on MCM's 1 and 2. MCM 1 addresses public education and outreach in order to garner greater public support, provide awareness, and foster behavior change and greater compliance. It is hypothesized that as the public gains a greater understanding of the reasons that stormwater management is necessary and important, they will support MS4s in their attempt to fund initiatives and implement the program. It is also hypothesized that as the public becomes aware of the personal responsibilities expected of them and their community, they will take actions to protect or improve the quality of waters in their area. The three main guidelines for this MCM are forming partnerships, using a variety of educational materials and strategies to



target audiences and behaviors of concern, and reaching a diverse audience. The ACSEC is structured in a way to directly address this MCM through the suggested guidelines.

MCM2 addresses public participation and involvement in order to gain broader public support, decrease obstacles to allow shorter implementation schedules, build a broader base of expertise and economic benefits, and serve as a conduit to other programs as citizens become involved in stormwater concerns. Possible practices include public meetings/citizen panels, volunteer water quality monitoring, volunteer education/speakers, storm drain marking, community litter sweeps, structural stormwater best management practice (BMP) installations, and wetland and oyster restoration. The ACSEC has been involved in developing and implementing most of these programs and will continue to build on their past successes for this MCM. The ACSEC itself, including communication and coordination between a variety of stakeholders and organizations, is a public participation component of the regional effort. The ACSEC includes participation from representatives from over twenty area organizations and partner community representatives.

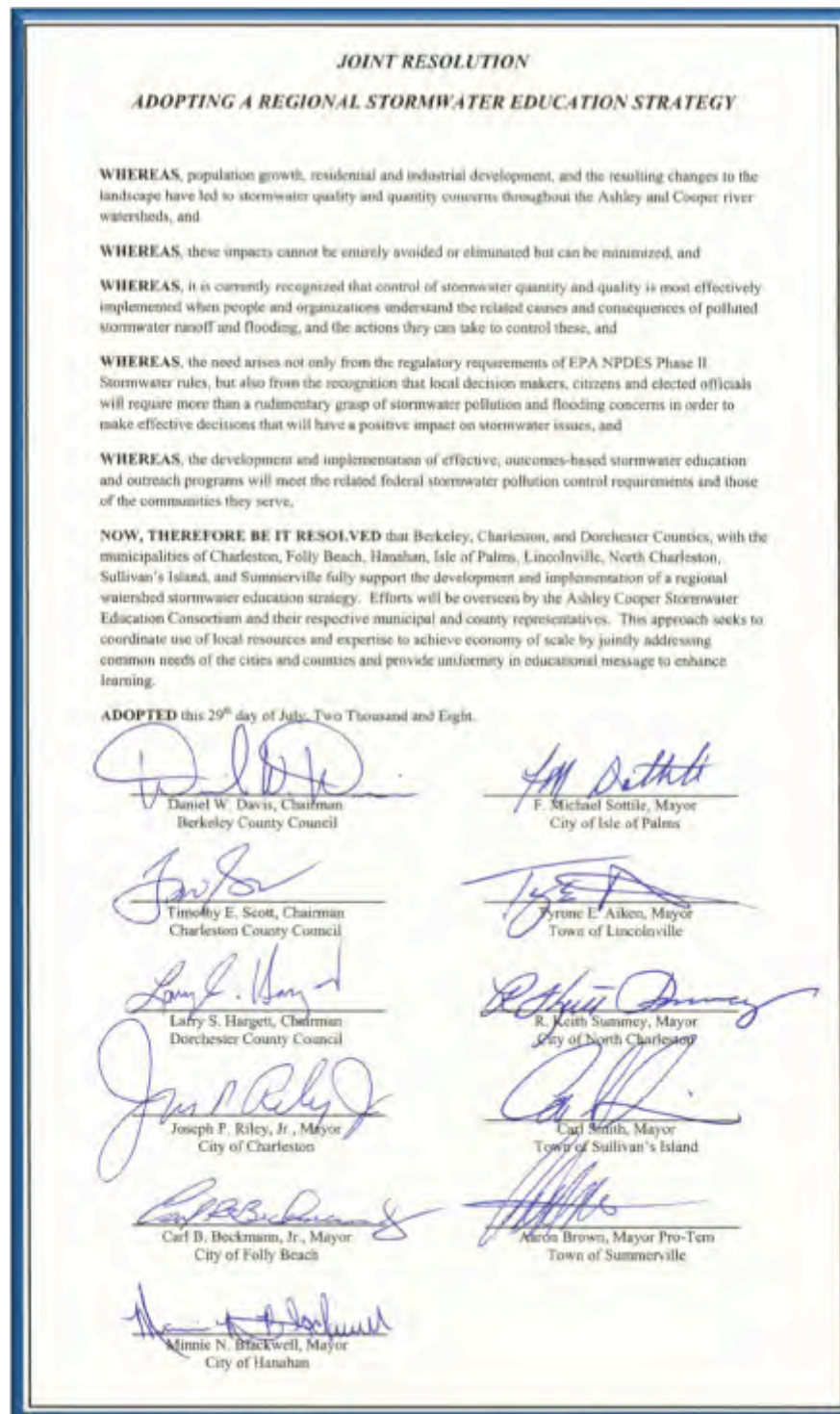
1.2. ACSEC Background

1.2.1. Brief History

The ACSEC was formally initiated in 2008, although conversations leading to its existence began in 2002. Clemson Public Service Activities' Carolina Clear program served as the coordinating agency and met with the SMS4 stormwater managers in the Charleston-North Charleston Urbanized Area to establish the mission and goals, potential education providers, and a general education strategy. Carolina Clear is regionally implemented by Clemson Extension; David Joyner was hired in June 2007 to serve as the ACSEC regional coordinator and began communicating with regional organizations that had similar water resource education goals and establishing informal partnerships. Education partners met as a group in 2008 and subsequently met with the community representatives to give overviews of their programs. Contemporary with the development of the consortium partnership, each partnering community's governing body signed individual resolutions to adopt a regional, watershed-scale education partnership through the ACSEC. On July 29, 2008, mayors, council chairpersons, or other elected officials representing the MS4 communities signed a joint resolution at a ceremony held at the City Gallery in downtown Charleston. The joint resolution represents a public commitment by the member communities in the region to address stormwater runoff pollution as partners working with regional education providers. A copy of the signed joint resolution can be viewed in Figure 1 and is also archived on the ACSEC website.



Figure 1. Signed joint resolution adopting a regional stormwater education strategy





1.2.1. Tri-County Population and Trends

The urbanized area previously defined and entitled Charleston-North Charleston includes 3 counties (all ACSEC members) and 10 municipalities, 7 of which are partnering with the ACSEC. The 2000 Charleston-North Charleston urbanized area can be viewed in Figure 2. The urbanized area population in 2000 exceeded 365,000 persons; total population and density data are shown in Table 1.

Table 1. U.S. Census Bureau population statistics for the tri-county

2010 US Census Population Statistics							
Region	2000 Total Population	2010 Total Population	Population Increase 2000-2010	Population Density (persons per square mile)	Housing Units (2010)	Households (2005-2009)	Home Ownership Rate (2005-2009)
South Carolina	4,012,012	4,625,364	15.3%	153.9	2,137,683	1,693,388	70.3%
Berkeley County	142,651	177,843	24.7%	161.8	73,372	56,203	71.0%
Charleston County	309,969	350,209	13.0%	382.3	169,984	139,754	61.4%
Dorchester County	96,413	136,555	41.6%	238.2	55,186	42,675	74.8%

While US Census Bureau 2010 urbanized area population statistics have not yet been made public, it is interesting to compare 2000 and 2010 population for the counties in the region. Table 1 identifies that Dorchester County's rate of population growth of 41.6% almost tripled the rate of South Carolina's population growth. All counties grew in population from 2000-2010, though Charleston County's growth rate leveled out to be less than the state's. The most densely populated county by more than 150 persons per square mile is Charleston County. Of the state's 46 counties, these three counties comprise almost 14% of the state's population and a similar percentage of the state's number of households. The total number of households across this tri-county region is nearly 239,000. Clemson's Strom Thurman Institute developed predictive models for the Charleston tri-county region, which align with population characteristics evident from 2000-2010, including expanding populations in the Dorchester and Berkeley County regions. Figure 3 presents a map illustrating urban area expansion since 1973 and projections of urbanized development in 2030.

In 2008-09, the Clemson Extension-Carolina Clear sponsored a master's intern on behalf of the ACSEC from the College of Charleston's Environmental Studies program. Ms. Julia Carter's internship project was designed to provide a physical and social characterization of the tri-county, and utilized an ArcGIS™ platform for organizing, projecting, and analyzing data. Ms. Carter's final report is entitled:

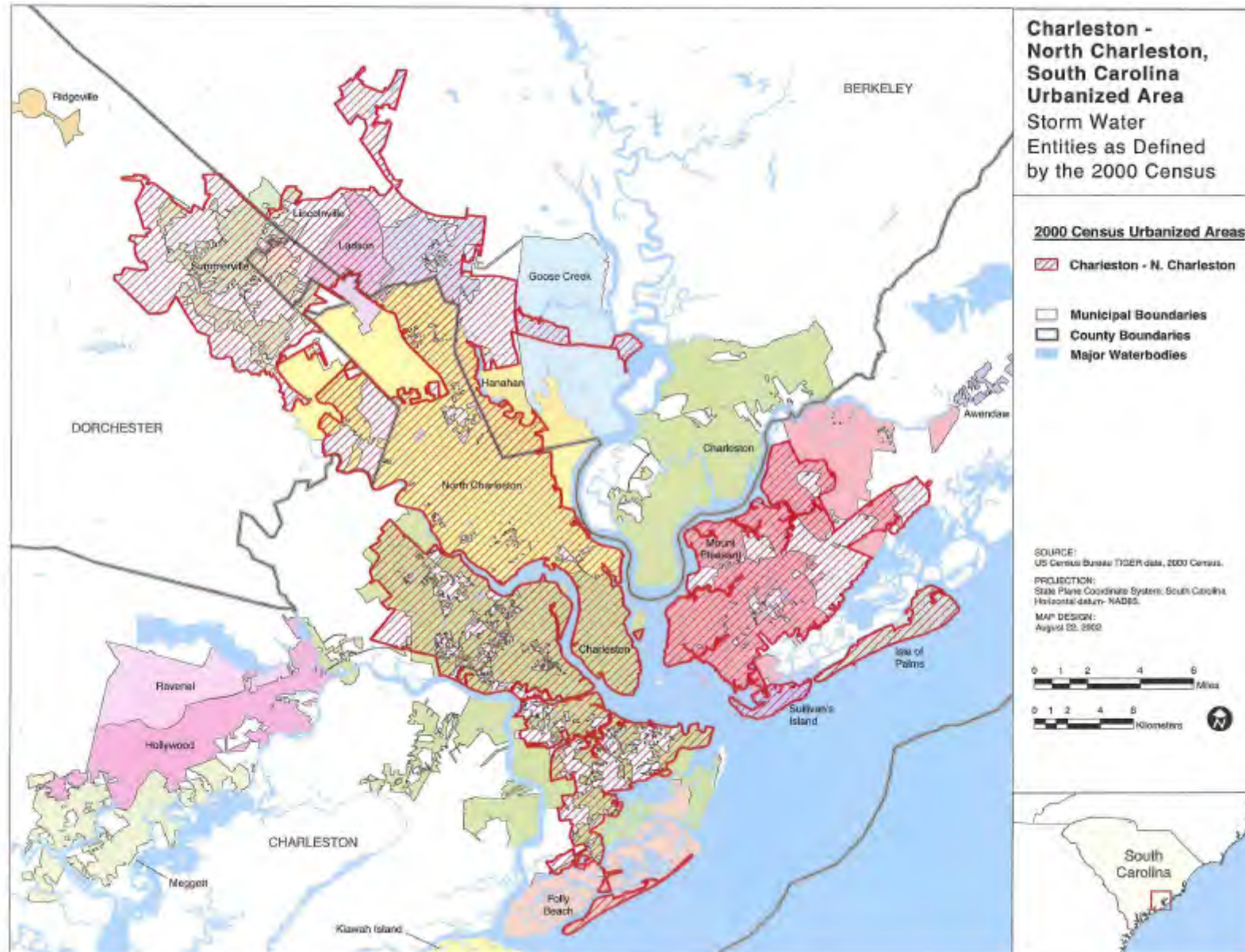
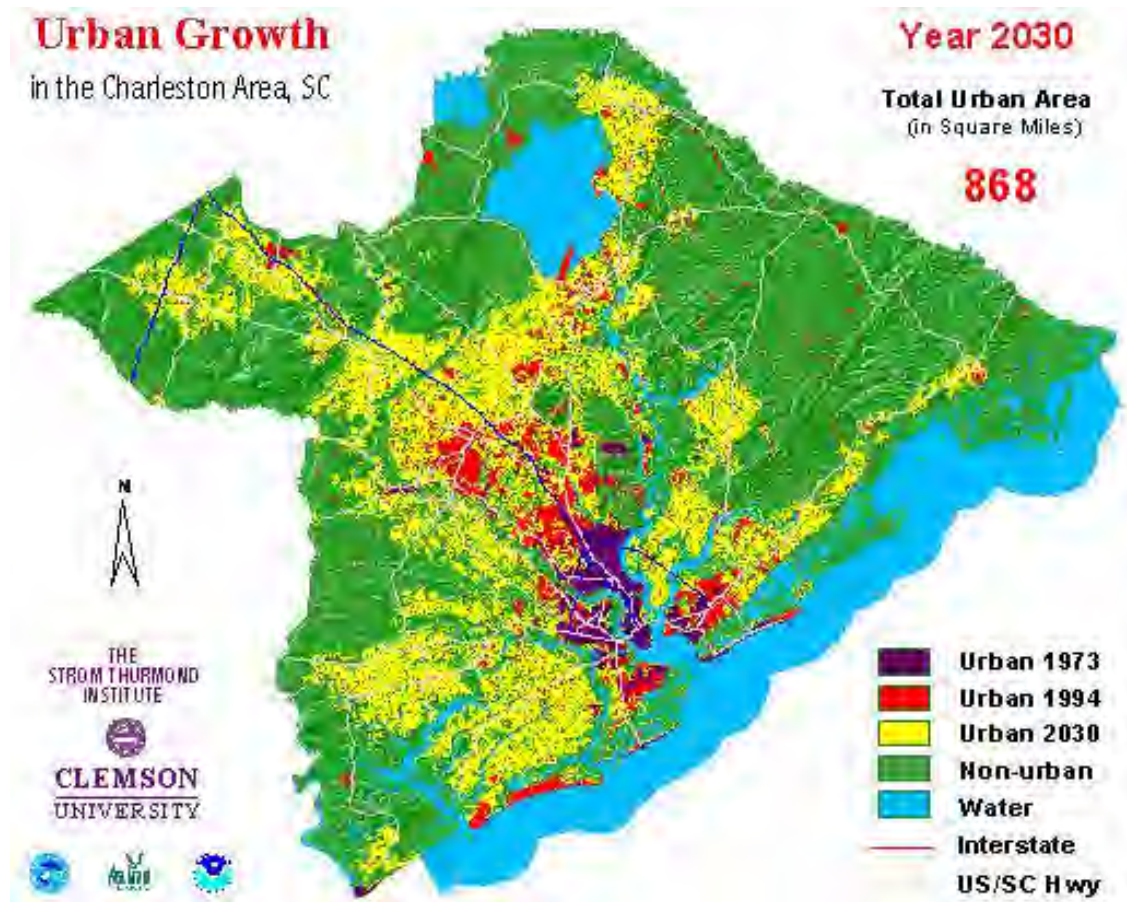


Figure 2. Charleston-North Charleston, SC urbanized area (2000)



[Using Geographic Information Systems \(GIS\) as a tool for characterizing the Charleston North Charleston urbanized area to guide stormwater education and outreach programming.](#) The report provides a robust survey of the region, including more than 150 maps at the tri-county and watershed (Hydrologic Unit Code [HUC] 12) scale, and is referenced in the outreach plan. The report can be accessed at the ACSEC website in the archives page.

Figure 3. Charleston tri-county urbanized area projections





1.2.2. Community Partners

As of January 2012, the following counties and municipalities are members of the ACSEC (asterisk indicates community partnership through Intergovernmental Agreement [IGA] with Charleston County):

- Berkeley County
- Charleston County
- Dorchester County
- City of Charleston
- City of Folly Beach*
- City of Isle of Palms*
- Town of Lincolnville*
- City of North Charleston
- Town of Sullivan's Island*
- Town of Summerville

Figure 4. ACSEC Community Partner-County and Municipal Seals



1.2.3. Partnering Organizations

As of January 2012, over 30 organizations and affiliated programs are partners in the ACSEC. Their biographies, including mission statements, overviews, programs and primary audiences are listed in Appendix A.

- Clemson University Public Service Activities (PSA)
 - Carolina Clear Program
 - Cooperative Extension Service
 - Restoration Institute
 - Center for Watershed Excellence
- South Carolina Sea Grant Consortium
- South Carolina Department of Natural Resources



- ACE Basin National Estuarine Research Reserve Coastal Training Program
- SC Oyster Restoration and Enhancement Program (SCORE)
- Charleston Soil and Water Conservation District
- College of Charleston
 - Master's of Environmental Studies Program
- Community Pride, Inc.
- Adopt-a-Highway (BCD region)
- Lowcountry Earth Force
- Michaux Conservancy
- South Carolina Maritime Foundation
 - Spirit of South Carolina
- Charleston County
 - Recycling Program
 - Project Impact
- Keep Dorchester County Beautiful
- Berkeley County Water and Sanitation
- South Carolina Marine Association
- The Sustainability Institute
- Charleston Waterkeeper
- U.S. Green Building Council-South Carolina Chapter
- Charleston Water System
- Keep Charleston Beautiful
- South Carolina Native Plant Society-Lowcountry Chapter
- Surfrider Foundation-Charleston Chapter
- South Carolina Aquarium
- USDA-Natural Resources Conservation Service

Figure 5. ACSEC Education Partners





1.2.4. Mission and Overall Goals

The ACSEC mission:

To 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.

The overall goals of the ACSEC include:

- *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 the 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 goals and objectives*
- *Create an interactive reporting process to facilitate information exchange and dissemination among member entities*

1.3. Organization of the Outreach Plan

1.3.1. Public Awareness and Priority Issues

The ACSEC Strategic Education Plan defines two primary elements in the public education campaign:

- 1) **Increased public awareness of core messages and concepts;**
- 2) **Targeted outreach efforts aimed at particular water quality issues and specific behaviors of greatest relevance to the region.**



Both public awareness and specific priority issues are considered complementary and important elements in the long-term goal of fostering behavior change. The public awareness campaign is designed to provide a platform for illustrating and communicating the **connections** between the land-based activities and health of local waterways, as well as public health and the economic vitality of the region. The core messages developed for the program will be a foundation for the public awareness campaign. The connections will be illustrated primarily by using the recently developed *Thank You!* campaign (see section 2.3). The public awareness component is considered essential to provide a foundation for public knowledge of the issues. [The knowledge of the connections between stormwater runoff pollution, individual activities, and water resource health will provide the context for exhibiting the significance of actions that are commonly perceived as meaningless.] This context is an important element in helping foster behavior change, as it helps provide the awareness of *why* the stewardship principles are being recommended. Public awareness that their actions do have impact, and that others are also doing stewardship behaviors (cultural conformity) is also considered important in the overall awareness effort.

Concurrent and integrated with the public awareness campaign, there will be targeted efforts at specific issues and behaviors determined to be a high priority by the ACSEC representatives. The specific issues to be addressed in the next phase of the program incorporate the analysis of existing physical and social data, as well as professional experience. Specific issues of focus are prioritized by target audience and geography and include three primary issues for residential and commercial audiences. These issues are identified, with prioritization methods and targeted education strategies, in succeeding sections of the document.

1.3.2. Logic Model Approach

A Logic Model is a conceptual framework describing the logical linkage among program resources (inputs), activities, outputs, and short-term, mid-term, and long-term outcomes. The logic model illustrates a sequence of cause and effect relationships that guides program development, implementation, and evaluation. Furthermore, the established logic model can be utilized to measure and identify program performance and effectiveness. A preliminary logic model has been developed for the ACSEC (Figure 6). Logic models will also be developed over time for ACSEC specific program elements and initiatives to guide implementation and evaluation.

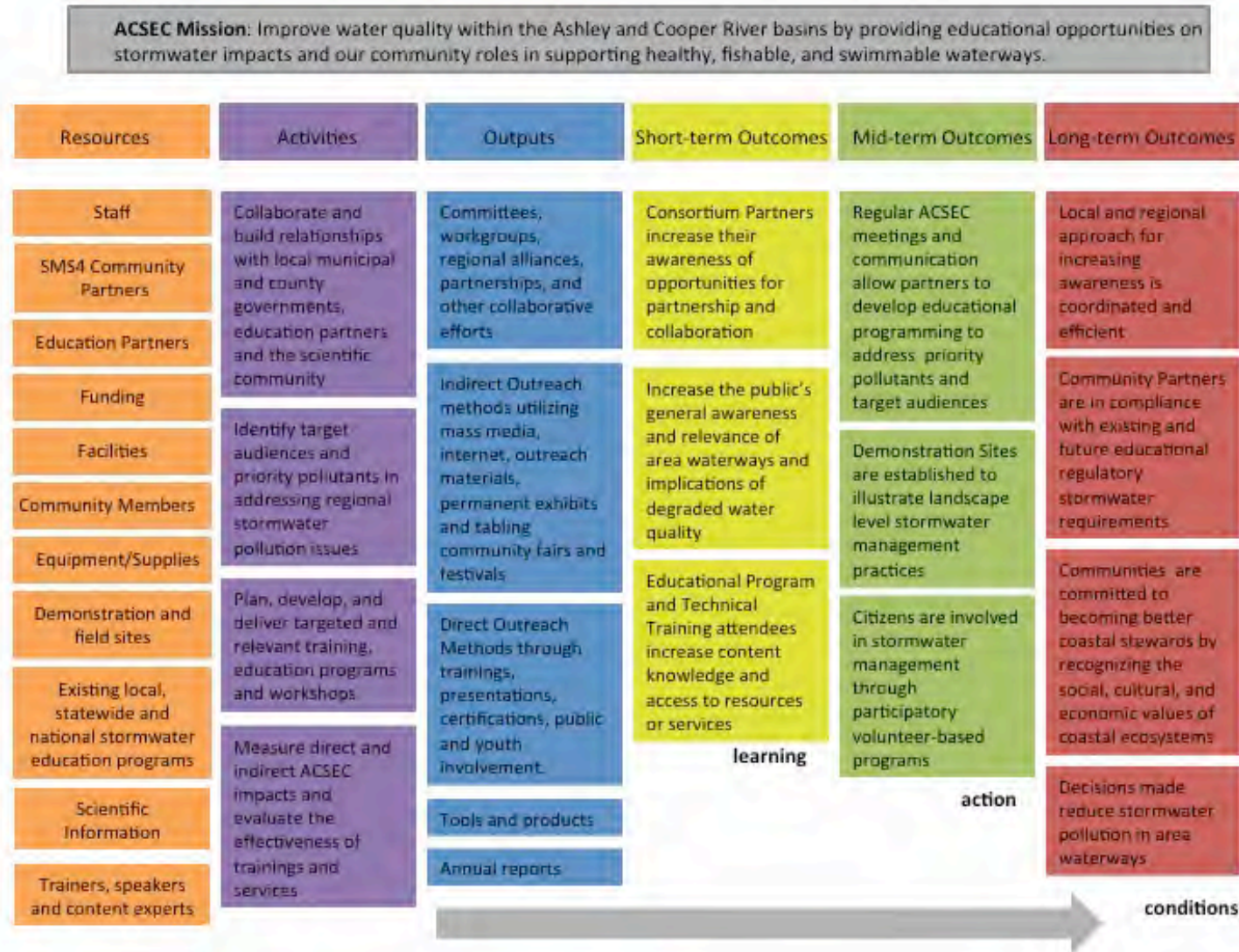


Figure 6. ACSEC logic model



2. Public Awareness Campaign

2.1. Public Survey Data

As stated in Section 1, the ACSEC strategic education plan contains two primary, inter-related elements, public awareness and targeting specific issues. Increasing public awareness, especially considering this relatively early stage in an overall long-term effort, is an essential element designed to foster better understanding of the connections between individual behaviors, the built environment, and the health of waterways. Stormwater runoff is the link between behavior and landscape management with water resource health. Likewise, public understanding and perceptions of these connections and the core messages play an important role in fostering behavior change (McKenzie-Mohr, 2010). Social research has also shown that individual behavior is largely driven by emotions in concert with, although to a lesser degree, rational analysis (Heath and Heath, 2010). Public awareness that evokes emotional responses and clarifies issues is likewise considered important in an outreach campaign that has a goal of fostering positive stewardship behaviors.

This section of the plan defines the core messages of the outreach program, associated public perception and behavior baseline data from public surveys, existing programs and awareness efforts, and outreach strategies designed to improve public knowledge. Increasing awareness of the core messages will help provide context for the recognition of individual behavior impacts on river system health and likewise the connection between the cultural, ecological, and economic health of the region. The goal of establishing this broad context includes evoking both information and emotional responses to help motivate stewardship practices and foster positive behavior change. Reiterating the core messages in specific efforts and infusing them within targeted outreach activities will further enhance overall regional stormwater education efforts.

2.1.1. Carolina Clear-ACSEC 2009 Tri-County Survey

Clemson Carolina Clear initiated a public survey that was conducted in the summer of 2009 in partnership with Clemson University's Department of Sociology and Anthropology and the School of Computing. Using the developed survey instrument, 399 residents of Charleston, Berkeley and Dorchester Counties participated in a telephone survey that sought to obtain information about residents' attitudes, knowledge, behaviors and intentions as they relate to the environment and water resources. These results are serving as guidance for outreach planning, as well as a baseline data for measuring the success of ongoing environmental and stormwater education efforts. All results from the 2009 survey reported in this document are weighted values based on correction factors to adjust respondents' demographics with demographics from the region. The survey report is available online: [Environmental](#)



Attitudes, Knowledge, and Behaviors of Residents of Charleston, Berkeley, and Dorchester Counties, SC (Mobley et al., 2009).

2.1.1.1. Key Findings

- **Residents of the tri-county area are concerned about water quality in the region and place a high value on the water bodies in their area.** Nearly 32% of respondents are “very concerned” and 42% are “somewhat concerned,” about pollution and the environmental quality of local streams and waterways.
- **Residents have a basic level of understanding about the various causes of poor water quality.** When thinking about the impact of humans on the environment, 46.8% of indicated that what people do on the land affects the quality of their local streams and waterways “a great deal” and 21.7% replied “somewhat.” However, 21.3% replied “not too much,” 3.2% “not at all” and 7% indicated they “do not know.”

Respondents were also asked to rate the extent to which nine different activities impacted streams and lakes in the area. Respondents were most likely to say that the following sources of pollution had either a “great impact” or “some impact” on water quality:

- Industrial sites (84.5%)
- Fuel and oil leaks from trucks, buses, or automobiles (86.5%)
- Fertilizers and lawn chemicals that people use on their lawn and garden (78.2%)

However, of the options listed, respondents were also most likely to indicate the following sources of pollution had either “very little” or “no impact” on water quality:

- Waste from birds (59.2%)
- Pet Waste (46.3%)
- Runoff from people washing their cars (43.8%)

- **For the most part, Charleston residents are active in water and environmental conservation efforts.** Slightly more than 72% of respondents indicated that, in the past two years, they had made an effort to reduce water usage out of concern for water quantity (i.e., drought) issues. However, a smaller proportion (40.2%) revealed that, in the past two years, they had reduced water usage out of concern for water quality. In general, Charleston residents are somewhat active in citizen-based environmental efforts: slightly more than 30% of respondents indicated that, in the past two years, they have participated in a lake or river cleanup in the past two years while slightly more than 18% indicated they have joined or volunteered for a conservation organization in the past two



years.

- **A high level of willingness to get involved in efforts to improve water quality generally matches the high level of concern about water quality.** Slightly more than 82% of respondents indicated they would become involved if they were directly impacted by water quality. Nearly 48% of respondents said they would “very likely” become involved in water quality improvement efforts if they knew the local government could save money. Nearly 45% of respondents indicated it was “very likely” they would become involved if the local media ran stories on positive actions taken by residents to improve water quality. Respondents were least likely to indicate they would “very likely” become involved for two items: if the local media ran stories on local water pollution problems (36.7% indicating “very likely” for this item) and if they had more information about water quality issues in their area (30.5% indicating “very likely”).
- **Respondents use a variety of communication channels for receiving local and regional information and news.** Respondents were asked to choose the three primary ways that they receive local and regional information and news. Slightly more than 62% of respondents indicated that they received their news through television evening news broadcasts and slightly more than 60% indicated the television morning news was a primary source of information. Local newspapers were the third most important source of information for respondents: 44.8% of respondents indicated this as one of their three primary sources of news. Billboards and posters and events/workshops were the least frequently mentioned source of news and information: 2.4% and .8% indicated this as one of their primary sources of news, respectively. In a separate question, slightly more than 56% of respondents indicated they used the Internet to get their local and regional news. Figures 7 and 8 graphically display these results.
- **Charleston residents are somewhat active in outdoor recreational behaviors, but there is a mixed picture in regard to water-based recreational activities.** Visiting the beach and hiking and walking were the two most popular activities, with 35.3% and 20.4% of respondents indicating they participated in these activities often, respectively. However, nearly 84.4% of respondents indicated they have “never” gone hunting or trapping, 83.6% indicated they had “never” kayaked or canoed, 64.0% indicated they had never gone swimming in rivers or lakes, and 63.9% indicating they “never” had gone motor boating. Just over half (51.1%) of respondents indicated they had “never” gone fishing.



Figure 7. Responses from 2009 survey regarding primary communication channels

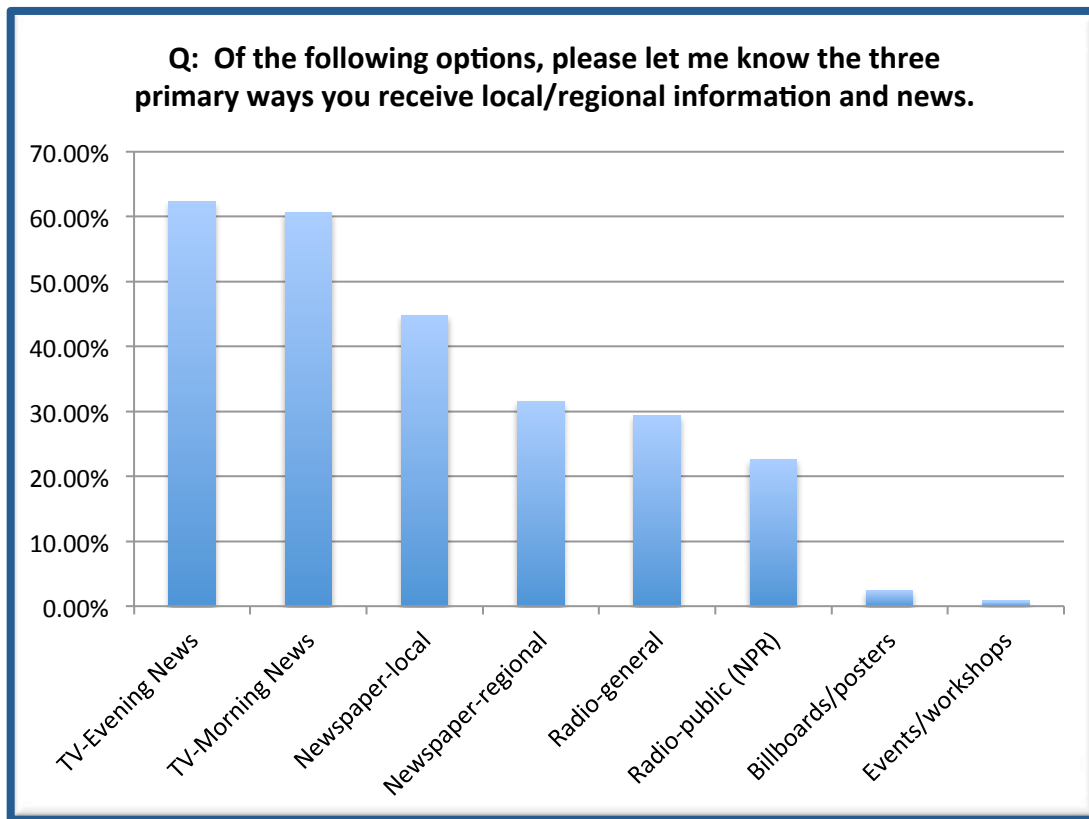
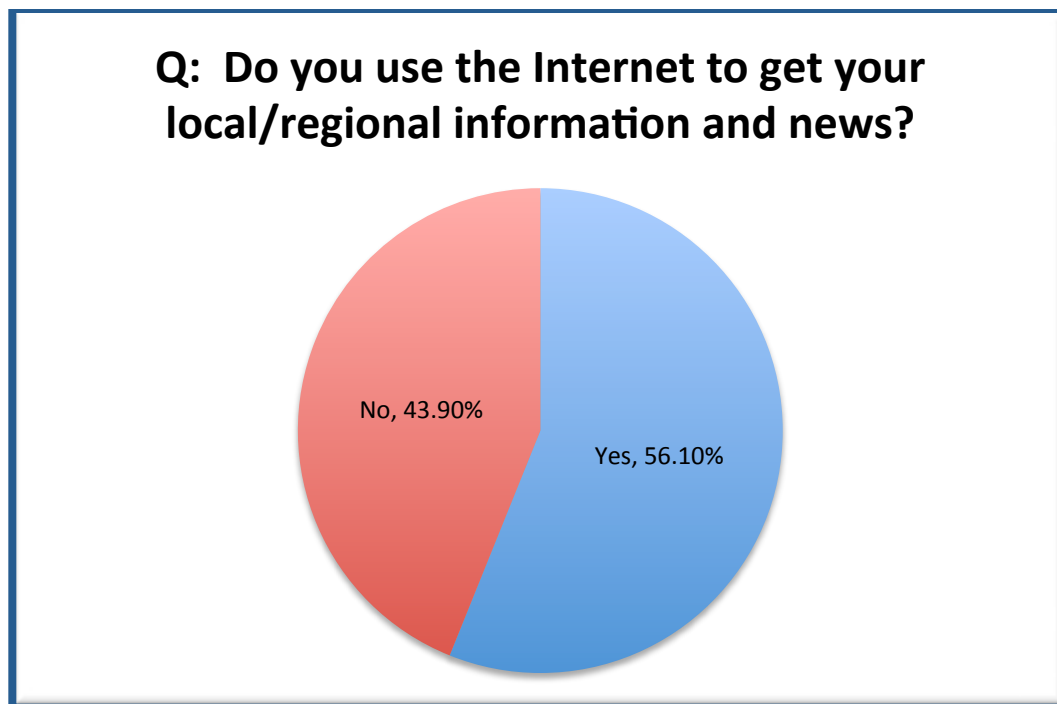


Figure 8. Question from 2009 survey regarding use of internet for local/regional news





2.1.2. Clemson Extension-ACSEC 2008 Event Survey

In 2008, in advance of the Carolina Clear-ACSEC public telephone survey, a field-based survey was conducted at a variety of local events. The survey was designed to provide information on home landscaping practices and water resource knowledge. The written survey was completed by 296 people and compliments the 2009 Carolina Clear-ACSEC survey with respect to particular topics. Summary results of the survey were listed in the appendix of the ACSEC's [first annual report](#) (2008-09), which can be accessed online at the ACSEC website.

2.1.3. Other Relevant Surveys

Several other surveys are utilized in the ACSEC strategic education plan to provide reference data with state and national trends or specific target audience information. The surveys include:

- *Public Perceptions and Concern about Runoff Pollution: Summary Finding for the SC Department of Health and Environmental Control* (SC DHEC, 2002)
 - This document provides statewide survey data with similar information as the 2009 Carolina Clear-ACSEC survey.
- *A Survey of Chesapeake Bay Watershed Residents: Knowledge, Attitudes and Behaviors Towards Chesapeake Bay Watershed Water Quality Issues* (McClafferty, 2002)
 - This document provides public survey information from the Chesapeake Bay Watershed for regional comparisons.
- *The Environment: Public Attitudes and Individual Behavior-A Twenty Year Evolution.* (GfK, SC Johnson, 2011); and *The National Report Card on Environmental Knowledge, Attitudes, and Behaviors.* (National Environmental Education and Training Foundation [NEEFT], 1998)
 - These documents provide public survey information for national trend comparisons.
- *Training Needs Assessment of Professional Decision Makers in the Coastal Counties of South Carolina. North Inlet-Winyah Bay and ACE Basin National Estuarine Research Reserve Coastal Training Programs.* (Pollack and Szivak, 2007)
 - This document provides a target audience survey and needs assessment for specific technical, commercial, and elected officials.



2.2. Core Messages

Core messages represent important themes that are utilized to promote public awareness throughout the outreach campaign. There are a few efforts and programs that focus on core messages (i.e. storm drain marking, youth programs, etc.), but overall they are largely a compliment to other, more targeted audiences and issues. Likewise, the core messages are primarily integrated within existing and new programs. Baseline data on public perceptions of core issues also helps shape the messages and delivery of other targeted efforts. The concepts are considered valuable because they can support the public perceptions on topics such as the significance of individual impact and personal responsibility. For example, if a large portion of the population thinks pollution is primarily derived from industry (as they often do, and indications are they do in this region as well), they may take little responsibility for their actions (positive or negative) because it is perceived as having little consequence. Building strategies that can build public confidence, recognition, and positively reinforce that each individual action matters can help overcome this public perception challenge.

2.2.1. Watershed Awareness

All land is associated with a drainage basin and the water flowing off the landscape drains to a body of water.

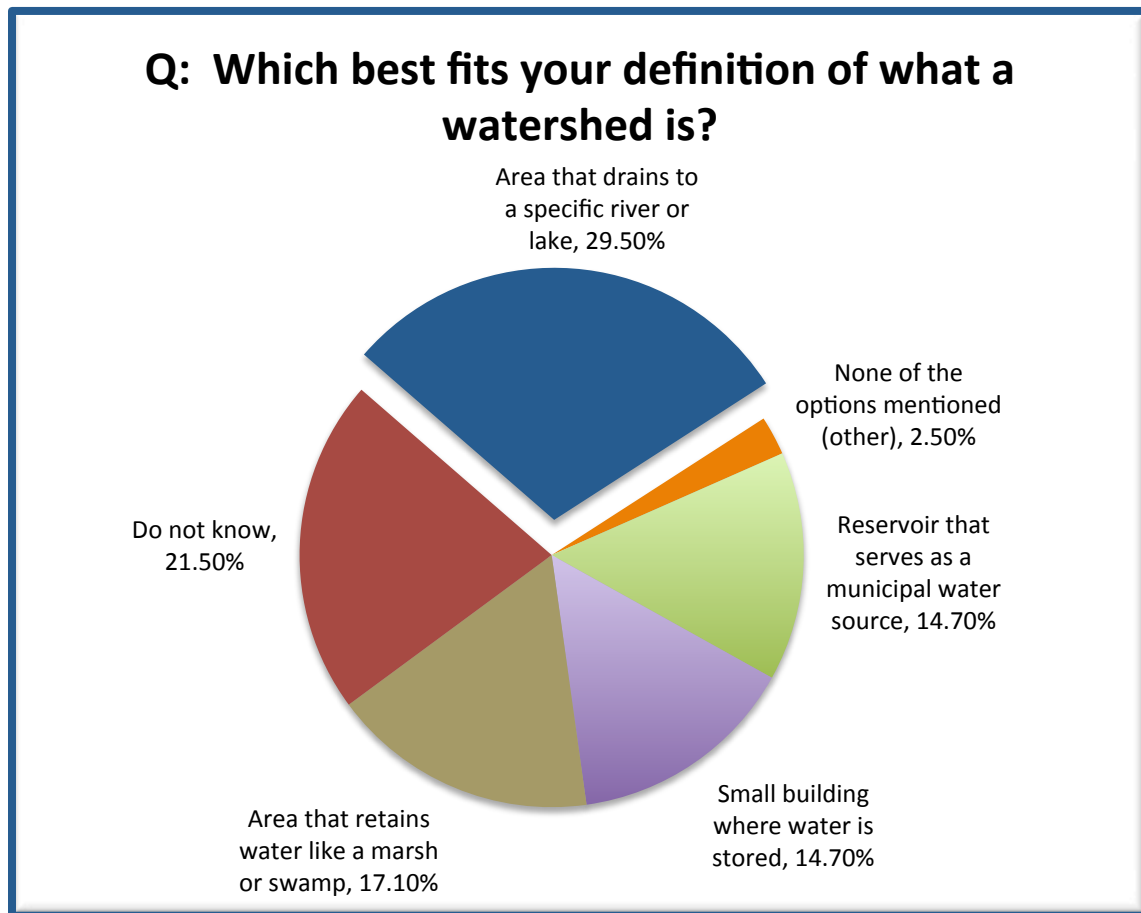
Watershed awareness is a foundation principle of any stormwater education strategy. Watersheds form the framework to understand connections between the landscape and receiving waters. This framework also provides the context to understand the role individual actions play in the health of local waterways. Recent public surveys form the baseline for current public perceptions and attitudes as they relate to general watershed awareness.

2.2.1.1. *Public Survey Information*

The Carolina Clear-ACSEC public survey conducted in 2009 asked for respondents to pick the correct definition of four options, or choose that it was none of them or that they did not know. Figure 9 represents the recorded responses.



Figure 9. Watershed question from 2009 Survey



Sub-group analysis: Cross tabulation results (Chi-square and Cramer's V) for the watershed definition question revealed a strong association between correctly defining a watershed and gender, race, and age. The relationship between gender and knowledge was very strong (Cramer's V=.426). Males (41.9%) were more likely than females (18.4%) to choose the correct definition. More than one-third of females (34.7%) were likely to indicate they did not know the definition as compared to males (6.5%). Regarding race, whites were more likely than minorities to choose the correct definition (41.3% v. 18.8%), or indicate they did not know the definition. Age showed moderately strong relationship, with individuals aged 65 and older more likely than individuals from other age groups to select the correct definition (42.4% of those 65 and older), whereas only 23.2% of those aged 18-34 responding correctly. The 18-34 age group was least likely to indicate, "do not know" for this question.



The 2008 Clemson Extension-ACSEC event survey included two questions about watershed awareness:

Figure 10. Question from 2008 Survey: Have you ever heard the term “watershed”?

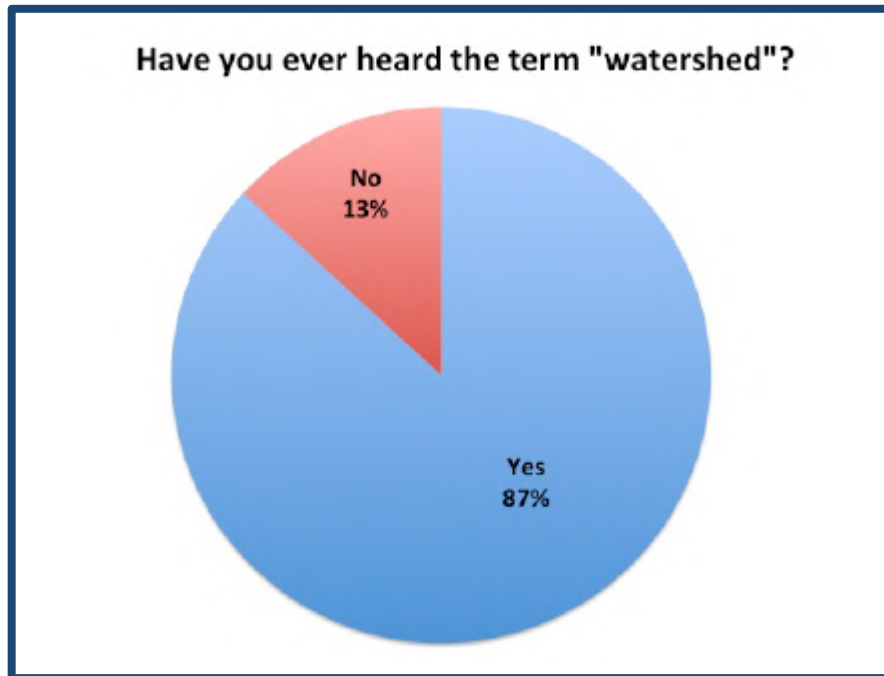
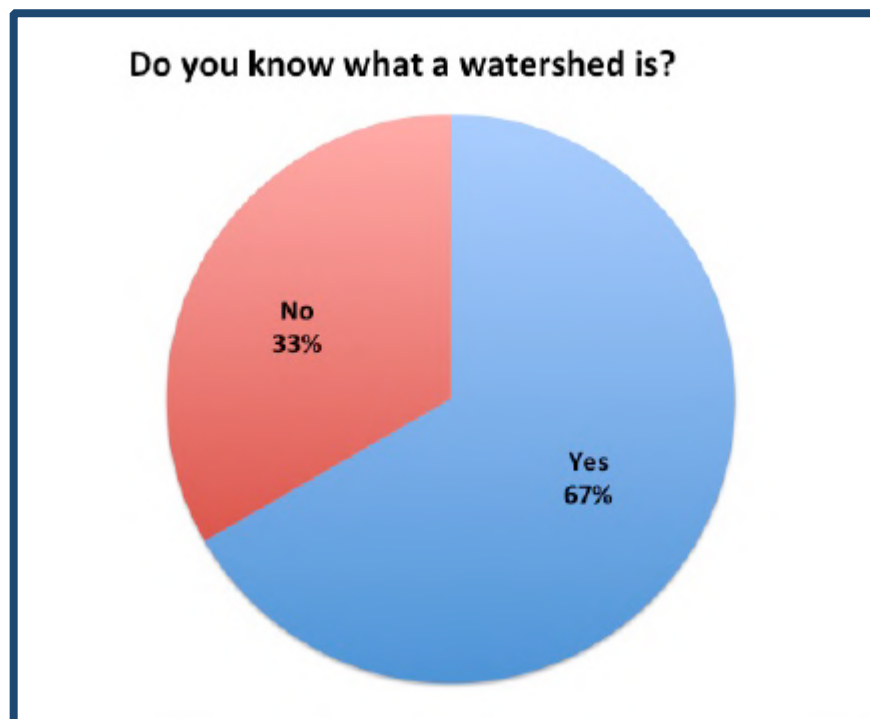


Figure 11. Question from 2008 Survey: Do you know what a watershed is?





2.2.1.2. Analysis

Tri-county surveys. In the 2009 telephone survey, approximately 30% (29.5%) selected the correct answer for the definition of a watershed from multiple choices. Another 21.5% did not know. Approximately 51% responded incorrectly or responded that none of the options fit the definition (2.5%) as to the definition of watershed. In the 2008 event survey, 86.8% had heard the term watershed and 66.7% responded that they knew what a watershed was, although their particular definition was not documented. When reviewed together, the surveys indicate that there is a relatively large percentage of the population in the Tri-county region that does not understand the concept, although most have heard the term, and there may likely be a large percentage that have a misconception about what a watershed is.

State, Regional and National Comparisons. As noted in the 2009 survey report, this question has been asked in a number of environmental surveys and offers an opportunity to compare watershed awareness of tri-county residents with the state and residents from other regions. In a statewide survey conducted in 2002 by SC Department of Health and Environmental Control (SC DHEC), the following question was asked: *“When it rains in your neighborhood, do you know which body of water the runoff from the rainwater flows into?”* The response was evenly split at 47% “YES” and 47% “NO”, with 6% responding “do not know.” This indicates that almost half of the state population is aware of the watershed/drainage basin they are located in, or nearest river/tributary/lake, although the level of their watershed knowledge is undetermined.

In the Chesapeake Bay watershed region (multi-state), a survey indicated that nearly half (48%) of respondents chose the correct definition of a watershed (McClafferty, 2002). Public knowledge of a watershed in the tri-county region was above the 41% correct response rate from a national survey conducted by the National Environmental Education and Training Foundation (NEETF) in 1997. The national rate, however, may have likely changed given the amount time since the survey was conducted. These public survey findings correspond to an EPA focus group discussion on watershed knowledge and awareness:

“During a 2001 focus group study, EPA found that although some people have heard the term watershed, few people understand it well enough to be able to define it and, more importantly, few people see the importance of understanding what a watershed is in addressing the problem of nonpoint source pollution. Linking the problem to the causes is often the most important stage of education.” (EPA, Getting in Step, 2003)

Public Survey Analysis Summary. The tri-county’s relatively limited understanding of watershed knowledge (~30%), especially in relation to state, regional, and national levels (40-50%), provides an impetus to target this core message for



outreach efforts. The 2009 Carolina Clear-ACSEC survey report noted: *“...the results of the current survey indicate that the watershed concept remains abstract and confusing for many tri-county residents.”* As noted in the review of the EPA study, another important issue may be translating not only the correct definition, but the reason watershed knowledge is important in terms of linking individual behaviors with overall water resource health. There is also a likelihood that a significant portion of the population has an existing incorrect or incomplete concept of a watershed, which will also need to be addressed in developing an outreach campaign that increases watershed awareness. Based on the analysis, targeted subgroups include: women, minorities, and young adults.

2.2.1.3. Outreach Strategy

Developing an outreach strategy to increase both public comprehension and significance of watersheds involves primarily infusing the messages in the most appropriate existing programs and communication channels. Watersheds are a very visual subject, as are most water-related outreach efforts, so utilizing visually-dominant outreach platforms is considered the most valuable. These include television, print, and billboard mass media, t-shirts and other promotional materials as well as direct contact methods, such as presentations, workshops, and involvement activities. These efforts will be phased in according to highest priority determined by consortium representatives. Existing ACSEC programs where watershed concepts are communicated include:

- General Public
 - Existing direct contact outreach programs, such as those with SC Aquarium, Clemson Extension, SC DNR, and other partner programs.
 - “Watershed Steward” practices and map on the storm drain marking doorhanger (see Figures 25-26).
 - ACSEC exhibit and public events, such as fairs and festivals. Utilize Enviroscape™ models. Develop large map and have participants find their “watershed address” and mark on the map to determine their homes watershed.
 - Water quality monitoring programs.
- Residential
 - Home landscaping programs (Carolina Yards and Neighborhoods, Ocean Friendly gardening, Master Gardener outreach).
 - Rainwater harvesting, rain gardening, and related workshops.
- Youth (with whom there is a degree of vertical migration, as children educate parents/friends/relatives about an issue).



- 4-H₂O summer camp “watershed ambassador” program
- In-school and after school programs
- Seeds to Shoreline wetland restoration program
- Watershed-themed online lessons

Potential new outreach strategies include:

- Partner with local television news meteorologists to include watershed messages during weather reports, especially focused before and during rain events.
- Partner with local counties and SC Department of Transportation to determine possible development of watershed signage program.
- Develop dynamic video for use in:
 - Public access county/municipal cable channel
 - ACSEC and partner websites
 - *Thank You!* campaign
- Include a watershed-themed billboard in mass media campaign.
- Include message in signs located at demonstration sites, ponds, boat ramps, parks and other geographically-relevant sites.
- Blue Business recognition program for commercial audiences.

Potential new subgroup outreach target strategies:

- Women:
 - Target audience print advertising (magazines, newspapers, newsletters, etc.).
- Young adults:
 - Creating free download “watershed” application for smartphone and tablet, which would identify the watershed in their current location and nearest water body.
 - “Street” advertising using dynamic visuals on posters and other print exposed at bus stops, bus sides, and other opportunities.
- Minorities:
 - Target audience print advertising.
 - Exhibit at relevant public events.



2.2.2. Untreated Stormwater Runoff

Storm sewers are separate from sanitary sewers and convey stormwater *untreated* to nearby receiving waters.

Based on recent public surveys (detailed in the next section), a portion of the public has a misconception or does not know that storm drains and ditches lead to South Carolina's waterways and not to treatment plants. This concept is associated with the other core concepts, but focuses specifically on the physical connection between stormwater runoff pollution and receiving waters. Likewise, this concept forms one of the core concepts that provide the context to link behavior and waterways, which will help support watershed stewardship principles.

2.2.2.1. Public Survey Information

In the 2009 Carolina Clear-ACSEC survey, respondents were asked, *"Do you believe that stormwater is treated before reaching lakes, rivers, and streams?"* (n=399). Respondents were first given a definition of stormwater as "runoff from yards and roads during storm events or from irrigation; it drains to ditches and storm sewers along roadways." Approximately 77% of respondents indicated that "no, stormwater is not treated", while 18.7% indicated that "yes, it is treated" and 4.3% "do not know." The 2008 Clemson Extension-ACSEC survey reported similar results when asked a similar question: *"Do you think most storm water runoff is treated?"* (n=261). Approximately 72% responded "no" (stormwater was **not** treated), with 9.6% indicating that "yes" (it is treated), and 18.8% indicating they "do not know."

Sub-group analysis. In the 2009 Carolina Clear-ACSEC survey, analysis revealed subgroup differences for all socio-demographic groups except for race. An overwhelming majority (92.1%) of females felt the stormwater was not treated (as compared to slightly more than 2/3 (67.9%) of males) (Cramer's V = .306; Table E-6). Individuals with a mid-level of education (some college or a two-year degree) were most likely to indicate that the stormwater is not treated (Cramer's V = .130; Table G-6). Individuals with a high school education or less were most likely to indicate it was treated (nearly one-fourth of these respondents as compared to 14.0% of those with a mid-level of education and 15.2% of those with a bachelor's degree or more). Individuals 18-34 years old were most likely and individuals age 65 and older were least likely to indicate that the stormwater was treated (24.7% of 18-24 years olds vs. 7.5% of individuals age 65 and older) (Cramer's V = .149; Table H-6). Regarding homeownership status, renters were more likely than homeowners to indicate that they believe that stormwater is treated (29.2% vs. 13.8%, respectively) (Cramer's V = .187; Table I-6). Target subgroups for this core message include: males, high school or less education level, young adults, and renters.



2.2.2.2. Analysis

Results from the surveys indicate that about 3 out of 4 people (72%) in the tri-county region correctly acknowledge that stormwater runoff is not treated. Those individuals that thought that stormwater was treated (18.7%) were more likely to be one or a combination of the following: male, high school or less education, renters, 18-24 years of age. These results compare favorably, in terms of stormwater treatment awareness by tri-county residents, with the 2002 DHEC statewide survey, where participants were asked “In most cities and towns in South Carolina, water that goes down storm drains is treated at water treatment plants before it is released into the nearest river...is this true, false, or are you not sure about this?” (n=513). Approximately 28% correctly answered “false” (that it was not treated), 17.6% answered “true” (it is treated) and over half of all respondents (54.2%) answered “do not know.” This concept is not easily compared nationally, because many areas of the country have combined sewer systems. The results indicate that residents of the tri-county region are more aware that stormwater is not treated as compared to the rest of the state. These results were comparable with stormwater treatment awareness questions in Carolina Clear surveys in the upper coast, midlands, and Pee Dee regions. Based on these results, outreach designed to improve public awareness of this core message would be a lower-priority as compared to other, less well known or understood core messages in the tri-county. Where possible, targeting efforts at specific subgroups may help increase awareness of the core concept, such as apartment and condominium complexes.

2.2.2.3. Outreach Strategy

Although a larger percentage of the public, based on the surveys, acknowledges that stormwater runoff is not treated, approximately 25% had a misconception about stormwater. This can be a challenging perception to change, especially in urban areas with few open ditches and a correspondingly higher percentage of subterranean infrastructure. Surface ditches provide an easier opportunity to illustrate the visual connection of the drainage network with nearby receiving waters, whereas a higher percentage buried storm sewer systems are out of view in urban environments. It can lead to an ‘out of sight-out of mind’ mentality. This can be compounded because the public is also commonly aware of water treatment plants in the region, and perhaps assume the street drains also lead to the treatment plant. They often don’t make the distinction between the two sewer systems, and probably give it little to no thought. Giving some credibility to this hypothesis, a survey in the Chesapeake region noted that a higher percentage of rural residents, in comparison to urban, correctly defined the term watershed (McClafferty, 2002). It also can perhaps be partially attributed to greater experience in outdoor activities. The challenge results from attempting to change a pre-existing perception, which can be more difficult than translating information where the individual has not already formed a concept. However, the core message is another essential element in the awareness campaign because it reiterates



the connection between the landscape, individual behavior, and waterbody via stormwater runoff. Focusing on areas populated between densely urban and suburban environments with programs such as storm drain marking could prove fruitful in this effort. In addition to infusing the message in the efforts outlined in the watershed awareness outreach strategy, the storm drain marking program would be the primary program of focus to increase awareness of this core concept. See Section 3 for an overview of the storm drain marking program.

2.2.3. Stormwater Pollution and Individual Actions

Stormwater runoff is a serious threat to the health of South Carolina's waterways; many pollutants in stormwater result from individual actions at home, work, and play.

2.2.3.1. Public Survey Information

There are several questions from previous surveys that relate to this core message, and they represent a complex variety of perspectives and behaviors. Figure 12 represents responses to the 2009 survey question: "How much does what people do on the land affect the quality of their local streams and waterways." Approximately 69% responded "A great deal" or "somewhat." The next largest response was "not too much" by almost a quarter (21.3%) of the respondents, and 7% "did not know." This indicates that a majority, almost 70%, acknowledged that there was a connection between activities on the land and the health of waterways. In the 2008 survey, 95.8% of respondents answered "yes" (Y/N question) to a similar question.

Respondents demonstrated a high level of public recognition that what happens on the land affects bodies of water, though a variety of opinions about the sources of pollution were expressed. In a commonly asked series of questions about major sources of pollution in waterways, land activities were ranked in the 2009 survey according to level of impact (see Figure 13). Industrial sites ranked highest in the survey, in both impact (84.5%) and degree of impact (57% "great impact"). A commonly held belief is observed in this survey, which is that industrial sites are the most significant source of pollution in waterways. The second most significant source of water pollution was agriculture (65.7% combined; 37.9% "great" impact); which interestingly also had the largest percentage of respondents replying "no impact" at 24%. Sediment from construction and parking lot runoff both had similar response percentages for impacts; with a large percentage (~43% and 44% respectively) acknowledging that they have "some impact."



Figure 12. 2009 survey response to human impact on waterways

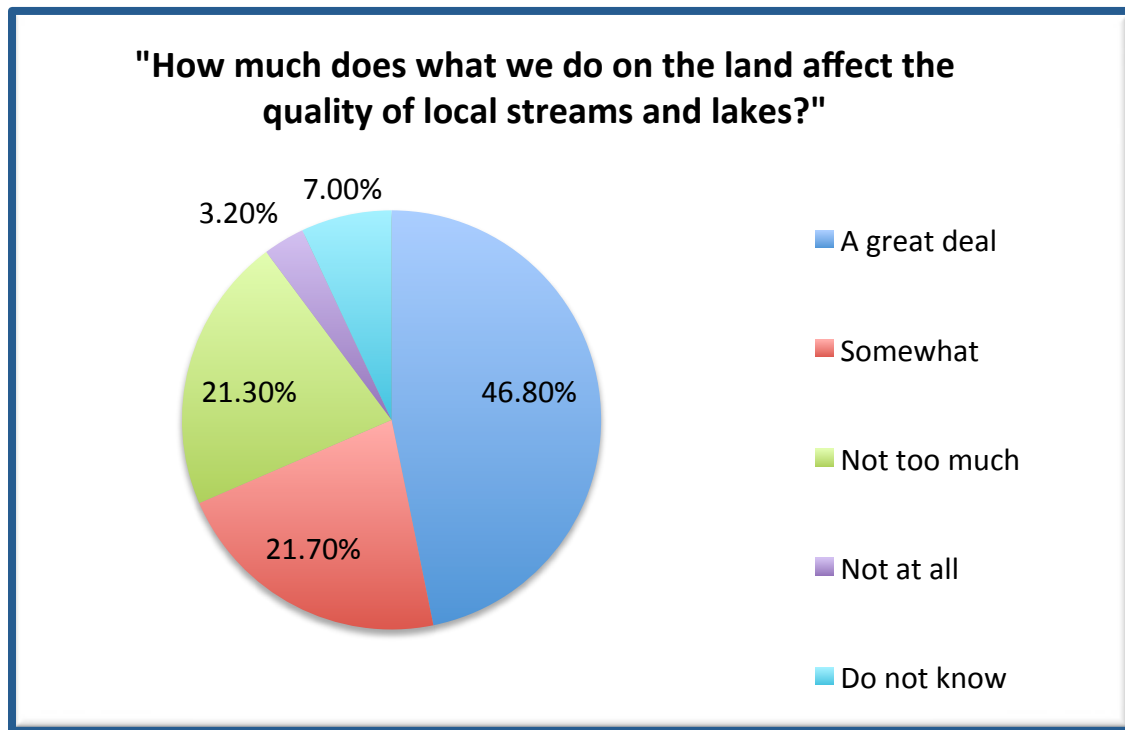
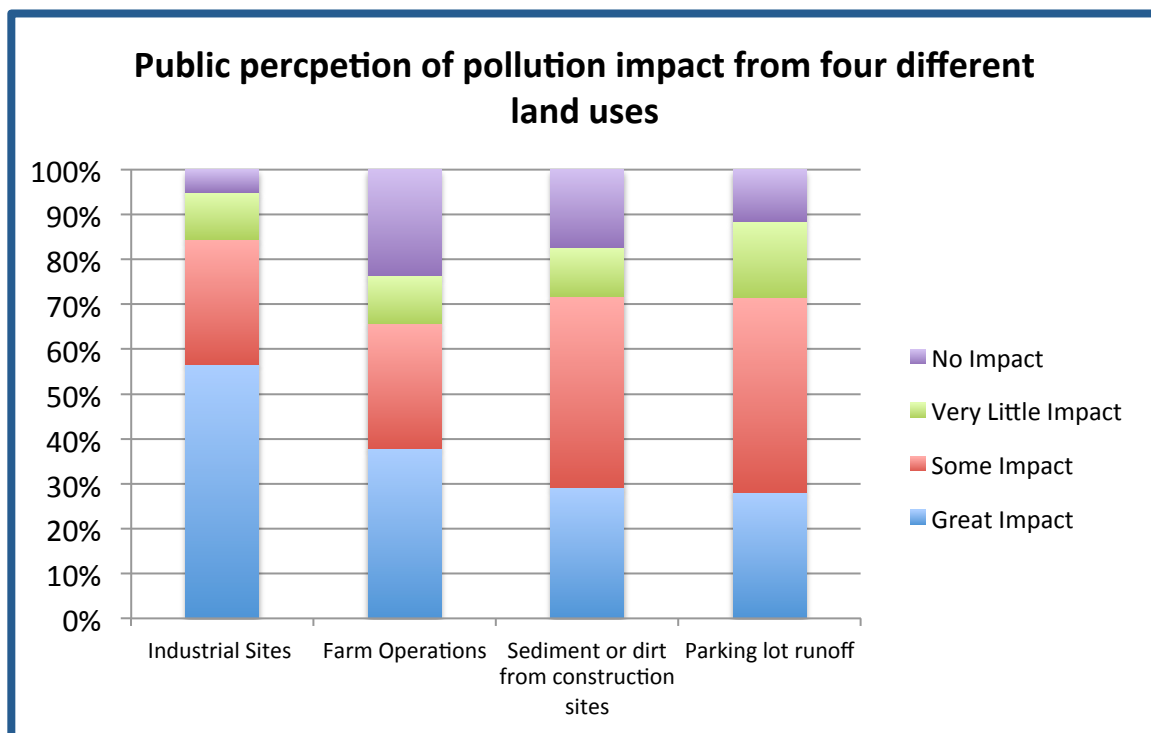


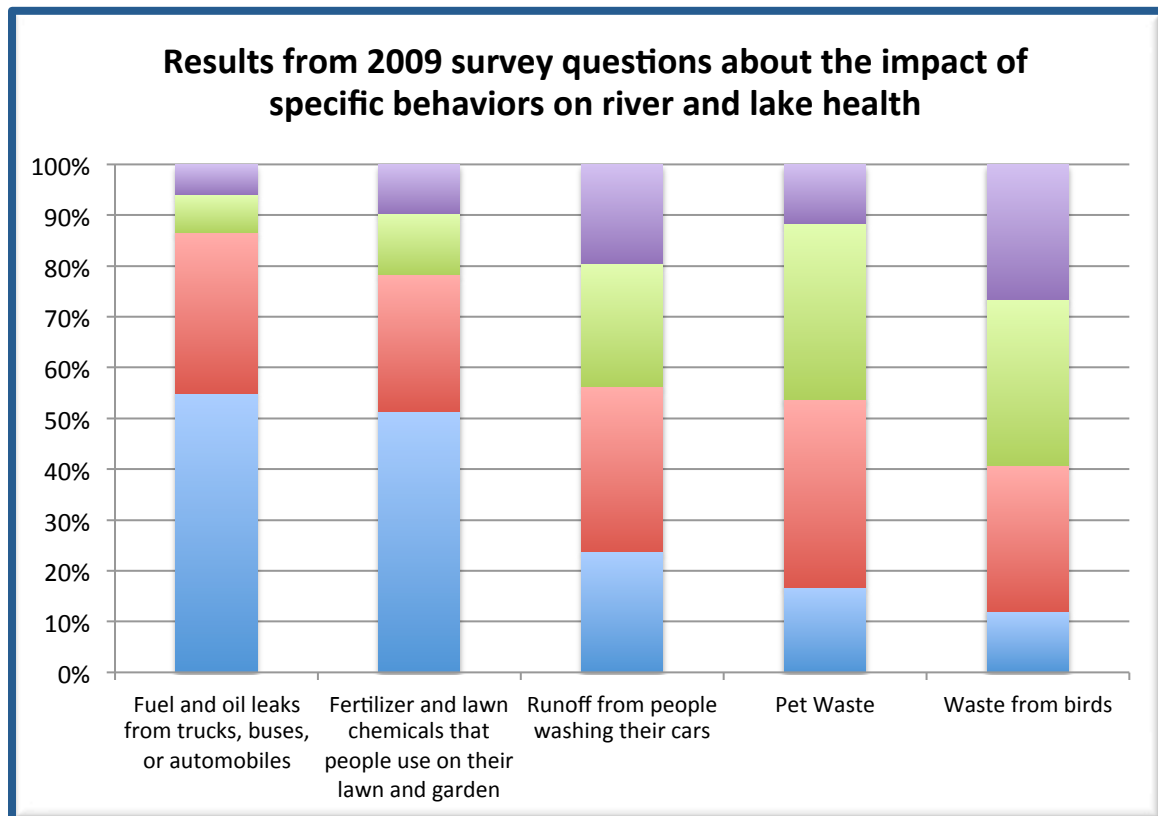
Figure 13. 2009 Survey of public perceptions regarding pollution from different land uses





In the 2008 survey, respondents were asked, “Do you think urban areas/cities cause more water pollution than industries?” Approximately 57% replied, “yes”, while 16% replied “no” and 27% “did not know.” Figure 14 illustrates 2009 survey results concerning about impacts from a selection of specific behaviors/issues

Figure 14. Results from 2009 survey questions about the impact of specific behaviors on river and lake health



When reviewing specific behavior survey data, the two primary sources identified as having a “great impact” were fuel/oil leaks (55%) and fertilizers and lawn chemicals (51%). Runoff from people washing their cars had an even distribution between all levels of potential impact. Pet waste had the highest percentage of “some impact” at 37%, but also had a combined “very little” and “no impact” response percentage of 46.3%. Interestingly, waste from birds was listed as having the least impact with combined “very little” and “no impact” response percent of almost 60%. Due to the number of responses, subgroup analysis was not included in this review, although it can be accessed at the source survey document.

2.2.3.2. Analysis



The surveys reflect the public perception that industry is primarily responsible for most pollutant issues, as well as agriculture (more relevant in rural geographies). This can lead to the idea that water pollution is a significant problem but someone else's responsibility. This perception is especially important to address in urban areas with both land uses integrated in the landscape/watershed. Repeated studies have indicated that non-point source runoff is the largest threat to the health of the Nation's waterways today. Public recognition and understanding of this core message is important because it is focused on individual responsibility, in the context of cumulative impacts at the community scale. To properly address this, it will be necessary to reiterate the significance of individual actions leading to community wide impact. One program to effectively do this is the *Thank You!* campaign.

The results of the regional surveys indicate that a large percentage of the public (~70%) believe that what people do on the land affects water quality. However, the causes of pollution related to human activity are highly variable. Survey respondents identified industrial sites as the most significant source of pollution in the 2009 survey, followed by agricultural land use, construction sites and parking lot runoff. Over half of the survey respondents in the 2008 survey indicated that urban areas cause more pollution than industrial sources. The 2002 DHEC statewide survey asked if "runoff from farms and cities causes more water pollution than industrial facilities." Almost half of respondents (46%) indicated they "did not know," while 23.5% said the statement was "true" and 30.8% "false." Regional and statewide trends indicate an inconsistent understanding of broad-scale land use impacts on water quality, with a tendency toward industry as a primary source of water pollution, however there was generally strong correlation that urban areas have some degree of impact on waterway health.

The National Pollutant Discharge Elimination System (NPDES) has been a successful model of addressing point source pollutants and setting limits based on receiving water capacity. Pollutants from industry received the highest percentage of perceived river health impact from the 2009 survey. The surveys indicate the public perception that industry is primarily responsible for most pollutant issues. This can lead to the idea that water pollution is a significant problem, but someone else's responsibility. This perception is especially important to address in urban areas with both land uses integrated in the landscape/watershed. Repeated studies have indicated that non-point source stormwater runoff is the largest treat to the health of the Nation's waterways today. Public recognition and understanding of this core message is important because it is focused on individual responsibility, in the context of cumulative impacts at the community scale. A challenge to communicating this core message is the need to reiterate the significance of what may be perceived as meaningless by indicating impacts and illustrating community unity through the *Thank You!* program.

With respect to individual behaviors, fuel/oil leaks and fertilizer and lawn chemical applications ranked the highest among sources identified. Pet waste and bird waste ranked as having the least impact among sources identified in the 2009 survey.



Communicating the concept that stormwater pollution has a negative impact on waterways that may seem visually healthy, especially in the larger, higher order watersheds, can be a challenge as many pollutants are unseen by the naked eye. Given that most humans are highly visual, and aesthetic plays heavily into human perceptions and therefore behaviors, conveying impact that can't always be seen can be difficult. It is common to have one or several litter sweep programs in a community, as this is the most visual pollutant and creates a negative aesthetic. Another particular challenge with this core message can be conveying the fact that seemingly "natural" elements can be considered pollutants when in excess, such as nutrients, bacteria, and sediment. Of course, toxic contaminants and hydrocarbons are easily recognized as pollutants, but again their limited visual impact can challenge the public's ability to accept the significance of the issue.

Awareness of water quality problems is often experienced after negative reactions from specific situations, such as shellfish bed closures (often isolated audience impacts) or beach closures (usually broader audience impacts). These issues are often economically and culturally significant as well. Awareness of pollution problems is also often visually (or sensory)-driven in cases such as fish kills or algae blooms. These impacts can be substantial, causing impairment and affecting the public perception of the waterway, but again the connection to stormwater is not always apparent. Research is also continually lagging behind the questions being asked to better define the specific sources of problems in a complex and dynamic system, which also can create hurdles with the lack of specificity in response to public inquiry. Focusing on visually-driven mediums, direct contacts, situational response (e.g. beach closures) and culturally-relevant messages are a focus to improve awareness of this core message.

2.2.3.3. Outreach Strategy

Presenting existing water quality data and behavioral "linkages" in a visually-dominant format (models, pictures, videos, billboards, etc.) that help evoke emotional responses is a significant part of helping communicate this important core message. Another important outreach strategy is to illustrate the "cause and effect" relationship between pollutants-potential sources-and impacts, such as bacteria-animal waste-and beach and shellfish closures. The chain reaction affects larger issues such as the economic vitality and cultural preservation of the region—issues that affect virtually everyone. Making these connections is essential in providing awareness and fostering positive behavior change for this and virtually all stormwater-related education efforts. The *Thank You!* campaign (see Section 2.3) will be one of the primary platforms for translating this core messages in visually-dominant mass media and other indirect contact outreach mechanisms. The core message will also be infused in other direct outreach methods (presentations, workshops, trainings) primarily using visual or field-based involvement activities (e.g. oyster restoration, water monitoring, etc.), including the list associated with the watershed awareness outreach strategy (Section 2.2.1.3).



2.2.4. Landscape Alterations-Impervious Surfaces

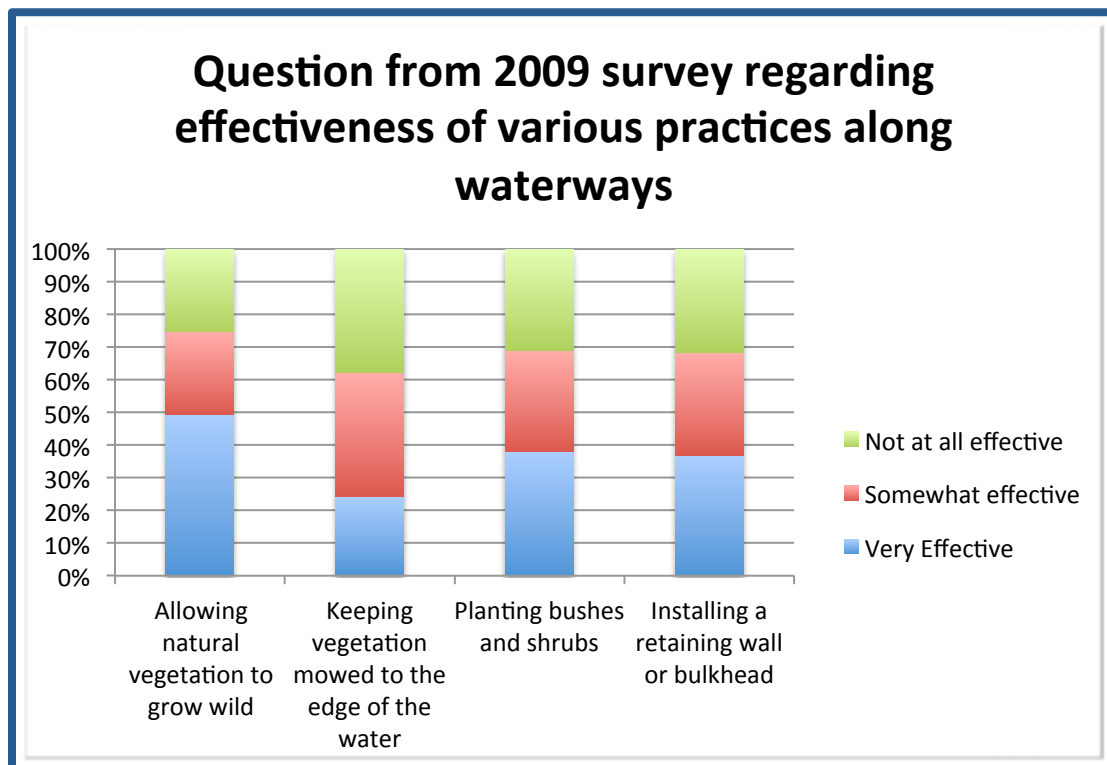
Landscape alterations such as increases in impervious surfaces and drain and ditch networks, alter hydrology and result in an increase in stormwater runoff volume

2.2.4.1. Public Survey Information

Although no regional survey question specifically addressed this core message, several related questions provide a degree of insight on public perspectives and knowledge of the concept. In the previous 2009 survey analysis, the respondents were asked what degree of pollution impact does parking lot runoff have on streams and lakes. Approximately 72% replied either “great impact” (28.1%) or “some impact” (43.5%). Correspondingly, 28.4% replied either “very little impact” (16.9%) or “no impact” (11.5%). Figure 15 illustrates a land use-based question from the 2009 survey:

“River banks and lake fronts are obvious places to think about water quality issues. In your opinion, how effective are the following measures in managing land along a river or lake in an environmentally-friendly way?”

Figure 15. Question from 2009 survey regarding effectiveness of various practices along waterways





2.2.4.2. Analysis

Based on the 2009 survey, almost 3 in 4 participants responded that parking lots had great or some impact on water quality. Therefore, many recognize at least some degree of impact of large-scale impervious surfaces on water quality, and likely water quantity. The second question sequence indicates public perceptions on various levels of impact from different forms of shoreline management. Allowing natural vegetation to grow wild and planting bushes and shrubs were both considered the most effective techniques for environmentally friendly management

A great deal of research has been focused on the relationship between river system health and the percentage of impervious surface in a watershed. As the area of impervious surface increases within a watershed, the hydrology changes and becomes what is commonly referred to as “flashy,” with the net result being a higher percentage of rainfall entering receiving waters as stormwater runoff. These primarily urban watersheds with high impervious surface percentages have increased stormwater volumes and associated pollutants entering receiving waters with little natural filtration. This core concept primarily focuses on developing a public understanding of the impacts of the built environment; implications from projected population increases; and promoting the use of structural best management practices (BMPs) that help improve infiltration and increase evapotranspiration rates. From small-scale residential projects to neighborhood-scale low impact developments, having a better understanding of the physical changes associated with landscape alteration helps to communicate the need to compliment behavior changes with structural landscape-level improvements to reduce stormwater runoff pollution.

2.2.4.3. Outreach Strategy

This core message emphasizes the relationship between the impacts from the built environment and the quality of waterways. Although the ACSEC regional strategy focuses primarily on pollution prevention at the source, improving awareness of land-use related impacts, both positive and negative, is considered a complimentary outreach effort. Many stormwater structural BMPs also have benefits at the site-scale, in addition to the watershed, and these should also be illustrated. Some benefits include improving flooding and moisture issues around a structure, increasing native habitat, and conserving water and associated bills. There are a variety of efforts that have been employed to expand awareness of these efforts, including:

- Development of literature and resources, such as a SC Rain Garden Manual and SC Residential Rainwater Harvesting Manual and websites
- Landscape Programs, such as Carolina Yards and Neighborhood (Clemson Extension), Charleston Friendly Yards (Keep Charleston Beautiful) and Ocean Friendly Gardening (Surfrider)
- Permanent exhibits that demonstrate stormwater BMPs (see Section 3 for more details)



- Native plant sales and exhibits (SC Native Plant Society)
- ACSEC Exhibit at fairs and festivals: Including interactive exhibits such as Enviroscape™, rain drop plinko (showing difference between impervious and pervious surfaces), and a rain barrel display.

2.3. *Thank You!* Campaign

2.3.1. Campaign Overview

A central theme throughout the ACSEC strategic plan, and the overall outreach effort, is providing a better understanding of the linkage or connection between individual behaviors, stormwater, and the quality of waterways. In 2011, a new overall ***Thank You!*** message and graphic were developed by the ACSEC to help illustrate and convey these connections. During ACSEC planning meetings, several essential elements were identified as important in delivering a unified stormwater message to the public, including:

- Positive—the message should be optimistic in encouraging positive behavior
- Flexible—the message should be versatile, given the variety of different issues the program deals with
- Simple—the message should be easily and quickly understood
- Visual—the message should be visually appealing
- Universal—the message should translate to a variety of audiences
- Impact—the message should build on the emotional connection with area waterways

The idea of utilizing a simple *Thank You!* phrase with a variety of by-line options (e.g. *Thank You!* For putting waste in its place and protecting SC's waterways) was received positively by ACSEC representatives. A graphic was produced in the summer of 2011 that seeks to illustrate a scripted, flowing "signature" that evokes a meandering river, seen below in Figure 16:



Figure 16. *Thank You!* Graphic

Thank You!

The message was developed to help connect watershed stewardship behaviors with a wide variety of cultural, economic, social, and environmental values. Indications from the public surveys indicate a high value and concern for area water resources, and the region has a long history and cultural connection to the waterways. Charleston is one of the largest port cities in the nation, and much of the overall economy is associated with the waterways. Tourism is the largest sector of the economy and water-based recreation is a significant sector, in concert with the region's significant cultural and historic preservation values. Charleston was voted "Top City in the U.S." in a 2011 readers poll by *Conde Nast Traveler* magazine. Surveys indicated that the most common outdoor activity was visiting the beach, with half (53.3%) of all respondents indicating they go to the beach "often/sometimes." Surveys, anecdotal information and experience exemplify this strong cultural connection to the area's waterways. The region also has strong culinary connections, with oysters, shrimp, crabs, and fish as staples of many local and visitor palettes. These translate into culturally significant activities, such as attending oyster roasts and lowcountry boils, cast netting for shrimp and other seafood, and fishing and crabbing. These activities, in concert with preserved African American traditions such as sweetgrass basket weaving, also transcend ethnic boundaries. Public connection with area waterways and associated activities presents a significant opportunity to build on the sense of place and cultural roots in the natural environment of the region. Developing a campaign that provides a visually-driven platform to convey these connections became paramount.

To translate the message, a goal was to have the "voice" of the *Thank You!* be an individual or group (or perhaps animals/wildlife in future iterations) that benefit from having healthy waterways. Those that benefit from healthy waterways also transcend larger social values such as economic vitality, cultural preservation, and public health. Individual "voices" can represent a variety of audiences, demographics and activities associated with the water. Examples include someone crabbing or fishing, cast netting, children and families or young adults at the beach, boaters, swimmers, surfers, or just sitting near a waterfront. For a specific example, oystermen and shrimpers are generally beloved figures by locals and visitors alike, and they are struggling to survive given a variety of economic constraints. They are also culturally and economically significant representatives of the region. They rely on healthy waterways and



ecosystems to continue their livelihood. To this end, a billboard graphic was developed with a local shrimper thanking an individual for properly disposing of pet waste, seen below in Figure 17:

Figure 17. Thank You! Pet Waste billboard from 2011-12 Mass Media Campaign



2.3.2. Implementation

Plans are to build on the current *Thank You!* campaign and utilize the message throughout most outreach platforms. This includes utilizing the message in a variety of media, including posters, signs, websites, billboards, video, print, and presentations. It will be a defining message for the ACSEC in the near future. Goals are to develop videos with the public providing their own words of “thanks” for good watershed stewardship, perhaps in a video contest or other format. Winning videos could possibly be played on a partnering local television station. Contracting with a professional videographer is also a possibility, which could also include other core messages and specific target behaviors. This video could be utilized on the ACSEC and partner websites, You Tube channel, local cable channels, and any other available video outlets.

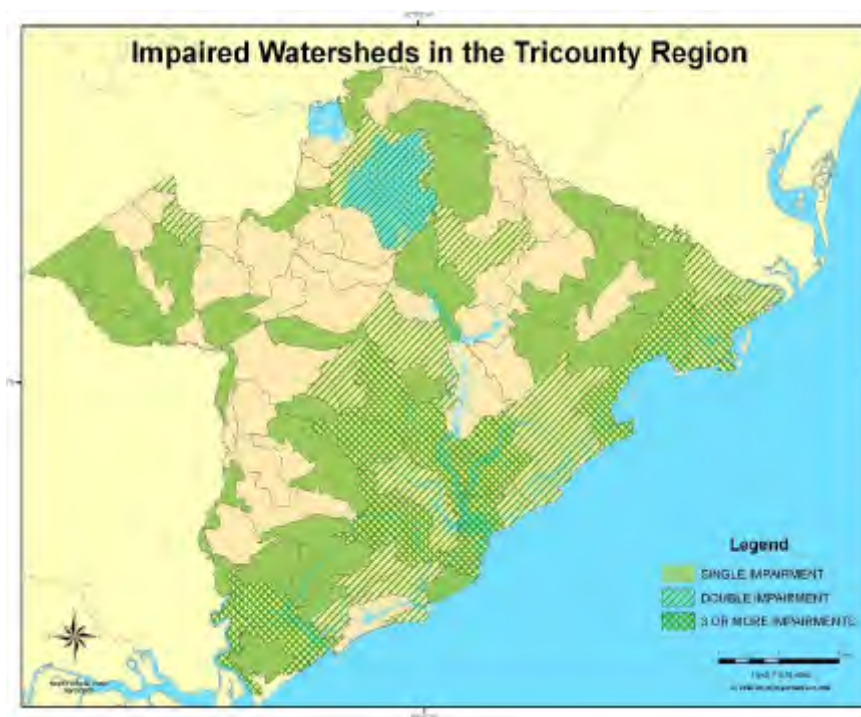


3. Regional Issues and Core Programs

3.1. Pollutant-Audience Matrix Tables

This section provides a table reference of potential pollutant sources, associated target audiences and geographies/watersheds, existing or planned programs and resources. The primary purpose of this planning document is to develop targeted efforts at high priority, region-wide issues determined to be of greatest relevance to the area waterways. The goal of this section is to identify existing programs and resources, especially those that are not specifically targeted over the next five years (Section 4), to illustrate the combined efforts of ACSEC partners in addressing a wide variety of stormwater-related awareness, education, and involvement efforts. For example, bacteria are the most common source of impairment listed in the 303(d) list for this area. There are no bacteria-related issues targeted by the ACSEC for specific outreach program focus in this outreach plan, partially because during planning meetings members felt that pet waste programs were generally well-established and the proper disposal of pet waste was becoming a social norm. Although pet waste management is not a primary focus, there are plans to support existing programs and potentially develop new initiatives when opportunities arise. For example, the ACSEC is currently developing a signage program for county park managed boat landings. These tables will be revised occasionally to include adapted and expanded programs in the region.

Figure 18. Map of 2008 303(d) listed impaired water bodies and associated watersheds





3.1.1. Pathogens (Bacteria and Viruses)

Table 2. Pathogens Pollutant-Audience Education Matrix

POLLUTANT CATEGORY: PATHOGENS (BACTERIA AND VIRUSES)					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organizations
<i>HUMAN:</i>	Septic System Owners	Rural Areas	Awendaw Creek, Bohicket Creek, Breach Inlet, Bulls Bay	MS4 Stormwater Program	MS4 Communities
Sanitary Sewer Overflows	MS4 Representatives	Barrier and Sea Islands	Bush Branch-Edisto River, Cape Romain, Copahee Sound	Local Ordinances (Folly and Isle of Palms) Septic Maintenance Outreach programs	Clemson Extension
Septic Systems	Homeowners	Agricultural Lands	Dawho River- North Edisto River, Dawson Branch	Structural BMPs (pet waste stations, signs, etc.)	USDA-NRCS
Illicit Connections	Apartment/ Condo Complex Owners	Urban Horse Barns/Farms	Dean Swamp- Four Hole Swamp, Echaw Creek	Confined Animal Manure Management Program (Camm)	Soil and Water Conservation Service
<i>DOMESTIC ANIMAL:</i>	Farmers with Horses and Cows	Parks (esp. Dog and Horse Parks)	Goose Creek, Guerin Creek, Halfway Gut Creek-Four Hole Swamp, Lake Moultrie	Scoop-the Poop	SC DNR
Horses	Carriage Tour Companies	Agriculture Lands, Rural Areas	Log Bridge Creek, Lower Ashley River, Lower Cooper River	Pond Conference and Management Workshops	Keep America Beautiful Affiliates
Cows	Urban Agriculturalists	Urban and Suburban Residential	Middle Ashley River, Rantowles Creek	SC DNR Nuisance Wildlife Presentations	Surfrider
Land fowl/Poultry (chickens)	Dog and Cat owners	Commercial	South Edisto River- AIWW,	Feral Hog Management Program	CCPRC
Dogs	Veterinary Clinics	Boat Landings	South Santee River, Spencer Branch, Stono River AIWW Store Creek,	Storm Drain Marking	SCMA
Cats (prim. Outdoor)	Wildlife Mangers	Ponds	Toogoodoo Creek, Turkey Creek-East Branch Cooper River	Park Stewardship Program	SC Sea Grant
Other (less common pets)	HOA representatives	Rest Stops	Upper Ashley River, Wadboo Creek, Wadmalaw River- AIWW	S.C. Clean Marina	
<i>WILDLIFE:</i>	Pond Owners, Managers, Professionals	Dumpster/ Garbage Areas		Coast-a-syst	
Avian (waterfowl)	Coastal Decision Makers	Preserves	Walker Swamp	Wetland and	
Urban Wildlife.	Elected and Appointed Officials			Oyster Reef Restoration	
Other (Deer, feral hogs, etc.)	Restaurants			Clean Vessel Act	



3.1.1. Nutrients

Table 3. Nutrient Pollutant-Audience Education Matrix

POLLUTANT CATEGORY: NUTRIENTS (NITROGEN AND PHOSPHORUS)					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organizations
Fertilizer	Homeowners	Residential Home Landscapes	Back River-Cooper River,	MS4 Stormwater Program	MS4 Communities
Sewage Treatment	Boaters	Commercial Landscapes	Bohicket Creek, Bull Bay	Carolina Yards and Neighborhoods	Clemson Extension
Boats	Construction Employees/Inspectors	Parks	Copahee Sound	Composting Programs	USDA-NRCS
Construction Sites	Commercial Landscape Companies	Managed Lands	Dawho River-North Edisto River	Charleston Friendly Yards	Soil and Water Conservation Service
Septic Tanks	Businesses with Landscapes	Golf Courses	Foster Creek, Goose Creek, Guerin Creek	Ocean Friendly Yards	SC DNR
Landscaping Debris	Parks/Commercial Landscape Maintenance Staff	Ponds	Lower Ashley River	Nutrient management agricultural Programs	Keep America Beautiful Affiliates
Compost Facilities	Golf Course Maintenance Staff	Compost Facilities	Lower Indian Field Swamp	Park Stewardship Program	Surfrider
Animal Manure (ag)	HOA representatives	Landfills	Lower Wando River	S.C. Clean Marina	CCPRC
Pet Waste	Pond Managers	Agricultural Lands	Polk Swamp, Sawmill Branch,	Permanent Exhibit BMP sites	SCMA
Wildlife	Coastal Resource Managers		Spring Branch-Four Hole Swamp	Coast-a-Syst	SC Sea Grant
Stormwater Ponds			Stono River-AIWW		SC NPS



3.1.2. Sediment

Table 4. Sediment Pollutant-Audience Education Matrix

POLLUTANT CATEGORY: SEDIMENT					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organizations
Construction Sites	Homeowners	Residential Home Landscapes	Bulls Bay	MS4 Stormwater Program	MS4 Communities
Parking Lots	Boaters	Commercial Landscapes	Cape Romain	CEPSCI	Clemson Extension
Dredging	Construction Employees/ Inspectors	Parks	Dawho River-North Edisto River	Carolina Yards and Neighborhoods	USDA-NRCS
Ditch Scraping	Commercial Landscape Companies	Managed Lands	Leadenwah Creek	Charleston Friendly Yards	Soil and Water Conservation Service
Agriculture	Businesses with Landscapes	Golf Courses	Lower Cooper River	Ocean Friendly Yards	SC DNR
Silviculture	Parks/ Commercial Landscape Maintenance Staff	Ponds	Middle Ashley River	Park Stewardship Program	Keep America Beautiful Affiliates
Residential Yards	Golf Course Maintenance Staff	Landfills	South Edisto River- AIWW	S.C. Clean Marina	Surfrider
Roads	HOA representatives	Agricultural Lands	Spencer Branch	Permanent Exhibit BMP Sites	CCPRC
	Pond Managers	Boat Landings	Stono River	Coast-a-Syst	SCMA
	Coastal Resource Managers				SC Sea Grant



3.1.3. Toxic Contaminants and Heavy Metals

Table 5. Toxic Contaminants and Heavy Metals Pollutant-Audience Matrix

POLLUTANT CATEGORY: TOXIC CONTAMINANTS AND HEAVY METALS					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organizations
Household Hazardous Materials (HHM)	Homeowners	Residential Home Landscapes	Back River-Cooper River, Breach Inlet	MS4 Stormwater Program	MS4 Communities
Landfills	Boaters	Commercial Landscapes	Bull Bridge Creek- Edisto River, Bulls Bay	County Recycling/Convenience Centers	Clemson Extension
Pesticides (Herb, Fung, insect)	Commercial and Home Auto Mechanics	Parks	Cape Romain, Dead River-Santee River	HHM Recycling Events	USDA-NRCS
Industrial and Sewage Disposal	Construction Employees/ Inspectors	Managed Lands	Deep Creek-Edisto River, Dutart Creek-Santee River	S.C. Clean Marina	Soil and Water Conservation Service
Park and Rec Maintenance Facilities	Commercial Landscape Companies	Golf Courses	Folly Creek, Hope Creek-Edisto River	Permanent Exhibit BMP Sites	SC DNR
Chemical Spills	Parks/ Commercial Landscape Maintenance Staff	Ponds	Lake Moultrie, Lower Cooper River	Coast-a-Syst	Keep America Beautiful Affiliates
Medical Waste	Golf Course Maintenance Staff	Landfills	Middle Ashley River	CYN Programs	Surfrider
Auto/Fleet Maintenance	HOA Representatives	Agricultural Lands	Outlet Wambaw Creek	Charleston Friendly Yards	CCPRC
Auto (brake pads)	Pond Managers	Boat Landings	Quinby Creek	Native Plant Sales	SCMA
Parking lots	Coastal Resource Managers		Rediversion Canal- Santee River	Ocean Friendly Yards	SC Sea Grant
Dock Sites					



3.1.4. Fats, Oils, and Grease

Table 6. Fats, Oils, and Grease (FOG) Pollutant-Audience Education Matrix

POLLUTANT CATEGORY: FATS, OILS, GREASE (FOG)					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organizations
Auto (home mechanic)	Homeowners	Residential Home Landscapes/ Driveways and Garages	None Identified	MS4 Stormwater Program	MS4 Communities
Ships/ boats/ marinas	Commercial and Home Auto Mechanics Boaters, Marina Owners and Operators	Commercial		County Recycling/ Convenience Centers	Clemson Extension
Restaurants	Restaurant Owners and Staff	Ponds		HHM Recycling Events	USDA-NRCS
Junkyards	Commercial Auto Repair	Marinas		S.C. Clean Marina	Soil and Water Conservation Service
Parking Lots	Parking Lot Managers	Golf Courses		Permanent Exhibit BMP Sites	SC DNR
Cars leaking oil				Coast-a-Syst	Keep America Beautiful Affiliates
				CYN Programs	Surfrider
			Charleston Friendly Yards	CCPRC	
			Native Plant Sales	SCMA	
			Ocean Friendly Yards	SC Sea Grant	



3.1.5. Debris

Table 7. Debris Pollutant-Audience Education Matrix

POLLUTANT CATEGORY: DEBRIS					
Potential Sources	Audience(s)	Geography/ Land Use	Priority Watersheds	Programs/ Resources	Organization s
Cigarette Butts	Smokers	Roadways	None Identified	S.C. Beach Sweep/River Sweep	SC Sea Grant
Illicit dumping	Boaters	Commercial Properties		Adopt-a-Highway	Community Pride, Inc.
Boats	Homeowners	Restaurants		Clean Cities Sweeps	Keep America Beautiful Affiliates
Garbage trucks	Fisherman	Urban Areas		Beach and Marsh Sweeps	SC DNR
Docks/fisherman	Truck Drivers	Tourism-High Traffic		Monofilament Recycling Program	Clemson Extension
Renters	Commercial Drivers	Intersections		Cigarette Butt litter awareness program	Surfrider
Vehicles-uncontained	Fast Food Restaurants	Parks		Cigarette butt cannons	Waterkeeper MS4 Municipal Stormwater Programs
	Park and Beach goers	Beaches		Palmetto Pride	SC DOT



3.2. ACSEC Core Programs

3.2.1. Public Education

3.2.1.1. *Carolina Yards and Neighborhoods*



The [Carolina Yards & Neighborhoods Program](#) is a Clemson Extension program that recognizes homeowners who implement the principles of environmentally friendly landscape management. The Carolina Yardstick Workbook provides a step-by-step process on creating an attractive and healthy yard in a way that serves to protect South Carolina's natural resources. The Workbook provides an evaluation of the homeowner's yard and land practices. For each positive action taken, an inch is earned. By meeting the minimum requirements on a CYN scorecard, a Carolina Yard is created. The CYN Program is highlighted in the ACSEC demonstration site located in Ladson on the fairgrounds. During the time of the Coastal Carolina Fair,

visitors to the demonstration site can see firsthand the CYN principles at work and ask any questions to a Master Gardener present on site. The CYN Event Series is provided in partnership with Trident Technical College and focuses on seasonally relevant gardening practices.

3.2.1.2. *Master Gardener*



The [Clemson Extension Tri-County Master Gardener Program](#) trains, selects, and utilizes knowledgeable volunteers to facilitate the educational work of the Consumer Horticulture Agent. 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, research-based recommendations that collectively represent a significant public service. These good stewardship practices directly and indirectly benefit the health of South Carolina's waterways.

3.2.1.3. Master Naturalist



Charleston County Parks & Recreation Commission and Clemson University offer the Certified South Carolina [Master Naturalist](#) program for people interested in understanding and protecting the state's valuable natural resources. Master Naturalist candidates complete a 13-day field study course led by a variety of experts. Participants learn naturalist skills and visit a variety of unique habitats along the SC coast, including Carolina bays, oyster middens, and barrier islands. Participants also learn about stormwater threats to water quality and take-home actions to help reduce these impacts. The Master Naturalist program develops volunteer citizen scientists, conservationists, and educators who can positively impact the natural resources of the state. The Master Naturalist Program is hosted at the Caw Caw Interpretive Center in the tri-county region.

3.2.1.4. Ripple Effect ACSEC Bimonthly E-Newsletter



Ripple Effect, the ACSEC e-newsletter, was designed to provide awareness of consortium-related activities, including current, recent and future events. The *Ripple Effect* also includes links to pertinent electronic resources providing information on good stewardship practices. The E-Newsletter is bimonthly, creating an opportunity for consistent communication regarding ACSEC news and events. Recipients of the *Ripple Effect* may forward the newsletter to others or unsubscribe at any time. Archives are



available at the Charleston County Public Works [stormwater program website](#). All ACSEC community and education partners are encouraged to submit information for inclusion in the *Ripple Effect* and to also distribute this e-news through their own offices and departments.

3.2.1.5. Permanent Exhibits

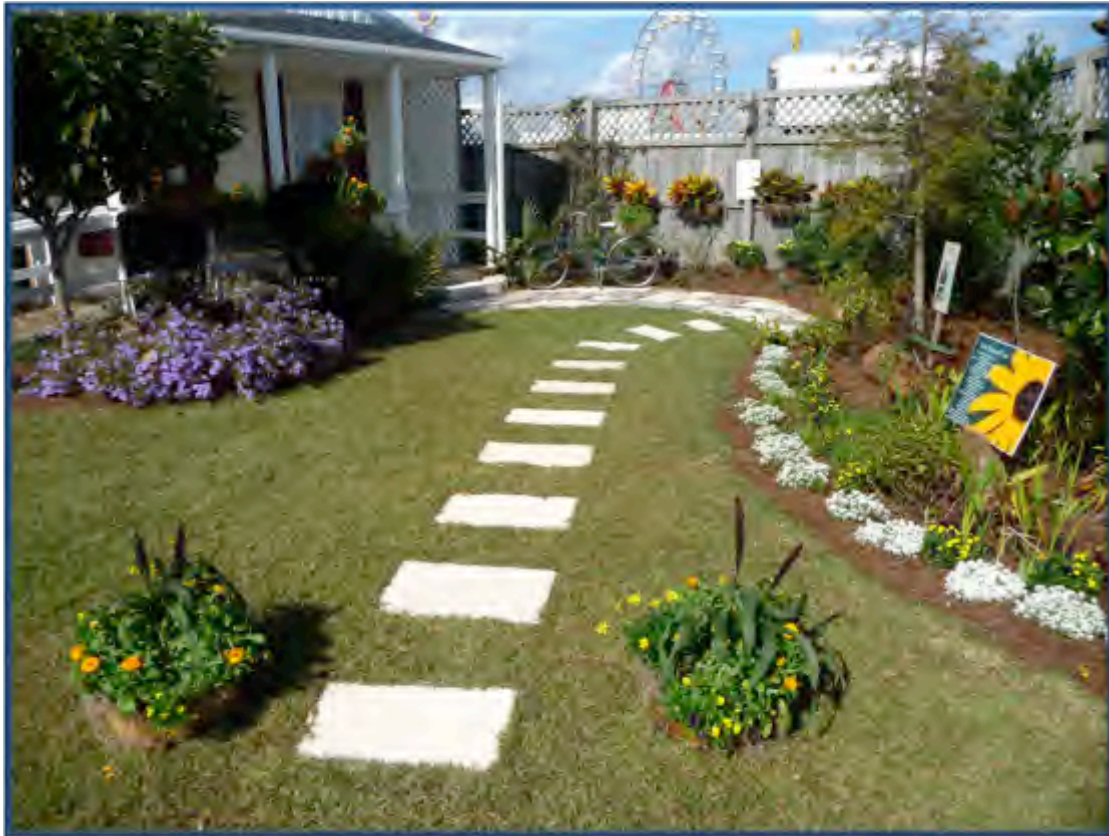
More than a dozen stormwater BMP permanent exhibits have been established in the region over the last four years by the ACSEC, most in partnership with two or more organizations. The installation is often associated with training for residential and/or commercial audiences. Permanent exhibits have been identified as a valuable public outreach activity because they can help dispel myths about certain techniques (e.g. “won’t a rain garden attract mosquitoes? Are native plants boring?”). Designing, installing, and maintaining the sites is a significant responsibility, as a site can “backfire” and cause a negative reaction by the public if it fails because of poor long-term management planning. However, there are a myriad of benefits from permanent exhibits when well designed, installed and maintained. They can provide a source of information and serve as research sites to determine effectiveness in the context of region conditions, as well as insight into maintenance issues (e.g. weeds growing in pervious pavers, pollutant reduction of a rain garden, common issues with rain barrels, etc.). Common sites for permanent exhibits include schools, businesses, residences (often associated with an organization), parks and other public areas with high visibility. Likewise, priority audiences include: residents, businesses, coastal decision makers and elected/appointed officials because they play a major role in land use management in the community. Structural BMPs include one or a variety of the following:

- **Pervious hardscapes (pavers, cobblestone, gravel, concrete, etc.),**
- **Rainwater harvesting,**
- **Rain gardens,**
- **Native vegetation,**
- **Shoreline management techniques (“shorescaping”),**
- **Constructed wetlands,**
- **Pond management including exhibiting shoreline.**

Developing effective outreach signage for the sites is also a top priority. These sites serve as “passive” education for viewing by the public at their leisure. Signs are essential to interpret the site and provide sources for additional information. A current effort is to include QR codes to link signs and other print material to appropriate websites with info, videos, and other resources. This feature is confined to individuals with smart phone technologies, however. Including permanent stormwater BMP exhibits on the National NEMO network [S.C. LID Atlas](#) (Developed and maintained in South Carolina by Clemson Carolina Clear and SC Sea Grant) is also a continuous goal. Efforts are also underway to develop a Coastal Low Impact Development manual.



Figure 19. Carolina Yard Living Exhibit at the Exchange Park in Ladson, SC



3.2.1.6. Stormwater Pond Awareness and Maintenance

Stormwater pond management is an issue of particular relevance to the region because of the large number of stormwater retention/detention ponds utilized for stormwater management. Over 14,000 have been documented in the coast of SC, with some estimating the figure closer to 20,000 or more (Drescher et al. 2011). Ponds are a major feature on the landscape of South Carolina and likewise, play an important role in the ecological and economic integrity of the region. Stormwater BMP maintenance is one the three areas of focus for residential audiences. ACSEC, and in particular the stormwater division representatives, have experienced challenges with pond maintenance and lack of awareness by homeowner and community associations (HOAs) that are responsible for managing ponds in their neighborhood. An education shelter (AKA the “Ed Shed”) at Clemson Coastal Research and Education Center (CREC) is currently being developed for training and outreach of structural BMP installation and maintenance. It includes a small pond, and several features are being included in the plan including vegetated shoreline management techniques above and below water line (littoral shelves with submerged and emergent herbaceous vegetation), floating wetlands, and a constructed wetland. The site will also include other stormwater BMPs. Other stormwater pond outreach efforts include professional pond management



workshops (targeting commercial pond management companies), a new website (www.clemson.edu/extension/stormwaterponds) and a pond conference sponsored by the consortium (targeting HOAs). Depending on the public response and evaluations, the 2012 Charleston Area Stormwater Pond Management conference may become an annual event.

Figure 20. Clemson Extension Stormwater Pond Website Image



3.2.1.7. Rainwater Harvesting Programs

Over the past several years, Extension Agents have noted an increasing public interest in rainwater harvesting. The 2008 Clemson Extension-ACSEC field survey conducted at events in the Charleston, SC region noted that 89% (240 of 246) of respondents had heard of rain barrels. Although this indicated a very high awareness, only 15.6% had installed a rain barrel or cistern at their home. Written responses (n=95) asking why they have or have not installed a rainwater collection system revealed that the top reasons for not installing a rain barrel were: 1) cost (15%) and knowledge (15%), 2) time (14%), 3) not interested/no perceived need (11%), 4) no gutters (9%) and renter/condo/apartment owner (9%). With increasing public interest, rainwater



harvesting is considered a unique vehicle to engage residential, commercial, and youth audiences with a larger message about stormwater runoff pollution, especially with respect to translating stormwater quality and quantity impacts from impervious surfaces. Several outreach methods were employed from 2008 to the present to help improve awareness and overcome known barriers. These efforts included permanent public exhibits; local research; selling and donating promotional rain barrels; youth rain barrel painting; development of Internet and print resources including a statewide residential rainwater harvesting manual and how-to video; presentations; residential and commercial workshops, including hosting professional accreditation training through the American Rainwater Catchment Systems Association in June 2010. The ACSEC rainwater harvesting program will continue to be implemented through a variety of workshops and presentations, largely associated with the Carolina Yards and Neighborhoods program.

Figure 21. Promotional Rain Barrel and RWH manual





3.2.1.8. CEPSCI (Certified Erosion Prevention and Sediment Control Inspector) Program



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.

3.2.1.9. South Carolina Clean Marina Program



The South Carolina Clean Marina Program provides a unique opportunity for marina owners and operators to improve their customer services, protect water quality and be recognized for their efforts. By meeting prescribed environmental performance criteria, marinas can qualify to fly the Clean Marina flag to attract recreational and transient boaters to their facility. South Carolina's Clean Marina program is part of an international effort along with 24 other states and territories to use best management practices to protect and improve water quality at marinas. The program is administered by the SC Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management and the South Carolina Marine Association.



3.2.1.10. Blue Business Program

During the planning process, expanding programs into a variety of commercial sectors became a high priority. In recognition of the need to broaden efforts into this arena, a proposal to develop, pilot, and eventually launch a business partnership network and recognition program evolved in 2011. Efforts to date include identifying ACSEC representatives that were willing to serve on an exploratory committee. The proposed name of the program is *Blue Business*, which may be refined to the Blue Business Partnership Network. This was explored, as the effort is meant to serve in a positive capacity, to be a resource for businesses to learn from each other and for public recognition of positive efforts. The Blue Business committee had an initial meeting on October 13, 2011 to begin outlining the program. One of the first objectives included reviewing similar programs both in the tri-county region and nationally. It was decided that the program would be developed in an iterative process, focusing on one industry at a time. Restaurants were identified as the first industry to target for the pilot. Other commercial sectors would come online as the program developed. Next steps included developing a straw-man outline for the program, identifying restaurant owners and managers that would participate in focus group study, and investigate marketing opportunities. As the program develops, a plan will be created to guide efforts and will be added to this document.

3.2.2. Public Involvement

3.2.2.1. Litter Sweeps



S.C. Beach Sweep River Sweep. 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.



Adopt-a-Highway, Community Pride, Inc. Roadside Litter Sweeps. 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.



Keep Charleston Beautiful Sweeps. Keep Charleston Beautiful (KCB) is dedicated to promoting the cleanliness and beautification of the City of Charleston through education, public awareness and community involvement. KCB 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.



Surfrider Beach and Marsh Sweeps. 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.

3.2.2.2. Storm Drain Marking

The ACSEC developed a storm drain marking program in 2008, which focused on providing a volunteer opportunity for local youth, residential, and business groups. The program provides training and overview of the program, which includes reinforcing core messages and specific messages relevant to the group. The program also provides long-term educational opportunities for the public by affixing semi-permanent round medallions on curb inlets. The drain marker was custom designed to include the ACSEC logo and a fish and shrimp (see Figure 22). The marker provides awareness of the linkage between the storm drain and local waterways, and environmental risks of pollutants washing into storm drains. Each volunteer group is provided a storm drain-marking kit that includes markers and adhesives, safety gloves, safety vests, a first aid kit and cleaning equipment, among other items.

Currently, the storm drain marking program developed is set to be evaluated and refined in 2012, including developing a new website, expanding advertising and program



offerings, and new drain evaluation element. The website will include an informational and training video. Other areas of program expansion include the development of three marking options: 1) plastic/poly markers for residential and lower-traffic areas; 2) metal markers for commercial and higher traffic areas; and 3) a storm drain stenciling program, potentially with a watershed specific message (i.e. “Drains to Ashley River”), for areas that are highly visible for auto traffic, but have limited foot traffic (such as busy intersections). Particular geographies to focus the program include apartment and condominium complexes (based on subgroup analysis), and dense urban and suburban areas primarily drained by drop inlets.

Figure 22. ACSEC Storm Drain Marker

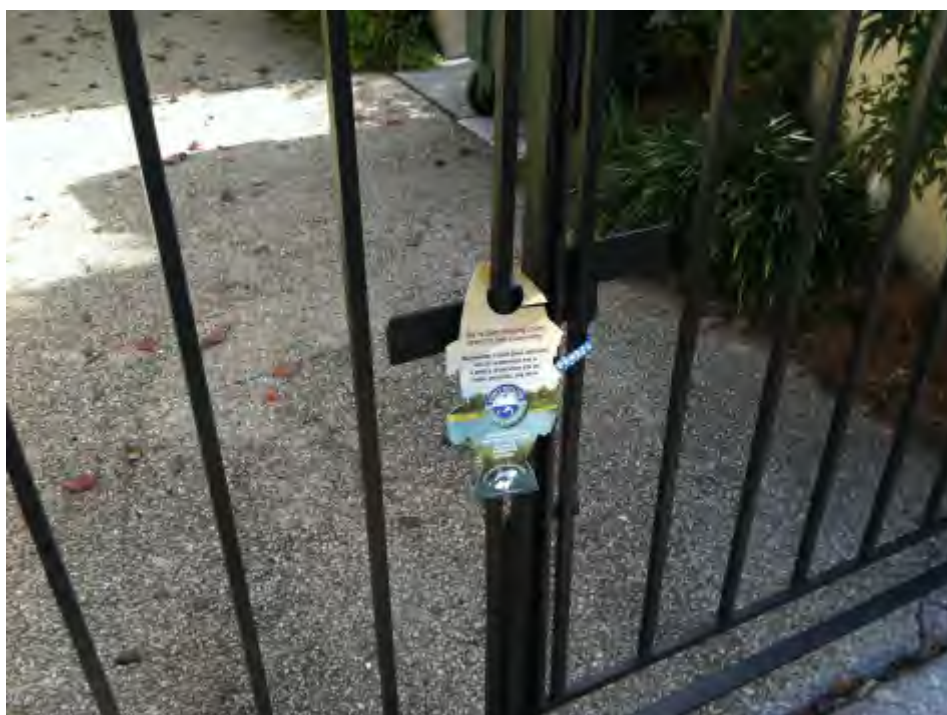




Figure 23. Picture of Storm Drain Marker on Drain Inlet



Figure 24. ACSEC Storm Drain Marking Program Door Hanger



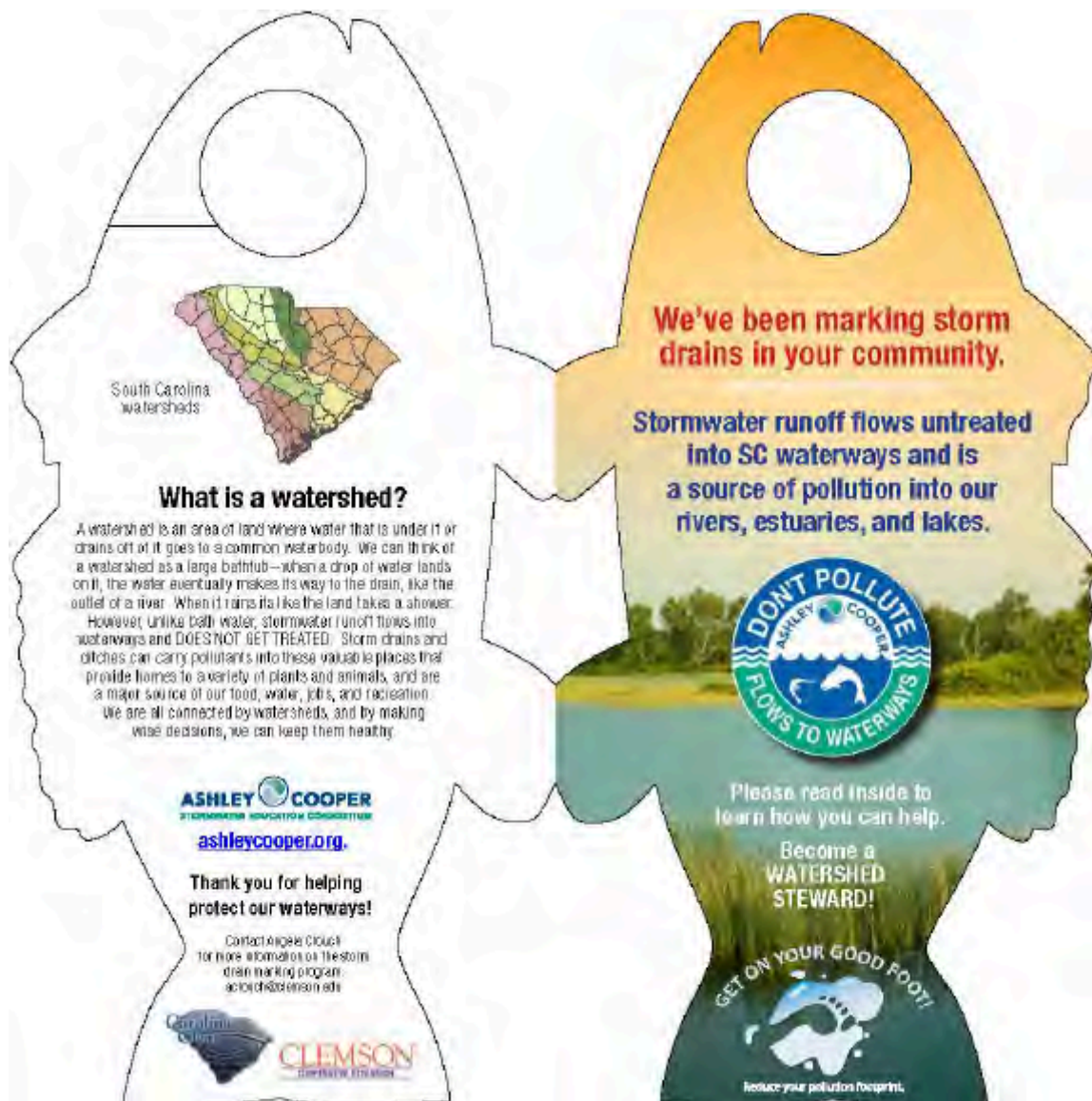


Figure 25. Storm drain marking program door hanger (outer graphic)

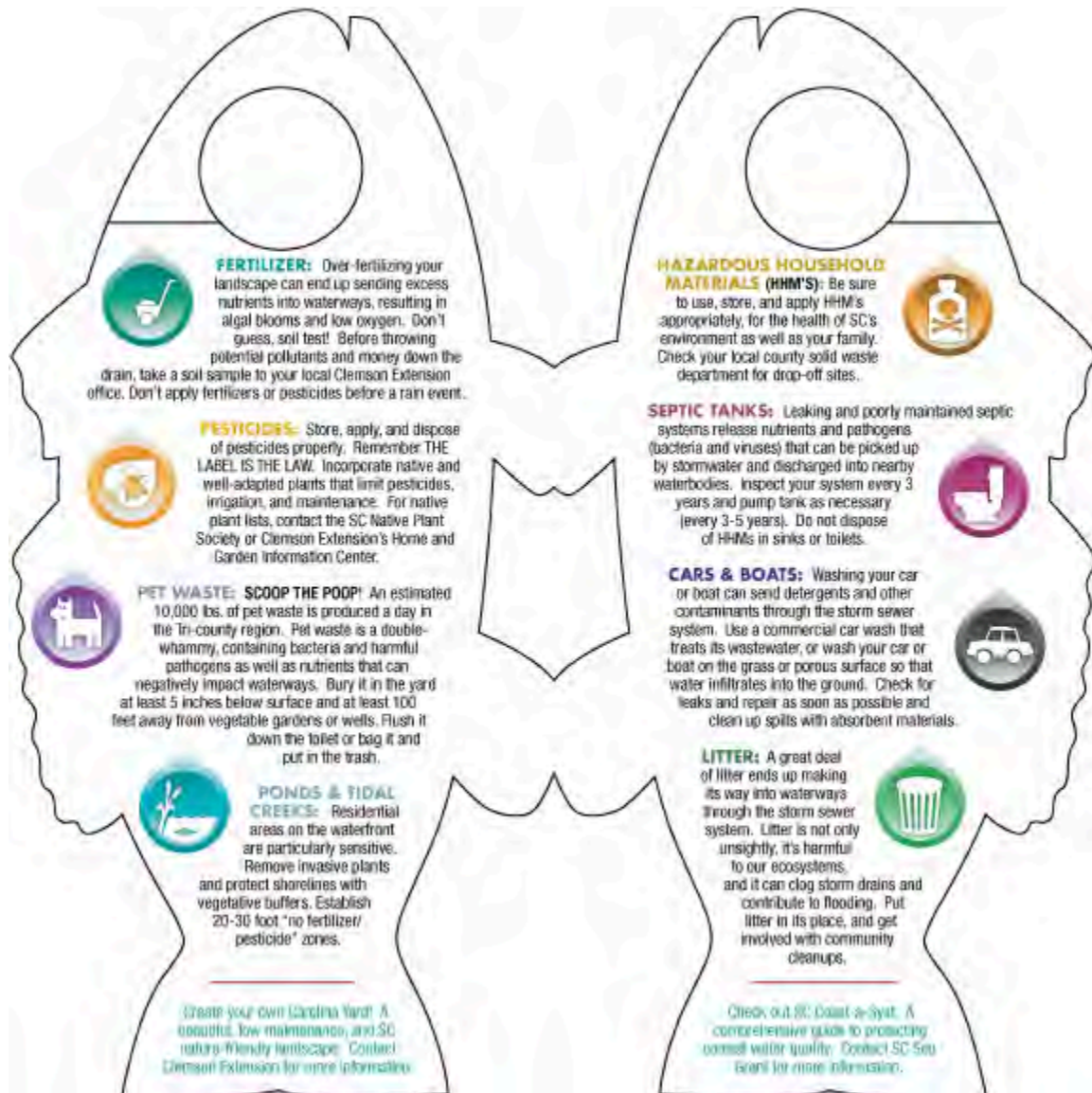


Figure 26. Storm drain marking program door hanger (inside graphic)



Youth and their parents/guardians are the primary audiences conducting storm drain marking to date. During storm drain marking events, participants also attach door hangers on residential and commercial buildings in the proximal community (see Figures 24-26). The ACSEC is also adopting a new program element, a personal message strategy that was developed in the Coastal Waccamaw Stormwater Education Consortium. Youth from area schools and neighborhoods will be given blank door hangers and will create their own artwork and personal messages (watershed, pollution, what you can do, target pollutant messages, etc.). Personal messages from local youth will likely resonate strongly with the residents and have a significant impact. The planning and program design of the revised storm drain marking program will be added to this document in 2012.

3.2.2.3. SCORE: Oyster Reef Construction



The South Carolina Department of Natural Resources (SCDNR) is responsible for managing the state's oyster resources. Appropriate management includes the planting of material to provide substrate, known as cultch, for recruitment of juvenile oysters. The best cultch material is oyster shell.

In order to increase oyster habitat at the minimum cost to taxpayers, SCDNR has initiated the South Carolina Oyster Restoration and Enhancement (SCORE) program. There are two major components to the SCORE program: oyster shell recycling and community-based restoration. By working together, community members and biologists can restore oyster populations while 1) enhancing habitat for fish, shrimp, and crabs, 2) improving water quality of estuarine areas, and 3) informing and educating children, industry, and the general public.

3.2.2.4. Youth Programs



4-H₂O Exploration Program is a statewide camp program implemented by Clemson University Cooperative Extension Service, which educates children about water quality, conservation, and how to be good watershed stewards through fun, hands-on activities. Together with regional partners, campers will experience a unique look at coastal

South Carolina's natural heritage, and the special role river systems play in this beautiful landscape. The Ashley and Cooper Rivers provide the perfect setting to explore the ecology and history of the area, and are the focus for two 4-H₂O day camps in the Charleston Tri-County region. Campers will visit a variety of sites by land and water around the region, beginning in the freshwater inland reaches and progressing



downstream toward the coast. Along the way, we'll see a variety of habitats—from historic rice field wetlands, to tidal creeks, estuaries, barrier islands, the ocean—and the plants and animals that call these places home. As we end on the beach, we reflect on the journey water takes as it makes its way to the ocean, and ponder its next visit during this continuous cycle. Like ripples in a pond, our goal is to develop watershed ambassadors that spread their new knowledge to their communities.

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.



4. Priority Issues and Education Strategy

4.1. Education Strategy Methods

The methodology for encouraging behavior change in the ACSEC Stormwater Outreach Strategic Plan draw heavily on social marketing techniques and more specifically the Community-Based Social Marketing (CBSM) approach developed by environmental psychologist Dr. Douglas McKenzie-Mohr. The CBSM method is based on research in social psychology and has demonstrated success in fostering behavior change on both the individual and community levels in a number of programs around the world (McKenzie-Mohr, 1999). The CBSM steps to developing effective outreach include: 1) Selecting behavior(s), 2) Identifying Barriers and Benefits, 3) Developing Strategies, 4) Piloting, 5) Broad Scale Implementation and Evaluation. Particularly relevant to the ACSEC public education efforts, McKenzie-Mohr notes:

“Programs that are strictly information-based have little likelihood of substantively changing behavior. Nonetheless, this does not mean that providing information should not be a component of a behavior change program, only that by itself information is unlikely to be effective. The critical question to ask is, How does providing information address barriers to a target audience engaging in the behavior I wish to encourage?” (McKenzie-Mohr, 1999)

This insight lead to the development (or future development) of barrier and benefit analyses for each targeted issue/behavior(s). Although not every outreach effort that will be implemented by the ACSEC will go through this comprehensive process, CBSM will serve as a guide to investigation and development of targeted strategies to foster behavior change. The EPA documents: *Getting In Step: A Guide to Effective Outreach in Your Watershed*, and *Getting Your Feet Wet with Social Marketing* also provide guidance on how to incorporate social marketing techniques into watershed outreach programs (EPA, 2003 and Wilbur, 2006). The fertilizer application education strategy is the most robust to date and serves as model for the development of other behavior strategies, which will be created, refined, and/or supplemented to this document over the course of the outreach campaign.

4.2. Regional Priority Issues

4.2.1. Priority Development

Several driving forces lead to the development of this comprehensive outreach planning document. One of the most significant was the impending new NPDES Phase II SMS4 General Permit and specifically the draft language relating to MCMs 1 and 2. The



ACSEC is being proactive in addressing anticipated revisions to the permit, which include a more focused and measurable approach. This is being accomplished by synthesizing previous experiences, evaluations, insights from partners and the public, regional characterizations, impaired waters, and public survey information. One of the goals of this plan was to define three significant “issues” for residential and commercial audiences. Presented information, discussing survey data, field experiences, and conducting prioritizing activities during ACSEC meetings helped define these issues.

The first prioritization activity was conducted in December 2010 during an ACSEC meeting with community and education partners represented. The primary objectives for the meeting were to develop a list of potential pollutant sources in region by category, rank those sources and consider specific contributing actions associated with the top five potential sources in each pollutant category. Lastly, breakout groups identified barriers and benefits to desired behaviors to help develop the education strategy. Figure 27 represents the results of the pollutant priority exercise. Nutrient runoff from fertilizers was identified as the top priority (20 total votes), followed by sediment from construction sites (14), oil and grease from home auto mechanics (12) tied with pathogens from sanitary sewer overflows (12), and finally toxic contaminants from hazardous household chemicals (8).

Following this activity, individual behaviors to encourage were identified by consortium members for each of the top five pollutants and sources. These represent a large data set, and more than what can effectively be represented in this document. The top behaviors for each pollutant during the exercise were the following:

- **Nutrients from fertilizers:** appropriate application of fertilizer, both quantity and temporal distribution (such as avoiding application before rain events)
- **Sediment from construction sites:** proper installation and maintenance of sediment control best management practices
- **Oil and Grease from automobiles:** proper disposal of oil and washing car on lawn/pervious surface
- **Pathogens from sanitary sewer overflows:** consistent inspections and maintenance (note: although this was indicated as a significant potential source of pathogens/bacteria into receiving waters; it was determined that this was more of an infrastructure and internal county/municipal issue and much less of a public education opportunity).
- **Toxic contaminants from Hazardous Household Chemicals:** Appropriate disposal and cleanup

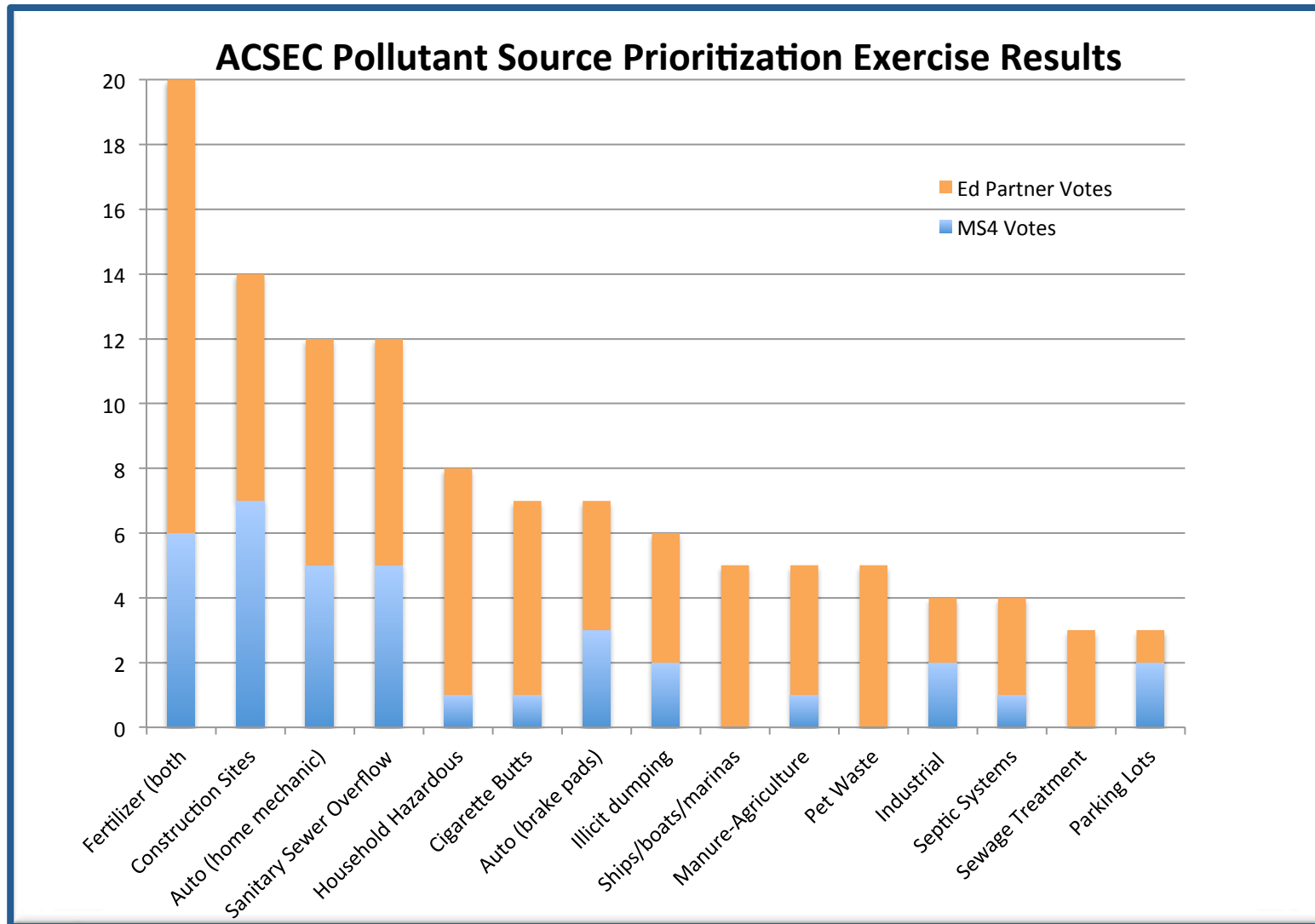


Figure 27. ACSEC Pollutant Source Prioritization Exercise Results



The priority pollutant sources were revisited during the June 2011 ACSEC meeting, and the residential and commercial issues were refined and finalized. The refinement was largely based on existing education programs and identifying programmatic “gaps” that were hypothesized as having the greatest potential to reach through education efforts.

- **RESIDENTIAL AUDIENCES, Region-Wide Priority Issues:**

- ***Home Landscaping*** (primary topic: nutrient management/proper application of fertilizer)
- ***Pond Issues and Awareness*** (primary topics: maintenance, public/HOA awareness)
- ***Home Auto Repair*** (primary topic: petroleum and other automotive fluid management)

- **COMMERCIAL AUDIENCES, Region-Wide Priority Issues:**

- ***Landscapers and Pond Management Companies*** (primary topics: nutrient management and post-construction BMP maintenance)
- ***Restaurants/Hospitality*** (primary topic: FOG [fats, oils, grease] management)
- ***Automotive Businesses*** [includes maintenance/repair shops, gas stations, car washes, etc.] (primary topic: petroleum product management)

4.3. Residential Audience Priority Issues

4.3.1. Fertilizer Application (Homeowners)

4.3.1.1. Overview

Nutrient management, and in particular proper residential fertilizer application, ranked as the highest priority to address in this phase of the outreach campaign during ACSEC polling exercises. The 2008 303(d) list of impaired water bodies with nutrient-related impacts (Dissolved Oxygen, Chlorophyll b, Nitrate-Nitrogen, Total Phosphorus [TP]) included 15 associated watersheds with one or more impaired parameters (see Section 3 for list). Charleston Harbor and associated tributaries also have a developed TMDL for Dissolved Oxygen (Cooper and Wando Rivers) and Oxygen Demanding Substances: Carbonaceous and Nitrogenous Biochemical Oxygen Demand (Ashley River). Notably, river and estuarine oxygen levels are particularly stressed in the summer and late fall, when water temperatures rise and oxygen holding capacity diminishes. This



corresponds with the growing season and potential fertilizer inputs. The following sections provide an audience analysis, behavior selection, barrier and benefit analysis, outreach strategy and timeline for this priority outreach issue.

4.3.1.2. Audience Analysis

Public surveys in 2008 and 2009 identified some basic home landscaping characteristics and behaviors. Overall, a majority of the public (87%) thinks fertilizers and lawn chemicals have “some” or a “great” impact on streams and lakes. This can prove beneficial in garnering public support in addressing this issue and focusing on improving specific fertilizer behaviors. The 2008 Clemson Extension field survey indicated most people characterized their yard as “suburban” (71.3%), with the majority (88.2%) estimating their yard size as one acre or less. Approximately 68% were a half-acre or less. About 34% of respondents classified the percentage of turf grass in their yard between 50-75%, although results were relatively evenly split between groups (quartiles).

Highlights from the behavior-related fertilizer questions from the 2008 and 2009 surveys include:

- A significant percentage of homeowners do **not** fertilize their lawn
 - 45% of all homeowners do NOT fertilize in 2009 survey; 31% in 2008 survey
- About half (48%) of those that do fertilize do so once per year
- Most people use the label on the bag for determining fertilizer application rates/info
 - About half (45%) in both surveys
- About a quarter (24%) of homeowners have someone outside the household fertilize their lawn
- Approximately three-quarters (76.6%) “always” or “nearly always” consider the likelihood of a rain event before fertilizing

4.3.1.3. Behavior Selection Matrix

Based on the exercise during the December 2010 ACSEC meeting, ACSEC representatives identified proper fertilizer application as a high, region-wide priority. During the November 2011 ACSEC meeting, consortium representatives participated in a series of activities to identify and rank specific fertilizer behaviors to emphasize in the upcoming education campaigns. The six behaviors include:

- Using low or no-phosphorus fertilizer
- Not fertilizing before a rain event
- Reduce frequency of fertilization



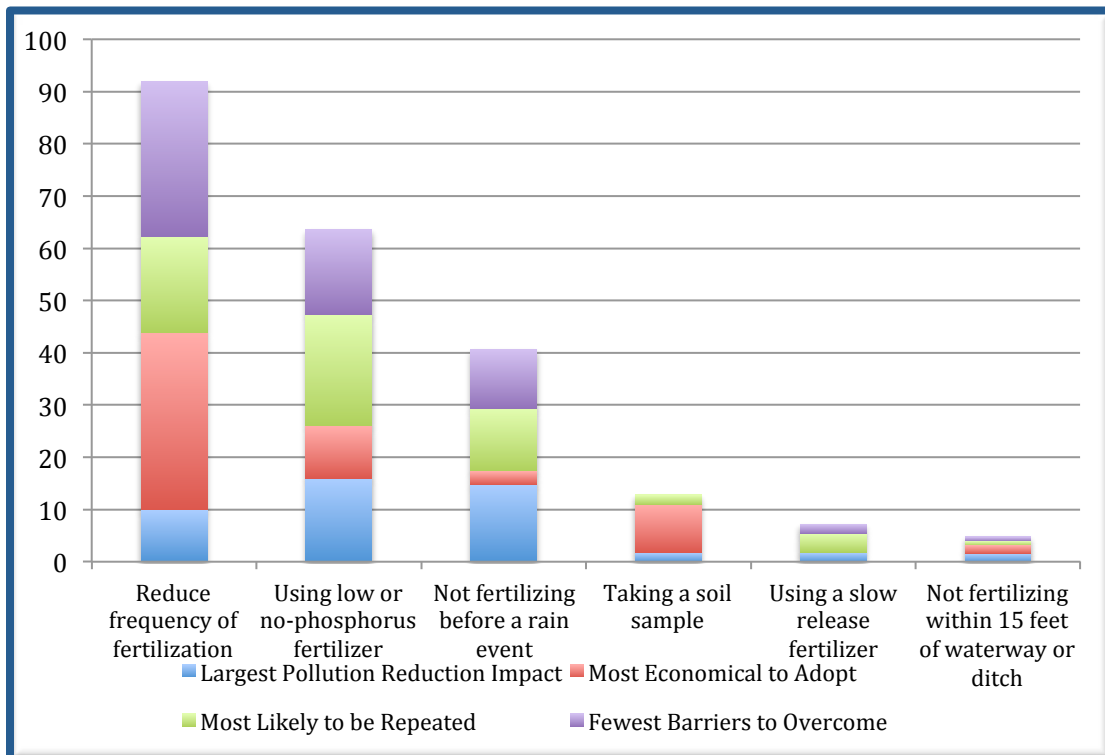
- Using a slow-release fertilizer
- Taking a soil sample
- Not fertilizing within 15 feet of waterway or ditch

Consortium representatives were presented with available information from surveys and a specific presentation on “Phosphorus Issues in the Lowcountry” by Joe Fersner of Woolpert, Inc. They were then given response pads and were asked to provide their highest and second-highest priority to a series of four questions:

- 1) Which behavior (if adopted) will have the largest positive impact on water quality? [IMPACT]
- 2) Which behavior will be the most affordable for the audience to adopt? [ECONOMICAL]
- 3) Which behavior will be most likely to be sustained (repeated) by the audience? [SUSTAINABLE]
- 4) Which behavior has the fewest barriers to overcome? [BARRIERS]

The responses for these questions were tallied to identify which behaviors would be the most impactful to target. The results for each question represent a combination of both highest and second highest responses. Second highest responses were given an 80% point value. Figure 28 represents total point values for each behavior in stacked bar graph format depicting each question element.

Figure 28. Graph of Fertilizer Related Behavior Selection exercise





As seen in Figure 28, reducing the frequency of fertilizer application scored the highest combined total (92), followed by using low or no-phosphorus fertilizer (63.6), and not fertilizing before a rain event (40.6). The remaining three behaviors scored significantly lower, including taking a soil sample (12.8), using a slow release fertilizer (7.2), and not fertilizing within 15 feet of a waterway or ditch (4.8).

Although each of these behaviors is recommended, depending on the type of outreach activity or medium, the exercise provides guidance on which areas to focus in the future. Research related to CBSM has shown that simple, focused messages have a higher likelihood of being adopted (McKenzie-Mohr, 1999). This is especially true when using mass media outreach mechanisms with brief (7-60 second per event) audience exposures. Based on data gathering from the November 2011 ACSEC meeting, the top two identified behaviors pertaining to fertilizer use; reducing frequency of fertilizer application and using zero to low phosphorus fertilizer, are expanded upon in a barrier and benefit analysis.

4.3.1.4. Barrier and Benefit Analysis of Selected Behaviors

Education programs are most effective when developed to remove or reduce barriers and increase benefits; making adoption of the desired behavior more attractive. During the November 2011 ACSEC meeting, Barriers and Benefits of target behaviors were discussed and recorded by Consortium members. Identifying the unique set of benefits and barriers for each behavior is an integral step in developing an effective education strategy. The results of this discussion are depicted in the following Table 8 pertaining to Fertilizer Frequency and Table 9 pertaining to Zero to Low Phosphorus Fertilizer Use.

Table 8. Barriers and Benefits to Reducing the Frequency of Fertilizer Application

Barriers	Benefits
Social Norm; The Greener the Grass the Better	Less Need to Store Chemicals on Property
More Information Available on When to Use as Opposed to When Not to Use	Cost Effective; Using Less Fertilizer Cost Less
Potential for Challenges with Fertilizer and Distributor Industry	Using Less Fertilizer is More Environmentally Friendly; Stewardship Approach to Gardening
Misperception on How Much is Needed; The More is Better Mentality	Commercial Potential: Market Landscape Company or Home Gardener as Environmentally Responsible



Table 9. Barriers and Benefits-Using Low or No Phosphorus Fertilizer

Barriers	Benefits
Perception that Low Phosphorus Fertilizer is not as Effective as Other Fertilizers	Healthier Lawn
Availability of Zero to Low Phosphorus Fertilizers in Stores	Cost Effective; Zero to Low Phosphorus Fertilizers Cost Less
Knowing What the Middle Number in Fertilizers Represents	Using Zero to Low Phosphorus Fertilizer is More Environmentally Friendly; Stewardship Approach to Gardening
The More is Better Mentality	

4.3.1.5. Education Strategy

Once barriers and benefits have been identified, the education strategy is developed to remove barriers and enhance perceived benefits of engaging in the desired behavior. Depicted in Table 10 and 11, the Education Strategy is developed utilizing the “Building Blocks Worksheet” from the *Getting In Step* document. The message, target audience, format and distribution, resources and evaluation are outlined per specific behavior. A variety of distribution tools and resources are included to create a diverse messaging strategy to be utilized based on outreach circumstances. Acute evaluation items are identified in order to gauge program effectiveness as well as assist in future planning efforts.

The preliminary timeline for the fertilizer application education strategy is illustrated in Table 12. In creating a five-year timeline, potential for adjustment exists as programs develop and change. During year five, progress will be evaluated and future benchmarks will be identified. The education strategy developed for proper fertilizer application serves as a reference model for the ACSEC in creating community-based social marketing endeavors. The process of developing the behavior selection matrix and barrier and benefit analysis to guide a specific education strategy is a repeatable process and can be utilized in future ACSEC efforts.

A simplified approach was taken in developing the education strategies for residential priority issues home auto repair and pond management. The development of these strategies utilized known information and Clemson University Carolina Clear staff discussion to select target behaviors as well as identify benefits and barriers.



Education Strategy: Fertilizer Application				
Target Audience: Residential				
Driving Force: Excess nutrients in stormwater runoff negatively impact water quality in local waterways				
Goal: Increase awareness and desired behavior of appropriate fertilizer application by homeowner audience				
Objective: Increase the number of individuals who utilize zero to low phosphorus fertilizers				
Behavior	Message	Format and Distribution	Resources	Evaluation
Utilize zero to low phosphorus fertilizers in the tri-county area	In the lower coastal plain of South Carolina, phosphorus typically occurs naturally in soil in normal to excessive amounts; therefore, fertilizers containing phosphorus are not recommended for this area	~Educational material/ interpretive signage where fertilizers are sold; include QR code ~CES soil sample analysis ~ACSEC <i>Ripple Effect</i> ~CES Website ~Master Naturalist and Master Gardener Trainings ~CYN Programs ~CES phone calls and in person visits/ recomendations by Master Gardeners ~Inclusion in education programs by ACSEC partners ~Billboards/PSA ~SDM	~CES Website ~ACSEC Partners ~ACSEC E-Newsletter <i>Ripple Effect</i> ~Stores where fertilizers are sold ~Local Media coverage ~Mass Media outlets ~Blue Business ~Master Gardeners Office ~Established CYN Program ~CES Soil Sample Service ~SDM	~Mass Media Efforts ~Number of participating stores in providing educational materials ~Number of Interpretive Signs/Locales ~Published articles ~Number of participants in CYN programming ~Number of participants in ACSEC programs which address issue directly ~Number of soil samples indicating naturally occurring high level of phosphorus

Table 10. Education Strategy for increasing use of zero or low phosphorus fertilizers



Education Strategy: Fertilizer Application				
Target Audience: Residential				
Driving Force: Excess nutrients in stormwater runoff negatively impact water quality in local waterways				
Goal: Increase awareness and desired behavior of appropriate fertilizer application by homeowner audience				
Objective: Increase the number of individuals who fertilize less often				
Behavior	Message	Format and Distribution	Resources	Evaluation
Reduce the frequency of fertilizer application	Many trees and landscape plants require little to no fertilizer once established and mature; utilizing less fertilizers can prevent excess fertilizer from being washed into waterways as harmful pollution	~Educational material/ interpretive signage where fertilizers are sold; include QR code ~CES Soil Sample analysis ~ACSEC <i>Ripple Effect</i> ~CES Website ~Master Naturalist /Master Gardener Trainings ~CYN Programs ~CES phone calls and in person visits/ recommendations by Master Gardeners ~Inclusion in education programs by ACSEC partners ~Billboards/PSA ~SDM	~CES Website ~ACSEC Partners ~ACSEC E-Newsletter <i>Ripple Effect</i> ~Stores where fertilizers are sold ~Local media coverage ~Mass media outlets ~Blue Business ~Master Gardeners Office ~Established CYN Program ~CES Soil Sample Lab ~SDM	~Mass Media Efforts ~Number of participating stores in providing educational materials ~Number of Interpretive Signs/Locales ~Published articles ~Number of participants in CYN programming ~Number of participants in ACSEC programs which address issue directly ~Number of Soil Samples and Recommendations

Table 11. Education Strategy to Reduce Frequency of Fertilizer Application



Appropriate Fertilizer Application

Focus Area	Audience	Strategy	Year 1	Year 2	Year 3	Year 4	Evaluation Year 5
Utilize zero to low phosphorus fertilizers in the Tricounty area	Residential	Storm Drain Marking	Develop and Implement	Develop and Implement	Implement	Implement	Program participants/ Drains marked
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Interpretive signage			Develop	Develop and Pilot	Store participation, feedback
		CYN Series	Develop and Pilot	Pilot	Implement	Implement	Participant feedback
		Outreach Materials		Develop	Pilot	Implement	ACSEC distribution at education programs
		Blue Business		Develop	Develop	Pilot	Business feedback
Reduce the frequency of fertilizer application	Residential	Storm Drain Marking	Develop and Implement	Develop and Implement	Implement	Implement	Program participants/ Drains marked
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Interpretive signage			Develop	Develop and Pilot	Store participation, feedback
		CYN Series	Develop and Pilot	Pilot	Implement	Implement	Participant feedback
		Outreach Materials		Develop	Pilot	Implement	ACSEC distribution at education programs
		Blue Business		Develop	Develop	Pilot	Business feedback

Table 12. Timeline for Fertilizer Application Strategies



4.3.2. Stormwater Pond Maintenance and Neighborhood Awareness of Stormwater Infrastructure

4.3.2.1. Overview

ACSEC members have identified stormwater pond management and associated neighborhood awareness as a priority issue for residential audiences. Stormwater managers specifically identified a deficit in neighborhood association awareness and knowledge of pond maintenance responsibilities. Beyond the pond itself, it was identified that providing awareness of the connections between homeowner practices and the runoff inputs into the community pond(s) was a complimentary outreach goal. When untreated stormwater runoff flows directly into stormwater ponds and other nearby waterways, forms of pollution such as pet waste, leaf litter, oil and gas, accumulate and can negatively impact water quality. Stormwater ponds are a tool in preventing flooding and protecting water quality. Many actions to minimize water quality impacts are the following:

- Dispose of pet waste properly
- Report illegal dumping
- Wash cars on pervious surfaces
- Appropriate fertilizer application (see section 4.2)
- Appropriate home auto repair practices (see section 4.3)
- Properly dispose of leaf litter and lawn clippings or compost
- Utilize vegetative buffers to stabilize pond edges and trap sediments

From the above list, Clemson Carolina Clear staff utilized a modified behavior selection matrix to select two priority behaviors for further education strategy development. The actions to reduce negative impacts on stormwater ponds resemble general water quality stewardship messages. Therefore, one priority awareness initiative is identified as a stormwater pond general awareness campaign “Only Rain Down the Storm Drain” and serves to address many of the desired actions. The second target behavior selected is much more specific, “utilize vegetative buffers to stabilize pond edges and trap sediments.” These behaviors were selected based on level of impact on water quality, degree of repeatability, ability to reduce barriers and economic feasibility. The education strategies for each can be seen in Table 13 and Table 14.

4.3.2.2. Audience Analysis

No regional data are currently available. A survey of homeowner/community owner association representatives is currently scheduled for summer 2012.

4.3.2.3. Education Strategy



Education Strategy: Pond Management			
Target Audience: Residential			
Driving Force: Stormwater ponds are impacted by pollution found in stormwater runoff and one tool in preventing flooding and protecting water quality			
Goal: Increase utilization of recommended best management practices by individuals for water quality benefits in stormwater ponds			
Objective: Increase the number of individuals who understand the infrastructure connection between home landscape and stormwater ponds			
Message	Format and Distribution	Resources	Evaluation
<p>"Only Rain Down the Storm Drain."</p> <p>Stormwater runoff is not treated and flows directly into stormwater ponds and other nearby waterways. Forms of pollution, such as pet waste, leaf litter, oil and gas , are found in stormwater runoff and negatively impact water quality</p>	<p>~Pond Signage</p> <p>~Charleston Area Stormwater Pond Conference</p> <p>~CYN Event Series at Trident Technical College</p> <p>~Illegal Dumping Business Cards</p> <p>~CES office phone calls and in person visits</p> <p>~Other trainings and workshops provided by Carolina Clear and ACSEC partners</p> <p>~Mass Media Efforts (Billboards, PSA, etc)</p>	<p>~Pond Conference Partnering Agencies</p> <p>~CES Website "Stormwater Pond Management Resource"</p> <p>~County Recycling Programs</p> <p>~Litter Prevention Hotline</p> <p>~Coastal Waccamaw Education Consortium</p> <p>~CYN</p> <p>~HOA and POA's</p> <p>~Master Gardeners</p> <p>~"Ed Shed" demonstration site</p> <p>~CofC Graduate Intern (Research:Case Studies, Database and Survey)</p> <p>~Research</p> <p>~Storm Drain Marking Program</p> <p>~Thank You! Campaign</p>	<p>~Number of attendees and participant feedback at The Charleston Area Pond Conference</p> <p>~Number of CES Stormwater Pond Management Resource Website Hits</p> <p>~Number of CYN Certifications</p> <p>~Number of stormwater pond phone calls recieved at CES</p> <p>~Number of Thank You! pertinent efforts</p> <p>~Outreach material distributed to HOA and POA contacts</p> <p>~Number of Storm Drain Marking Programs</p> <p>~Outreach material developed</p> <p>~Stormwater pond with interpretive signage</p>

Table 13. Pond Management Education Strategy for homeowner/neighborhood awareness



Education Strategy: Pond Management				
Target Audience: Residential with Stormwater Ponds in Housing Vacinity				
Driving Force: Stormwater ponds are impacted by pollution found in stormwater runoff and are a tool in preventing flooding and protecting water quality				
Goal: Increase utilization of recommended best management practices for water quality benefits in stormwater ponds				
Objective: Increase the number of stormwater ponds with vegetative buffers				
Behavior	Message	Format and Distribution	Resources	Evaluation
Utilize vegetative buffers to stabilize stormwater pond shorelines	Vegetative buffers along stormwater pond edges will stabilize pond banks, as well as provide other benefits such as trapping sediment and yard debris, filter pollutants in runoff, absorb nutrients that grow algae, deter nuisance wildlife and provide cover and forage for fish and invertebrates	~Pond Signage ~Charleston Area Stormwater Pond Conference ~CYN Event Series at Trident Technical College ~CES office phone calls and in person visits ~Other trainings and workshops provided by Carolina Clear and ACSEC partners ~List of recommended plants	~Pond Conference Partnering Agencies ~CES Website "Stormwater Pond Management Resource" ~Area Case Studies Ex. Kiawah Island ~Coastal Waccamaw Education Consortium ~Local Nurseries ~SC Native Plants Society ~Existing Programs: CYN, OFG, and CFY ~HOA's and POA's ~Master Gardeners ~"Ed Shed" ~Existing documents/outreach material ~Research (including CofC MES Graduate Student Research, Survey, Database, and Case Studies)	~Number of Attendees/participant feedback at 2012 Pond Conference ~CES Pond Management Website Hits ~Number of stormwater ponds with newly established vegetative buffers ~Number of HOA's and POA's that have recieved shorescaping outreach material from ACSEC ~Number of CYN Certifications ~Number of CES phone calls ~Outreach material developed

Table 14. Pond Management Education Strategy for increasing use of vegetative buffers



Stormwater Pond Management

Focus Area	Audience	Strategy	Year 1	Year 2	Year 3	Year 4	Evaluation Year 5
Awareness Campaign: Only Rain Down the Storm Drain	Residential	Storm Drain Marking Programs	Develop and Implement	Develop and Implement	Implement	Implement	Program participants/ Drains marked
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Interpretive signage	Develop	Develop	Develop and Pilot	Implement	Host pond sites
		Pond Conference	Develop and Implement		Develop and Implement		Participation, feedback
		Thank You! Campaign	Develop and Pilot	Pilot	Implement	Implement	Number of Impacts
Utilize vegetative buffers to stabilize stormwater pond shorelines	Residential	Outreach Material	Develop	Develop and Pilot	Distribute	Distribute	ACSEC distribution at education programs
		Pond Conference	Develop and Implement		Develop and Implement		Participation, feedback
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		CYN Event Series/ Partner Programs	Develop and Pilot	Pilot	Implement	Implement	Participation, feedback, yard certifications

Table 15. Timeline for Stormwater Pond Management Education Strategy



4.3.3. Home Auto Repair

4.3.3.1. Overview

ACSEC members have identified home auto repair as a priority stormwater issue for residential audiences. When stormwater runoff transports motor oil, antifreeze, gasoline, and other car fluids water quality is negatively impacted. Many actions can reduce negative impacts caused by home auto repair, some of which include the following:

- Utilize funnels when pouring fluids
- Check driveways for puddles
- Catch fluids in a container and never allow fluids to drain onto the ground
- Clean up all leaks and spills using absorbent material
- Never wash away spilled fluids with water
- Take used motor oil to a collection a station
- Never dispose of oil or car fluids down storm drains

Clemson Carolina Clear staff utilized a modified behavior selection matrix to select “clean up all leaks and spills using absorbent material” and “take used motor oil to a collection station” as priority behaviors for further education strategy development. These behaviors were selected based on level of impact on water quality, degree of repeatability, ability to reduce barriers and economic feasibility. Both of the education strategies, proper cleanup and disposal, are represented in the following Table 16 and Table 17.

The preliminary timeline for the home auto repair education strategy is illustrated in Table 18. In creating a five-year timeline, potential for adjustment exists as programs develop and change. During year five, progress will be evaluated and future benchmarks will be identified.

4.3.3.2. Audience Analysis

In the 2009 survey, a majority of respondents (87%) indicated that they consider fuel and oil leaks from automobiles, trucks, and buses to have a “great” or “some impact.” This can prove beneficial in garnering public support in addressing this issue and focusing on improving individual pollution reduction behaviors associated with automotive maintenance. Highlights from the survey regarding specific behaviors included:

- Majority (86%) have “never” operated a vehicle with a motor oil leak
- Majority (96%) have “never” poured oil down a storm drain

4.3.3.3. Education Strategy



Education Strategy: Home Auto Repair				
Target Audience: Residential				
Driving Force: When stormwater runoff transports motor oil, antifreeze, gasoline, and other car fluids, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways to dispose of engine fluids				
Objective: Increase the number of individuals who take used motor oil to collection stations				
Behavior	Message	Format and Distribution	Resources	Evaluation
Take used motor oil to collection stations typically available at recycling centers and auto repair shops	Engine fluids should always be taken to a collection station to be disposed of properly. Never dispose of oil or car fluids down the storm drain; these materials can be harmful to water quality and the environment	~ACSEC <i>Ripple Effect</i> ~CES Website ~Educational materials at Home Auto Repair Shops ~CES office phone calls and in person visits ~Master Naturalist and Master Gardener Trainings ~Education programs by ACSEC partners ~Billboards/PSA ~Interpretive signage in highly visible locations such as boat landings, beach access etc ~SDM Program	~CES Website ~CCPRC and other ACSEC Partners ~ACSEC E-Newsletter <i>Ripple Effect</i> ~Local Auto Repair Shops ~Local Media Coverage ~Local Mass Media ~Blue Business ~SDM Program	~CES Website Hits ~Mass Media Efforts ~Number of participating stores in providing educational materials ~Number of Interpretive Signs/Locales ~Published articles ~Number of Storm Drain Marking Programs

Table 16. Education strategy for home auto repair proper disposal of oil



Education Strategy: Home Auto Repair				
Target Audience: Residential				
Driving Force: When stormwater runoff transports motor oil, antifreeze, gasoline, and other car fluids, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways to dispose of engine fluids				
Objective: Increase the number of individuals who clean up engine fluid leaks and spills using dry methods				
Behavior	Message	Format and Distribution	Resources	Evaluation
Clean up all engine leaks and spills using absorbant material such as kitty litter, then sweep with a broom and dispose of properly	Spilled engine fluids should never be washed away with a hose; these materials are harmful to water quality and the environment. All leaks and spills should be cleaned up utilizing an absorbant material	~ACSEC <i>Ripple Effect</i> ~CES Website ~Educational materials at Home Auto Repair Shops ~CES office phone calls and in person visits ~Master Naturalist and Master Gardener Trainings ~Education programs by ACSEC partners ~Billboards/PSA ~Interpretive Signage in highly visibale locations such as boat landings, beach access etc ~SDM	~CES Website ~CCPRC and other ACSEC Partners ~ACSEC E-Newsletter <i>Ripple Effect</i> ~Local Auto Repair Shops ~Local Media Coverage ~Local Mass Media ~Blue Business ~Storm Drain Marking Programs	~Mass Media Efforts ~Number of participating stores in providing educational materials ~Number of Interpretive Signs/Locales ~Published articles ~Storm Drain Marking Programs

Table 17. Education strategy for home auto repair proper clean up of oil and auto fluids



Home Auto Repair

Focus Area	Audience	Strategy	Year 1	Year 2	Year 3	Year 4	Evaluation Year 5
Clean up engine spills and leaks using absorbent material	Residential	Storm Drain Marking Programs	Develop and Implement	Develop and Implement	Implement	Implement	Program participants/ Drains marked
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits/ <i>Ripple Effect</i> recipients
		Interpretive signage			Develop and Pilot	Implement	Store participation, feedback
		Outreach Material	Develop	Develop and Distribute	Distribute	Distribute	Store participation, ACSEC education programs including message & material
Dispose of used motor oil at collection stations	Residential	Mass Media	Develop and Implement				Number of Impacts
		Storm Drain Marking Programs	Develop and Implement	Develop and Implement	Implement	Implement	Program participants/ Drains marked
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits/ <i>Ripple Effect</i> recipients
		Outreach Material	Develop	Develop and Distribute	Distribute	Distribute	Store participation, ACSEC programs
		Interpretive signage			Develop and Pilot	Implement	Store participation

Table 18. Timeline for home auto repair strategy



4.4. Commercial Audience Priority Issues

The commercial audiences section includes the ACSEC education strategy and timeline for each of the priority issues pertaining to stormwater education for commercial audiences. The commercial priority audiences, as identified in the January 2011 ACSEC meeting are as follows:

- ***Landscapers and Pond Management Companies*** (primary topics: nutrient management and post-construction BMP maintenance)
- ***Restaurants/Hospitality*** (primary topic: FOG (fats, oils, grease) management)
- ***Automotive Businesses*** [includes maintenance/repair shops, gas stations, car washes, etc.] (primary topic: petroleum product management)

4.4.1. Fertilizer Application (Landscaping Businesses)

4.4.1.1. Overview

When stormwater runoff transports fertilizers and yard debris, excess nutrients enter waterways and can negatively impact water quality, potentially leading to algae blooms and fish kills caused by a reduction in dissolved oxygen. Fertilizers are most likely transported in stormwater runoff when applied before a rain event, applied on an impervious surface, or applied in greater amounts or more frequently than plants can or will utilize. If professional landscapers consider plant needs and water quality when applying fertilizers, appropriate precautions can be taken and serious negative water quality impacts can be avoided.

Yard debris is a source of excess organic carbon and may also physically clog stormwater drains and pipes potentially creating backup and overflow. Professional landscapers should always dispose of yard debris properly and never wash or place down the storm drain. The priority issues to be addressed in ACSEC education efforts for professional landscapers are “Fertilizer Application” and “Proper Disposal of Yard Debris.” The education strategy and timeline are illustrated in Tables 19-21.

4.4.1.2. Education Strategy



Education Strategy: Landscaper Water Quality Stewardship				
Target Audience: Commercial Landscapers				
Driving Force: When stormwater runoff transports fertilizers and yard debris, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways for professional landscapers to protect water quality				
Objective: Increase the number of landscapers that consider water quality issues when applying fertilizer				
Behavior	Message	Format and Distribution	Resources	Evaluation
Consider impacts on water quality when applying fertilizer. "Be wise when you fertilize."	Excess fertilizers transported in stormwater runoff can negatively impact water quality, potentially leading to fish kills caused by a reduction in dissolved oxygen. Fertilizers are most likely transported in stormwater runoff when applied before a rain event, applied on an impervious surface, or applied more frequently than necessary.	~ACSEC <i>Ripple Effect</i> ~CES Website ~Outreach materials provided to landscapers ~Blue Business Certification ~Storm Drain Markers ~Mass Media and Thank You! campaign ~CES Office: Soil Sample analysis and Master Gardener ~Interpretive signage in stores	~CES Website ~ ACSEC Listerv and Partners ~Social Media ~Landscape professionals ~Local media coverage ~Local mass media efforts ~Blue Business initiative ~Storm Drain Marking Programs ~Carolina Clear Intern ~Participating stores where fertilizers are sold ~Landscaper associations	~Number of participating landscapers in receiving educational materials ~Blue Business certified landscapers ~Outreach materials developed and distributed ~Published local media articles ~Feedback from professional landscaping associations

Table 19. Education strategy for landscaper water quality stewardship fertilizer application



Education Strategy: Landscaper Water Quality Stewardship				
Target Audience: Commercial Landscapers				
Driving Force: When stormwater runoff transports fertilizers and yard debris, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways for professional landscapers to protect water quality				
Objective: Increase the number of landscapers that consider water quality issues when disposing of yard debris				
Behavior	Message	Format and Distribution	Resources	Evaluation
Never dispose of leaf litter, grass clippings and other forms of yard debris down the storm drain. "Only rain down the storm drain."	Yard Debris transported in stormwater runoff can negatively impact water quality, potentially leading to fish kills caused by a reduction in dissolved oxygen. Yard debris may also clog stormwater drains and pipes potentially creating backup and overflow. Yard Debris should be disposed of properly and never washed or placed down the storm drain.	~ACSEC <i>Ripple Effect</i> ~CES Website ~Outreach materials provided to landscapers ~Blue Business Certification ~Storm Drain Markers ~Mass Media and Thank You! campaign ~CES Office: Master Gardener contact ~Interpretive signage in stores	~CES Website ~ ACSEC Listerv and Partners ~Social Media ~Landscape professionals ~Local media coverage ~Local mass media efforts ~Blue Business initiative ~Storm Drain Marking Programs ~Carolina Clear Intern ~Landscape associations	~Number of participating landscapers in receiving educational materials ~Blue Business certified landscapers ~Outreach materials developed and distributed ~Published local media articles ~Feedback from landscape associations

Table 20. Education strategy for landscaper water quality stewardship proper disposal of yard debris



Commercial Landscaping Practices

Focus Area	Audience	Strategy	Year 1	Year 2	Year 3	Year 4	Evaluation Year 5
Appropriate Fertilizer Application ("Be Wise When You Fertilize")	Commercial	Blue Business			Develop	Pilot	Program participants, feedback
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Outreach Materials	Develop and Distribute	Distribute	Develop	Develop and Pilot	Materials distributed
		Interpretive Signage in Stores			Develop	Develop and Pilot	Store participation, feedback
Disposal of Yard Debris ("Only Rain Down the Storm Drain")	Commercial	Blue Business			Develop	Pilot	Program participants, feedback
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Outreach Material	Develop and Distribute	Distribute	Develop	Develop and Pilot	Materials distributed
		Thank You! Campaign	Develop and Pilot	Develop and Pilot	Implement	Implement	Number of impacts
		Interpretive Signage in Stores			Develop	Develop and Pilot	Store participation, feedback

Table 21. Landscaper Education Strategy Timeline



4.4.2. Restaurants and Hospitality

4.4.2.1. Overview

Fats, oil, and grease (FOG) that are not disposed of properly may be transported by stormwater into local waterways causing negative water quality impacts. FOG's can also solidify in stormwater pipes and can cause pipes, drains and sinks to back up and overflow. Restaurant owners and managers should assure staff is aware of the significance of proper FOG disposal, as well as procedures to avoid illegal discharges. Barriers to proper disposal can be reduced by maintaining grease traps in well-lit areas and in close proximity to the kitchen door. By simply educating staff on the significance of this issue, restaurant owners may reduce the likelihood that FOG's make their way into local waterways. The Blue Business initiative is a significant portion of the education plan to address this water quality issue. Development of the restaurant section of Blue Business initiative begins in year two of the strategic education plan. Development of additional outreach materials is also necessary to target the specific restaurant staff audience. Tables 22-24 outline the education strategy and timeline pertaining to restaurants as a target audience and FOG's as a priority issue.

4.4.2.2. Education Strategy



Education Strategy: Fats, Oils and Grease Management				
Target Audience: Restaurants				
Driving Force: When stormwater runoff transports fats, oils and grease, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways for restaurants to dispose of fats, oils and grease				
Objective: Increase the number of restaurants that educate employees about proper FOG management				
Behavior	Message	Format and Distribution	Resources	Evaluation
Restaurant managers should educate employees about proper disposal of fats, oils and grease.	FOG's solidify in stormwater pipes and can cause pipes to become blocked and overflow. Never dispose of FOG's down the storm drain; these materials can be harmful to water quality and the environment. Instead, assure restaurant employees are aware of proper disposal protocol.	~Outreach materials provided to restaurants ~Blue Business Certification ~Storm Drain Markers ~Mass Media and Thank You! Campaign ~ACSEC <i>Ripple Effect</i> ~CES Website	~Local restaurants ~Local media coverage ~Local mass media efforts ~Blue Business initiative ~Storm Drain Marking programs ~Carolina Clear intern ~CES Website ~ACSEC Listerv and Partners ~Social Media	~Number of participating restaurants receiving educational materials ~Blue Business certified restaurants ~Outreach materials developed and distributed ~Published local media articles

Table 22. Education strategy for employee education for restaurants



Education Strategy: Fats, Oils and Grease Management				
Target Audience: Restaurants				
Driving Force: When stormwater runoff transports fats, oils and grease, water quality is negatively impacted				
Goal: Increase awareness of appropriate ways for restaurants to dispose of fats, oils and grease				
Objective: Increase the number of restaurants that maintain their grease trap				
Behavior	Message	Format and Distribution	Resources	Evaluation
Maintain restaurant grease trap to allow for proper disposal of fats, oils and grease.	FOG's solidify in stormwater pipes and can cause pipes to become blocked and overflow. Never dispose of FOG's down the storm drain; these materials can be harmful to water quality and the environment. Instead, assure your restaurants grease trap is properly maintained and accesible.	~Outreach materials provided to restaurants ~Blue Business Certification ~Storm Drain Markers ~Mass Media and Thank You! Campaign ~ACSEC <i>Ripple Effect</i> ~CES Website	~Local Restaurants ~Local media coverage ~Local mass media efforts ~Blue Business initiative ~Storm Drain Marking programs ~Carolina Clear intern ~CES Website ~ACSEC Partners ~Social Media	~Number of participating restaurants recieving educational materials ~Blue Business Restaurants ~Outreach materials developed and distributed ~Published local media articles ~Restaurant feedback

Table 23. Education strategy FOG management for restaurants



Restaurant Fats, Oils, and Grease Management

Focus Area	Audience	Strategy	Year 1	Year 2	Year 3	Year 4	Evaluation Year 5
Maintain grease trap	Commercial	Blue Business		Develop	Pilot	Pilot	Program participants, feedback
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Outreach Materials	Develop and Pilot	Pilot	Distribute	Distribute	Materials distributed
Educate employees about proper FOG management	Commercial	Blue Business		Develop	Pilot	Pilot	Program participants, feedback
		CES Website/ <i>Ripple Effect</i>	Develop and Implement	Implement	Implement	Implement	Website hits, <i>Ripple Effect</i> recipients
		Outreach Material	Develop and Pilot	Pilot	Distribute	Distribute	Materials distributed

Table 24. Timeline for restaurant education strategy



4.4.3. Auto Repair Businesses

4.4.3.1. Definition of the Issue

Water quality is negatively impacted when stormwater runoff transports motor oil, antifreeze, gasoline, and other car fluids into local waterways. Much like residential home auto mechanics, commercial auto stores can take responsibility to prevent negative impacts caused by engine fluids in stormwater runoff. Based on preliminary data and discussion provided by Clemson University Carolina Clear staff, the priority behavior identified for auto repair shops pertains to appropriate clean up of spilled auto fluids. Auto Repair Shops should always use dry methods to clean up leaks and spills, being careful never to wash these materials down a storm drain. Future ACSEC research will help to better understand auto repair shop challenges and vulnerability pertaining to water quality contamination and stormwater runoff. At that time, target behaviors and strategies will be identified and addressed.



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6. Appendix

6.1. Partner Directory

6.1.1. Ashepoo Combahee Edisto River (ACE) Basin National Estuarine Research Reserve



Mission: The ACE Basin NERR aims to protect the natural beauty, abundant wildlife and unique cultural heritage of the area through long-term research, water-quality monitoring, education and coastal stewardship.

Website: www.dnr.sc.gov/marine/NERR/index.html

Physical Address: 217 Fort Johnson Road, James Island, SC 29412

Primary Audience: General Public, Youth, Decision Makers, Residential and Teachers

Education Programs: Coastal decision-maker training, Educational Vessel *Discovery* Programs, land-based environmental programs, Coastal Exploration Series, ACE Basin Teacher's Workshop

Additional Information: The ACE Basin, located 45 minutes south of Charleston, SC, is one of the largest undeveloped estuaries on the east coast of the United States. The ACE Basin National Estuarine Research Reserve (NERR) was designated in 1992 as a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the South Carolina Department of Natural Resources (SCDNR). The ACE Basin NERR aims to protect the natural beauty, abundant wildlife and unique cultural heritage of the area through long-term research, water-quality monitoring, education and coastal stewardship.



6.1.2. Charleston County Parks and Recreation Commission



Mission: The Charleston County Park and Recreation Commission will improve the quality of life in Charleston County by offering a diverse system of park facilities, programs, and services.

Website: www.ccprc.com

Physical Address: 861 Riverland Drive Charleston, SC 29412

Primary Audience: General Public, Higher Education Students, Residential, Decision Makers, Teachers, Youth

Education Programs: Master Naturalist, A variety of interpretive programs for school groups, youth groups and general public which include seining, bird watching, canoe trips, night hikes, lowcountry plants and wildflowers, etc. Program list is available at www.ccprc.com/index.aspx?NID=125

Brief Overview: One of the prime responsibilities of the Charleston County Park & Recreation Commission is the development of a countywide park system. These parks are generally of a size and scope that would not be developed by other municipalities and public service districts. The park system emphasizes passive activities, outdoor recreation, environmental education, and public beach access. Each park facility offers a variety of programming generally directed toward the natural features and characteristics of the site. The staff and commission of the Charleston County Park and Recreation are committed to maintaining high standards in the delivery of leisure services and facilities to the citizens of Charleston County.



6.1.3. Clemson University Carolina Clear Program



Mission: Carolina Clear is a comprehensive approach developed by Clemson University to inform and educate communities about water quality, water quantity, and the cumulative effects of stormwater with the goal of modifying behaviors to achieve greater protection and restoration of shared water resources.

Website: www.clemson.edu/public/carolinaclear/

Physical Address: 259 Meeting Street, Charleston SC

Primary Audience: Youth, Residential, Commercial, Teachers, Higher Education Students, Decision Makers

Education Programs: 4H₂O Youth Summer Camp, Carolina Yards and Neighborhoods, Seeds to Shoreline, rainwater harvesting and rain garden installation programs, and technical trainings for a variety of audiences

Brief Overview: Currently, more than 1150 of our lakes, rivers and creeks have been listed as impaired by the state's Department of Health and Environmental Control (DHEC). Stormwater is the leading threat to water quality, and it is recognized that control of such pollution is most effectively implemented when people and organizations understand its impacts, its sources and the actions each individual can take to minimize their contribution to stormwater. Carolina Clear was developed to inform and educate communities about water quality, water quantity, and the cumulative effects of stormwater. Carolina Clear is a comprehensive approach developed by Clemson University to inform and educate communities about water quality, water quantity, and the cumulative effects of stormwater. Carolina Clear addresses the special significance of South Carolina's water resources and the role they play in the state's economy, environmental health, and overall quality of life.



6.1.4. Clemson University Cooperative Extension Service



Mission: The mission of the Clemson University Cooperative Extension Service is to provide sound, scientifically based information to South Carolinians and to help them use that information to improve the quality of their lives.

Website: www.clemson.edu/extension

Physical Address: 259 Meeting Street, Charleston, SC

Education Programs: Programs pertinent to ACSEC are: Master Gardener Certification Program, soil sample service, 4H₂O Youth Summer Camp, Carolina Yards and Neighborhoods, Certified Erosion Prevention and Sediment Control Inspector (CEPSCI), Certified Stormwater Plan Review (CSPR).

Brief Overview: South Carolina Cooperative Extension is based at South Carolina's two land-grant institutions, Clemson University and South Carolina State University, in all 46 counties, and at the five Research & Education Centers. Focusing upon research-based information in agriculture, environment, food safety & nutrition, economic & community development, youth & families, Cooperative Extension Service engages citizens to help build a better South Carolina.



6.1.5. College of Charleston: Master of Science in Environmental Studies Program



Website: www.cofc.edu

Physical Address: 66 George Street, Charleston SC

Mission: to provide environmental students with interdisciplinary, integrative science and policy training. Through a comprehensive, balanced, and inclusive curriculum, this program strives to prepare students to solve the increasingly complex environmental problems facing society. The MES program focuses on human impacts to the environment and provides quality research and management training through a thesis or internship option.

Primary Audience: Higher Education Students, Technical, Decision Makers

Programs: Master degree programs in Environmental Studies, Environment and Public Administration dual-degree program

Brief Overview: Our Master of Environmental Studies (MES) program prepares students to deal with the complex nature of environmental issues through an interdisciplinary approach that capitalizes on the unique faculty and research strengths of the College of Charleston, SC. The faculty at the College of Charleston contributes through the policy sciences and the natural science areas of biology, geology, mathematics, and physics. The MES program curriculum consists of several core courses which give students a background in two substantive academic curricula: Environmental Policy and Environmental Science, as well as two semesters of Graduate Core Seminars and a Case Studies course. Additionally, students are able to focus their interests either in Environmental Science - concentrating in Biology, Geology, or Physics - or in Environmental Policy.



6.1.6. Community Pride, Inc. and Adopt-a-Highway



Mission: 1) To support and facilitate local efforts to enhance the visual landscape and environment of Charleston County 2) To inspire and create pride among citizens through community recognition and awards 3) To coordinate and promote the County's Adopt-A-Highway program

Website: www.communityprideinc.org

Address: 259 Meeting Street Charleston, SC 29401

Primary Audience: General Public, Businesses, and Civic Groups

Education Programs: Adopt-A-Highway

Brief Overview: Initiated in South Carolina in 1988, the Adopt-A-Highway program works to utilize the volunteered time of caring citizens to combat litter along SC highways. Volunteer groups complete a report card which provides information on how many volunteers participated in the cleanup, how many bags of trash were collected and how long the group worked. Adopt-A-Highway schedules four cleanups a year. Those interested in becoming involved sign an agreement form to participate committing to a two-year period, then SCDOT will put up a sign at the adopted section with the group's name on it. SCDOT provides trash bags, safety vests, and gloves for group.



6.1.7. Keep Charleston Beautiful



Mission: To promote a cleaner more beautiful Charleston through education, awareness, and community involvement.

Website: www.KeepCharlestonBeautiful.com

Physical Address: 823 Meeting Street, Charleston SC

Primary Audience: General Public, Youth, Higher Education Students, Residential, Commercial, Teachers, Decision Makers

Education Programs: Clean City Clara: Litter Prevention, Clean Cities Sweep, My City Is NOT Your Ashtray, Pick Up After Your Pet, Charleston Friendly Yards

Brief Overview: Charleston is renowned for its history, natural beauty and charm. Since 1977, Keep Charleston Beautiful has been working to maintain the beauty of the area through education, public awareness and community involvement. A clean Charleston is a visible demonstration of the pride that area residents take in their community. Keep Charleston Beautiful programs and events extend to all areas of the City of Charleston including the Charleston Peninsula, West Ashley, James Island, Daniel Island, and Johns Island. Keep Charleston Beautiful provides volunteer groups with advice, project assistance, and free supplies for litter cleanups. They also provide free education programs for litter prevention and work with school groups to plan cleanup and beautification events. Keep Charleston Beautiful works to both raise awareness for litter prevention and to provide systems and mechanisms to prevent litter. The Pick UP after Your Pet program, for example, both educates dog owners on the hazards of pet waste but also work to install dog bag dispensers in City parks and hand out free Frisbees to responsible dog owners. Keep Charleston Beautiful's goal is simple, educate today for a litter-free tomorrow.



6.1.8. South Carolina Aquarium



Mission: The South Carolina Aquarium inspires conservation of the natural world by exhibiting and caring for animals, by excelling in education and research, and by providing an exceptional visitor experience.

Website: www.scaquarium.org

Physical Address: 100 Aquarium Wharf Charleston, SC 29401

Primary Audience: General Public, Youth, Teachers

Education Programs: Hands on tangible conservation programs that serve Early Childhood, grades, K-2, 3-5, 6-8, 9-12. These are structured programs that are standards based. Conservation education programs throughout the day that take place in our galleries. Trading post station where kids can trade/discuss natural artifacts. Member programs that take place throughout the year on and offsite. Outreach programs that serve early childhood, elementary, middle, and high school students. Outreach programs that serve assisted living and senior facilities. Birthday Parties that have some conservation messaging. Job Shadow opportunities for Middle and High School students. Sleepovers for groups, clubs, and schools. Behind the Scene Tours.

Brief Overview: The South Carolina Aquarium inspires conservation of the natural world by exhibiting and caring for animals, by excelling in education and research, and by providing an exceptional visitor experience through many diverse audiences and programs. Like a tributary in a watershed we come together with other organizations to share the story and message about water and all things natural that depend on it.



6.1.9. South Carolina Department of Natural Resources -South Carolina Oyster Restoration and Enhancement Program (SCORE)



Mission: SCDNR's mission is to serve as the principal advocate for and steward of South Carolina's natural resources. SCORE's mission is to raise public awareness of coastal marine resource issues and encourage and foster active stewardship.

Website: www.dnr.sc.gov

Physical Address: 217 Fort Johnson Road, James Island, SC

Primary Audience: General Public, Youth, Teachers, Residential, and Higher Education Students

Education Programs: classroom activities related to oysters, biodiversity and water quality field lessons, and habitat water quality monitoring

Brief Overview: The SC Oyster Restoration and Enhancement program of the SCDNR is a community-based habitat restoration program focusing on oysters and saltmarsh. Both oysters and saltmarsh provide essential fish habitat and play major roles in water quality. SCORE seeks to raise public awareness of the importance of these habitats and involve coastal citizens in hands-on stewardship activities including habitat restoration.



6.1.10. South Carolina Maritime Foundation-Spirit of South Carolina



Mission: The South Carolina Maritime Foundation is a public nonprofit 501(c)(3) organization that owns and operates the tall ship Spirit of South Carolina. The Foundation's mission is to create opportunities for life-changing experiences resulting in leaders for tomorrow's communities.

Website: www.scmartime.org

Physical Address: 17 Lockwood Drive. Suite 501 Charleston, SC 29401

Primary Audience: Youth, Teachers, Higher Education Students

Education Programs: Spirit of South Carolina, Sea Spray Scouts 21st Century Spirit Ocean Adventure, Spirit Ocean Adventure Horizons Extended Day Programs

Brief Overview: The South Carolina Maritime Foundation offers varieties of educational programs designed to challenge and engage students while promoting responsibility, teamwork and stewardship for both their community and their environment. All programs are hands-on experiential based programs that emphasize learning through real world experiences for students in grades three through college and adults. Since 2007, over 283 educational programs have been conducted and almost 10,000 students have been served.



6.1.11. South Carolina Native Plant Society: Lowcountry Chapter



Mission: The South Carolina Native Plant Society is a non-profit organization committed to the preservation and protection of native plant communities in South Carolina.

Website: www.scnps.org

Primary Audience: General Public, Residential, Technical, Decision Makers, and Commercial

Education Programs: Native Plant Sales, SCNPS presentation at schools, garden clubs and for other groups, monthly meetings with guest speaker, tabling outreach events, fairs and festivals

Brief Overview: The South Carolina Native Plant Society is a non-profit organization committed to the preservation and protection of native plant communities in South Carolina. We work to make this happen by providing programs and activities designed to: educate and inform members and the general public about the importance of native plants support efforts by government agencies to protect habitats and endangered species encourage the use of native plant materials in public and private landscaping promote the commercial availability of native plant materials. We have five chapters state-wide and also a state organization. In addition to monthly meetings and field trips, the native plant society members conduct plant rescues, participate and sign on to important environmental issues affecting native plant communities, award biannual community grants, conduct biannual plant sales, perform outreach through education programs and participate in local events. We also support and partner with a variety of like-minded organizations.



6.1.12. South Carolina Sea Grant Consortium



Mission: The mission of the South Carolina Sea Grant Consortium is "enhancing practical use and conservation of South Carolina's coastal and marine resources that foster a sustainable economy and environment".

Website: www.scseagrant.org, www.cosee-se.org

Physical Address: 287 Meeting Street Charleston, SC 29401

Primary Audience: Youth, Teachers, and Scientists

Education Programs: COSEE SE (Center for Ocean Sciences Education Excellence): Our Amazing Coast Elementary Program, BAB (Build-A-Buoy), ROVs, REEF (Researcher-Educator Exchange Forum), Brown Bag Seminar Series, climate change South Carolina Sea Grant: From Seeds to Shoreline: Engaging Students in Salt Marsh Restoration; Photographs, Poems Pencils and Pluff Mud: Learning Salt Marsh Ecology through Visual Arts, Curriculum Connection (on-line supplement to the Coastal Heritage magazine), Clean Marine (marine debris education and stewardship), classroom/field based sessions on coastal habitats, climate change, marine animals and plants

Brief Overview: The S.C. Sea Grant Consortium is a state agency committed to optimizing the balance among economic, social, and environmental potential of the state's coastal and marine resources through the support of integrated research, education, and extension programs. It does so by engaging the talents and expertise found at South Carolina's leading university and research institutions to increase our knowledge about the natural, cultural, and social environments of South Carolina and the region. Through a program of research, education, extension, and training, the agency enhances economic opportunities and conservation of coastal and marine resources for South Carolina citizens.

Additional Information: SC Sea Grant has a number of publications available for download from the product section of the website categorized by topic area (www.scseagrant.org).



6.1.13. Surfrider Foundation: Charleston Chapter



Mission: The protection and enjoyment of the world's oceans, waves and beaches through a powerful activist network.

Website: charleston.surfrider.org
Facebook - Surfrider Foundation Charleston Chapter

Physical Address: PO Box 14065 Charleston SC 29422

Primary Audience: General Public, Youth, Higher Education Students, Teachers, Surfers

Education Programs: Beach and marsh litter sweeps, Ocean Friendly Gardens, pet waste dispensers and educational signage, cigarette butt receptacles and educational signage, Rise Above Plastics

Brief Overview: Surfrider Foundation strives to educate the public about the impact we all have on the health of the ocean. We raise awareness of issues that affect our ocean, and the fragile ecosystem of creeks and rivers that surrounds us. We organize beach and marsh sweeps and engage schools and other organizations to assist us with keeping the beaches and marshes clean.

Additional Information: You do not have to be a surfer to join our organization. Approximately 50% of our active members are not surfers. We are not a surf club by any means. We are a group of people that love the beach and want to see it as healthy as possible.



6.1.14. Sustainability Institute



Mission: The Sustainability Institute is an award-winning, nonprofit organization with a mission of empowering South Carolina communities to transform our homes and workplaces to conserve energy and reduce our overall environmental impact.

Website: www.sustainabilityinstituteSC.org

Physical Address: 113 Calhoun Street, Charleston, SC 29401
1441 East Montague Avenue, North Charleston, SC 29405

Primary Audience: General Public, Residential, Decision Makers, Technical

Education Programs: The Institute offers a variety of sustainable living workshops, including our signature Home Energy Conservation workshops. The Institute offers green business consulting. The Institute maintains 2 demonstration homes; The Greenhouse in Park Circle North Charleston, and Center for Sustainable Living in downtown Charleston.

Brief Overview: The Sustainability Institute (SI) is an award-winning, nonprofit, 501c(3) organization. Since 1999, we have conducted Energy Conservation workshops for over 4000 families, consulted with more than 50 businesses, and trained and certified over 225 home performance professionals. Our efforts have resulted in over \$2,000,000 in net energy savings for those with whom we have worked. By 2013, our programs will create 325 new 'green' sector jobs and will increase the energy efficiency of over 1200 units, with a 20%+ energy reduction in each. For over a decade, The Sustainability Institute has worked one person at a time to achieve energy efficiency in our community and thereby produce positive effects locally as well as on the global environment. Our programs create a win-win-win scenario because they work together to save energy costs, improve the environment, and create jobs. Our urgent focus is creating energy efficiency in the 'built environment' -- the buildings where we live and work. We work towards this focus in the following ways: Provide direct services and resources including energy improvements on homes, consulting services for businesses and municipalities, and the SC Green Building Directory 'Green' workforce training Community education and outreach



6.2. ACSEC 2012 Action Plan

Year One Strategy: Appropriate Fertilizer Application

Audience: Residential

January to December 2012	Strategy	Winter	Spring	Summer	Fall	Partner Involvement/ Staff
	Storm Drain Marking	Create drain assessment data sheet, order blank fish door hangers for school use	Clean Cities Sweep Initiative: SDM programs at participating schools	Outline SDM options based on drain location	Revamp Storm drain marking pamphlet	(Partners) Coastal Waccamaw Stormwater Education Consortium, Keep Charleston Beautiful, City of Charleston (Staff) Angela, Dave, Kim
	CES~Website/ <i>Ripple Effect</i>	ACSEC E-newsletter Ripple Effect Developed	Include specific message as tip of the month in Ripple Effect	Training on Cascade to update ACSEC website regularly	Develop new look for ACSEC website	(Partners) Center for Watershed Excellence (staff) Kim, Dave, Dawn
	Interpretive signage	Development in Year 3				
	CYN Series	Finalize paper work/agreement between TTC and CES	Launch first season in April	Revamp based on first season, no summer classes	Launch second season in September	(Partners) Trident Technical College (Staff) Mark Arena, Amy Dabbs, Jonathan Croft, David Joyner and Kim Counts
	Outreach Materials	Development in Year 2				
	Blue Business	Development in Year 2				



Year One Strategy: Stormwater Pond Management

Audience: Residential

January to December 2012

Strategy	Winter	Spring	Summer	Fall	Partner Involvement/ Staff
Storm Drain Marking	Create drain assessment data sheet, order blank fish door hangers for school use	Clean Cities Sweeps Initiative: SDM programs at participating schools	Outline SDM options based on drain location	Revamp Storm drain marking pamphlet	(Partners) Coastal Waccamaw Stormwater Education Consortium, Keep Charleston Beautiful, City of Charleston (Staff) Angela, Dave, Kim
CES Website/ <i>Ripple Effect</i>	ACSEC E-newsletter Ripple Effect Developed	Include specific message as tip of the month in Ripple Effect	Training on Cascade to update ACSEC website regularly	Develop new look for ACSEC website	(Partners) Center for Watershed Excellence (staff) Kim, Dave, Dawn
Interpretive signage	Meet with graphic design artist to create graphic	Present proposed graphic at ACSEC meeting		Develop signage for use at ponds	(Staff) Dave Joyner, Kim Counts
CYN Series	Finalize paper work/agreement between TTC and CES	Launch first season in April	Revamp based on first season, no summer classes	Launch second season in September	(Partners) Trident Technical College (Staff) Mark Arena, Amy Dabbs, Jonathan Croft, David Joyner and Kim Counts
Outreach Materials	CES stormwater pond website finalized	Promote website (Ripple Effect and Pond Conference)		Include Pond website in Pond signage	(Staff) Ben Powell, Kim Counts, Dave Joyner
Stormwater Pond Management Conference	Finalize conference logistics and speakers, promote	Host Charleston Area Conference/ Attend Grand Strand Conference	Review evaluation forms and compile lessons learned		(Partners) SCDNR, SC SeaGrant ACE Basin NERR (Staff) Dave Joyner, Kim Counts, Chris Ramaglia, Katie Giacalone, Ben Powell
Thank You! Campaign	Launch campaign with billboards in Tri-County area	Continue billboard rotation in highly visible areas	Continue billboard rotation in highly visible areas		(Staff) Katie Giacalone, Dave Joyner, and Kim Counts



Year One Strategy: Home Auto Repair

Audience: Residential

January to December 2012

Strategy	Winter	Spring	Summer	Fall	Partner Involvement/ Staff
Storm Drain Marking	Create drain assessment data sheet, order blank fish door hangers for school use	Clean Cities Sweeps Schools Initiative: SDM programs at participating schools	Outline SDM options based on drain location	Revamp Storm drain marking pamphlet	(Partners) Coastal Waccamaw Stormwater Education Consortium, Keep Charleston Beautiful, City of Charleston (Staff) Angela Crouch, Dave Joyner, Kim Counts
CES~Website/ <i>Ripple Effect</i>	Ripple Effect Developed, increase readership	Include specific message as tip of the month May/ June Ripple Effect	Training on Cascade to update ACSEC website regularly	Develop new look for ACSEC website	(Partners) Center for Watershed Excellence (staff) Kim Counts, Dave Joyner, Dawn White
Interpretive signage	Development in Year 3				
Mass Media	Utilize Thank You! Campaign on billboard with photo of individual recycling oil, to rotate in Tri-County Area	Continue billboard circulation in highly visible locations in Tri-County area	Continue billboard circulation in highly visible locations in Tri-County area	Continue billboard circulation in highly visible locations in Tri-County area	(staff) Katie Giacalone, David Joyner, Kim Counts
Outreach Materials		Reorder already developed promotional items for tabling events		Identify items specific to Home Auto Repair education	(Staff) Dave Joyner, Kim Counts, Katie Giacalone



Year One Strategy: Landscaping Practices

Audience: Commercial

January to December 2012

Strategy	Winter	Spring	Summer	Fall	Partner Involvement/ Staff
Blue Business	Development in Year 3				
CES~Website/ <i>Ripple Effect</i>	ACSEC E-newsletter Ripple Effect Developed, increase readership	Include specific message as tip of the month in March/April Ripple Effect	Training on Cascade to update ACSEC website regularly	Develop new look for ACSEC website	(Partners) Center for Watershed Excellence (staff) Kim Counts, Dave Joyner, Dawn White
Interpretive Signage in Stores	Development in Year 3				
Outreach Materials	CES stormwater pond website finalized	Reorder already developed promotional items for tabling event		Identify items specific to Commercial Landscaping Audience	(Staff) Ben Powell, Dave Joyner, Kim Counts
Thank You! Campaign	Launch Thank You! campaign with billboards in Tri-County area, Include Thank You! Logo in Ripple Effect	Continue billboard rotation in highly visible areas, TY logo in Ripple Effect	Continue billboard rotation in highly visible areas, TY logo in Ripple Effect		(Staff) Katie Giacalone, Dave Joyner, and Kim Counts



Year One Strategy: Fats, Oils, and Grease Management in Restaurants

Audience: Commercial

January to December 2012	Strategy	Winter	Spring	Summer	Fall	Partner Involvement/ Staff
	Blue Business	Meet with initial Blue Business committee to gauge interest, perceived need, and next steps to program development	Development in Year 2			
	CES~Website/ <i>Ripple Effect</i>	ACSEC E-newsletter Ripple Effect Developed, increase readership	Continue to promote Ripple Effect and add to recipient list	Training on Cascade to update ACSEC website regularly	Develop new look for ACSEC website, Include specific FOG message as "tip of the month" in Ripple Effect	(Partners) Center for Watershed Excellence (staff) Kim Counts, Dave Joyner, Dawn White
	Outreach Materials	Pilot restaurant staff education materials for use in restaurant kitchen	Gain feedback on developed materials			(Staff) Rachel Gutmann