



SOUTH CAROLINA SEA GRANT CONSORTIUM
~ 2015-2016 IMPACTS AND ACCOMPLISHMENTS ~

COASTAL AND OCEAN LANDSCAPE

IMPACTS

S.C. Sea Grant Consortium's Beach Sweep/River Sweep litter cleanup saves taxpayers \$145,652 in 2015
Susan Ferris-Hill, S.C. Sea Grant Consortium

Relevance: South Carolina has 2,876 miles of tidal shoreline, 504,450 acres of salt marsh, 165 linear miles of beaches, and more than 40 barrier islands. Natural resources account for approximately \$30 billion in annual economic output for the state (S.C. Dept. of Natural Resources' Economic Impact Report, 2009). And according to the S.C. Dept. of Parks, Recreation, and Tourism, tourism spending reached a record \$19.1 billion in 2014. Clean beaches, marshes, and waterways are critical to support commercial and recreational boating and fishing, wildlife viewing, tourism, and other industries. A litter-free environment also contributes positively to quality of life.

Response: The S.C. Sea Grant Consortium initiated the annual Beach Sweep litter cleanup program in 1988. In 1989, Hurricane Hugo devastated coastal and inland areas. To increase the effectiveness of the cleanup, the Consortium partnered with S.C. Department of Natural Resources in 1990 to extend the program statewide; the cleanup was then named Beach Sweep/River Sweep. Through the use of volunteers and private sector funds, the cleanup contributes to the economic, environmental, and societal well-being of the state. By participating in Beach Sweep/River Sweep, the public is more informed about natural resource issues, such as litter's detrimental effects on the landscape and wildlife, and people are empowered to take action and become environmental stewards.

Results: In 2015, 3,625 coastal volunteers collected nearly 14 tons of litter, covered 181 miles of South Carolina's beaches, marshes, and waterways, and recycled as much debris as possible. There were 105 coastal site captains at 130 cleanup locations in seven coastal counties, from Waties Island to Daufuskie Island. The number of volunteer hours was 7,775. The dollar value of Beach Sweep/River Sweep coastal volunteers' time is \$145,652 (U.S. Bureau of Labor Statistics, 2012). Volunteers gained an increased awareness of the fragility of natural resources, of the importance of keeping them litter-free, and of the impact of contributing time to improve their communities and natural areas.

Recap: Beach Sweep/River Sweep has economic, environmental, and societal benefits. In 2015, 3,625 coastal volunteers spent 7,775 hours to collect nearly 14 tons of litter on 181 miles of South Carolina's beaches, marshes, and waterways. There were 105 coastal site captains at 130 cleanup locations in seven coastal counties. The dollar value of coastal volunteers' time equals \$145,652. The state's natural resources are cleaner, safer, and more beautiful for all to enjoy.

An Evaluation of Study Group Design Confirms the Utility of an Integrated Team to Produce Actionable Science

Dr. Susan Lovelace and M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

Relevance: Although funding agencies often specify strategic needs or targeted areas of work when they put out a "call for proposals," more effective models of engagement are needed to increase the



likelihood the collaboration will result in documentable impacts to the targeted constituencies. A strength of Sea Grant programs is their ability to pilot new designs and methods for science-to-management research. The S.C. Sea Grant Consortium sought to strengthen its research-to-applications efforts through the piloting of a *Study Group* design.

Response: A mini-proposal competition utilizing the *Study Group* concept was held in 2014. It incorporated two key elements: identifying specific needs for applied research on specific topics, and requiring that each *Study Group* consist of a Ph.D. level scientist, a graduate student, and a Consortium extension specialist. The scientists would provide guidance, the graduate students the research work and extension, and the extension specialists would provide mentorship in extension work and ensure end users were engaged throughout the project. Five *Study Group* proposals were funded in 2014. As the projects came to a close, a short evaluation was initiated to identify and describe advantages and disadvantages for participants and the Consortium, as well as to identify improvements to increase the efficiency and success of the program.

Results: A survey of participants found:

- Eleven of the 12 faculty, student, and Sea Grant managers believed the project addressed their programmatic needs.
- All of the students felt they were successfully mentored in engagement and extension.
- Fourteen of the 15 total respondents would like to participate in this style research program in the future.
- Two of the five students have graduated from their degree programs and have been employed in their fields.

These results were shared at the Coastal and Estuarine Research Federation conference in Portland Oregon in November 2015 and the research model was identified as a best management practice by the Sea Grant site review panel in 2015.

Recap: The S.C. Sea Grant Consortium piloted a novel *Study Group* approach to integrate science, outreach, management, and policy in comprehensive research projects that engaged users throughout the research and produced products of utility for the target audience. Evaluation of the five projects described a high level of satisfaction by participants, and the National Sea Grant Site Review Panel in 2015 identified the *Study Group* model as a best management practice.

ACCOMPLISHMENTS

S.C. Sea Grant Consortium researchers examine genetic component of sudden marsh dieback **Dr. James Morris, University of South Carolina**

The sudden dieback of salt marsh grasses, or “brown marsh,” has generated a great deal of interest from the public and among state and local agencies because of the potential threat to salt marsh ecosystems. Diebacks occur throughout the range of *Spartina*, and an event in 1985 drew numerous inquiries and complaints from residents around Charleston Harbor concerned marshes in their viewsheds were dying. Identifying the direct causes of brown marsh is complex and controversial. Despite the widespread interest among scientists, public officials, and private citizens, and numerous meetings between and among them, little progress has been made. S.C. Sea Grant Consortium researchers at the University of South Carolina undertook research to examine the hypothesis that genetically-based processes intrinsic to the *Spartina* populations of a marsh stand are important determinants of mortality. Researchers reasoned the response of the plant to stress, be it from drought or other factors, is compromised as the



plant ages and its DNA becomes methylated, or turned “off,” leading to DNA that was inactivated by attached methyl groups. This would essentially freeze the physiology of the plant, leaving it unable to respond defensively to a stress. Early results suggest that increases in global methylation might not be the answer to the brown marsh ecosystem condition, but rather the strategic placement of methyl marks on prominent defensive genes resulting in a decreased or diminished response to both biotic and abiotic stressors, in essence acting as a defense mechanism. These results suggest methylation lost due to aging, not increased methylation over time, causes brown marsh.

Beaufort, S.C. Stormwater Pond Management Conference organized by the S.C. Sea Grant Consortium and partners

April Turner, S.C. Sea Grant Consortium

Stormwater ponds are among the most highly used engineering practices for controlling stormwater quantity and improving water quality, with approximately 10,000 ponds across the eight South Carolina coastal counties. Although they play a significant role in watershed function by providing for flood management, poor management may impact the health of the pond and services provided, adjacent land values and profitability, and downstream water quality. The S.C. Sea Grant Consortium, working with the ACE Basin National Estuarine Research Reserve, convened a regional pond conference in Beaufort County in 2015 for stormwater professionals, homeowners, and local government officials and staff. The Consortium co-organized and co-led this effort to extend the latest scientific information on stormwater ponds to pond managers in the public and private sectors. Adapted from a previous event held in Charleston in 2014, the conference aimed to increase awareness of stormwater ponds and the need for regular maintenance; to provide participants the information needed to overcome common challenges in pond management; and to integrate communities with service providers to assist in inspection and management actions. More than 100 participants, including community association representatives, property and pond management professionals, stormwater management professionals, and county and municipal employees, attended the conference. Topics included water and sediment quality, pond inspection and maintenance, integrated weed management, shoreline management, and low impact development techniques. Continuing education credits were provided. Conference evaluations indicated 95% of participants increased their knowledge of ponds/pond management as a result of the trainings offered and 90% of those surveyed learned something new to apply in their future work. Overall, participant feedback revealed attending this event was a good use of their time (100%). Similar conference events are in the planning stages for 2016 and 2017.

S.C. Sea Grant researchers map and analyze potential offshore wind energy development coastal ocean areas

Dr. Paul Gayes, Coastal Carolina University; Dr. James Spirek and Dr. Camelia Knapp, University of South Carolina; M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

The S.C. Sea Grant Consortium managed a multi-institutional program funded by the Bureau of Ocean Energy Management (BOEM) - Office of Renewable Energy Program to initiate geophysical surveys of two areas offshore of South Carolina with high probability of being developed for wind power generation. The effort also provided detailed surveys to assess the potential to identify prehistoric and relict landforms, historic shipwrecks and objects, and hazardous unexploded ordnance. More than 50% of the designated areas have been surveyed, and at least three shipwrecks have been identified. Results from this program will be instrumental to both BOEM and South Carolina. On Nov. 23, 2015, BOEM published a Call for Information and Nominations in the Federal Register (under Docket ID: BOEM-2015-0134) for a 60-day public comment period to gauge the offshore wind industry's interest in acquiring



commercial wind leases in four areas offshore South Carolina and to request comments regarding site conditions, resources and other uses within the designated areas. BOEM received two nominations for commercial leases in support of wind energy projects.

S.C. Sea Grant Consortium supports collaborative research on impacts of runoff on estuarine waters in Beaufort County

April Turner, S.C. Sea Grant Consortium

Between 1990 and 2006, Beaufort County, S.C., experienced extreme growth and development, with the community becoming increasingly susceptible to environmental degradation from stormwater runoff and rapid salinity changes. The impacts on local fishery resources were identified as a concern by the county, and there was a lack of credible scientific data available to the county to make policy to protect waters. To help answer this research question, a project team was organized and received federal funding from the National Estuarine Research Reserve Science Collaborative to assess and model impacts to priority estuarine waterways in the county. The Consortium was responsible for leading the collaboration efforts, including coordination of all workshops for the Watershed Advisory Committee and other local stakeholders to provide local knowledge and to ensure the study results would inform stormwater management planning efforts in the county. A project report was completed in August of 2015, and the results and recommendations were presented to the Beaufort County's Stormwater Utility Board and the Natural Resources Committee. Credible data identifying those critical waters most sensitive to stormwater runoff have been provided to Beaufort County to address stormwater policy and for incorporation into the County's Stormwater Management Plan revisions.

After 10-year hiatus, S.C. Sea Grant Consortium and U.S. Geological Survey renew science collaborative partnership

M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

The S.C. Sea Grant Consortium and the U.S. Geological Survey (USGS) Coastal and Marine Geology Program formed a partnership in 1995 to develop and implement a 10-year S.C. Coastal Erosion Study, which consisted of a combination of science and mapping projects geared to developing a sediment budget for the South Carolina coast. Information from that effort led to a more robust data and information foundation for making beach management decisions and to millions of dollars in savings to local governments. The partnership was re-energized in 2015, when the Consortium and USGS signed an updated Memorandum of Understanding in April to enhance research collaborations between USGS and Consortium scientists and managers on inner shelf processes and coastal change along the east coast of the United States. Three cooperative projects have been funded at a total of \$87,000 to study the impacts of storm events on the shelf offshore and shoreline change induced by bathymetric features along the coast of Fire Island, N.Y., and to conduct a reconnaissance survey in the Cape Canaveral coastal system in Florida.

S.C. Sea Grant Consortium assists with development of Southeast Marine Debris Reduction Plan

E.V. Bell and Julie Davis, S.C. Sea Grant Consortium

The NOAA Marine Debris Program held a workshop on Jekyll Island, Ga., in January 2016 to begin drafting a Marine Debris Reduction Plan document. Divided into working groups based on area of expertise/interest, workshop participants identified objectives, strategies, and actions for reducing marine debris in the Southeast. The Consortium has assumed a leadership role in facilitating the development of the abandoned and derelict vessels (ADV) segment of the draft Marine Debris



Reduction Plan, which is expected to undergo a final review at a 2017 meeting before being implemented. The ADV working group consists of representatives from state agencies, local government, and the U.S. Coast Guard.

S.C. Sea Grant Consortium initiates development of web-based geospatial visualization tool in response to October 2015 flooding

M. Richard (Rick) DeVoe, Dr. Melody Hunt, and Andrea Sassard, S.C. Sea Grant Consortium

In October 2015, South Carolina experienced unprecedented heavy rainfall over a three-day period, resulting in high water levels within many state waterways and significant widespread flooding. The flooding led to water quantity and water quality concerns in the coastal regions and prompted state agencies and institutions to increase existing water monitoring efforts and initiate supplemental short-term response sampling efforts. The S.C. Sea Grant Consortium initiated discussions with representatives of four agencies and three research institutions conducting monitoring within state waters to help identify ways in which information on water monitoring efforts could be shared across institutions and be publicly accessible. The Consortium initiated work on a publicly accessible, web-based visualization portal (Viz-Port), and has solicited and received rapid response funding from the National Sea Grant Office to support its completion during FY16-17.. A GIS-based tool is being constructed to visualize water-monitoring information from these agencies and institutions. The portal will allow for web-based search, query, and interactive display of monitoring activities being conducted in the state's coastal waterways. Sampling information, including sampling frequency, date and time, parameters measured, and location of both long- and short-term monitoring efforts initiated as a response to the October rain/flood event, will be able to be viewed on the tool. Links to the data and contact information will be provided in a visual interface that can be customized by the user. Computing and data needs have been identified, an initial demonstration provided, and a platform chosen to develop the tool. The visualization tool will be publicly available in Fall 2016.

S.C. Sea Grant Consortium hosts regional Sea Grant meeting

Dr. Susan Lovelace and M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

The S.C. Sea Grant Consortium hosted a meeting of extension, communications and other programmatic staff from South Atlantic Sea Grant programs March 30-April 1, 2015, the first such meeting after an extended hiatus. Held at the Historic Penn Center, the retreat setting provided an opportunity for 28 staff from the four states to:

- exchange programmatic information
- explore/develop collaborative opportunities
- build personal relationships among Sea Grant extension program leaders and among Sea Grant faculty working in particular subject areas

The meeting moved from meet-and-greet to identifying common themes, projects and needs and to developing ideas for regional activities. Projects were identified and sketched using logic models. Several were further developed into proposals submitted to the National Sea Grant workshop competition. Relationships developed during the meeting have led to supportive and innovative relationships. The group would like to continue to meeting every 18-24 months to facilitate regional opportunities and to share best practices within the region.



S.C. Sea Grant Consortium calls on expert stakeholders to help envision its long-range future
Dr. Susan Lovelace and M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

To prepare for its next few rounds of strategic planning, the S.C. Sea Grant Consortium visioning process is looking back at its successes, assessing its current capabilities and resources, and projecting our future needs to maintain a resilient and productive economy, environment, and society. For the initial round – the “10,000-foot level” – the Consortium solicited nominations from our extension and programmatic advisory boards and staff to identify people with a variety of expertise to attend one of five discussion group sessions held in July 2015. More than 75 people participated. At those meetings, participants described the future in their terms and offered perspectives on the information needs of our state and region related to the Consortium’s five strategic programmatic areas. The Consortium followed these sessions with a formal meeting of its Program Advisory Board on Aug. 6, 2015, and received feedback and comments in response to the same set of questions at the “20,000-foot level.” Information received from these initial exercises is being compiled and summarized. The Consortium continued its visioning exercise by organizing sessions with discrete audiences (e.g., underserved populations and millennials) and in 2016 will be organizing an expert panel to help envision what the future will look like at the “30,000-foot level.” Those panels will discuss how the Consortium’s efforts can be grounded in the realities of budget and staffing, but forward thinking in its capabilities to partner, leverage, and serve as the point for partnerships and initiatives. The Consortium’s visioning exercise was identified by the National Sea Grant Site Visit Team as a “best practice.”

Focus groups allow S.C. Sea Grant Consortium to glimpse the future
Dr. Susan Lovelace and M. Richard (Rick) DeVoe, S.C. Sea Grant Consortium

The S.C. Sea Grant Consortium, as part of its 2015-2016 visioning process, conducted focus groups to engage users in thinking about education, communication, extension and research needs in the future. The sessions provided an opportunity for participants to imagine the coastal area 25-30 years from now and to consider challenges and opportunities for that time. Seven focus group sessions were held, with five focused on current programmatic areas of coastal and ocean landscape, sustainable development and economy, sustainable fisheries and aquaculture, hazard resilience in coastal communities, and scientific literacy and workforce development. Each of these included about 25 participants nominated by advisory committee members, select advisory committee members and other end users of information in the content area. Two additional focus group sessions were assembled from specific groups, the Consortium’s Program Advisory Board and the 10 outgoing Knauss fellows from Southeast or Gulf states. The latter was convened to include young scientists with policy experience. The content from each session, as well as those to be conducted next year, is summarized for inclusion in a briefing booklet for the Consortium’s future Experts Panel to consider in 2016.