



SOUTH CAROLINA SEA GRANT CONSORTIUM
~ 2017-2018 IMPACTS AND ACCOMPLISHMENTS ~

COASTAL AND OCEAN LANDSCAPE

IMPACTS

S.C. Sea Grant Consortium Supports Establishment of the Center for Coastal Environmental and Human Health at the College of Charleston

Paul Sandifer and Rachel Piker, College of Charleston

Relevance. As the human population becomes increasingly urbanized, it has become imperative to understand the health benefits of exposure to natural, healthy, and biodiverse ecosystems. Studies have shown that exposure to healthy ecosystems, both terrestrial and marine, are connected to ecosystem services and through certain mechanisms are beneficial to human health and well-being. However, there is a lack of literature that systematically reviews the most recently published evidence of how contact with green spaces, natural areas and biodiverse locales, and especially coastal ecosystems affect human health and in particular that identifies causative mechanisms.

Response. With Sea Grant development fund support, S.C. Sea Grant Consortium researchers at the College of Charleston (CofC) prepared a white paper summarizing relevant evidence from peer-reviewed literature relating to relationships between exposure to healthy coastal ecosystems and human health, and reached several conclusions:

- It is evident that more incorporation of green spaces in urban settings will increase health benefits and well-being
- Understanding human–biodiversity relationships and the ways nature exposure benefits health is essential if conservation, human health, and community planning is to be addressed practically by policymakers and practitioners
- There is a great need for interdisciplinary partnerships in the ecological sciences and human health fields in order to generate more research addressing the intersection between the two

Results. The initial foundation for the establishment of the Center for Coastal Environmental and Human Health (CCEHH) at the College of Charleston was laid by this research. The CCEHH mission is to “catalyze interdisciplinary teaching and research to increase understanding of the roles of healthy coastal environments in supporting human health and well-being.” An institutional website (<http://ssm.cofc.edu/additional-programs/center-for-coastal-environmental-and-human-health/index.php>) has been developed and is hosted by CofC as a nascent communication tool for the center. A detailed syllabus and outline for a proposed new course on Coastal Ecosystem Services and Human Health was developed for approval by the CofC. Founding director Paul A. Sandifer expects in the near-term to offer research assistantships for students, with a goal of raising funds to support student internships and conference participation.

Recap. The development of the College of Charleston’s Center for Coastal Environmental and Human Health was based, in part, on support provided by the Consortium through a program development grant.



Regional Stormwater Pond Conferences organized by S.C. Sea Grant Consortium Inspire HOAs to Implement Pond Maintenance

April Turner, S.C. Sea Grant Consortium

Relevance: In South Carolina, stormwater ponds are the most common structural best management practice for regulating stormwater runoff, particularly in coastal areas where development rates are high. They also create a unique set of management issues if not properly managed, especially as they age. Without regular inspections and proper maintenance, stormwater ponds can be transformed from pollutant sinks to pollutant sources, having implications for downstream ecosystem and human health. Some of the most common barriers to pond maintenance include lack of awareness of responsibility, misinformation on best management techniques, and financial costs.

Response: To encourage proper pond maintenance, the S.C. Sea Grant Consortium co-organized and co-led a series of regional pond conferences in Charleston (2014 and 2016) and Beaufort (2017), extending the latest scientific information on stormwater ponds to public and private-sector pond managers and owners. The one-day events included lectures, hands-on classroom activities/exercises, and field-based training on a variety of maintenance topics for both pond owners and pond managers. The goal was to increase awareness as to the purpose of ponds and their need for regular maintenance, to provide information and tools to overcome common challenges in pond management, and to connect pond owners and pond managers with service providers to assist in inspections and management actions.

Results: More than 400 participants (155 in 2014, 165 in 2016, and 100 in 2017), including homeowner association representatives (HOAs), property and pond management professionals, and stormwater management professionals, and county and municipal employees, attended the conferences. They heard from local and regional experts, interacted with pond-related organizations and businesses, and received continuing education credits. Pond maintenance strategies were implemented by HOAs in Charleston, Berkeley, and Beaufort counties because of the training and technical assistance they received at the conferences. For example, in Crowfield Plantation in Goose Creek, the HOA formed a pond committee, hired a pond management company, and began capital reserves planning for future upkeep. Wakendaw Lakes HOA in Mount Pleasant has focused on pond inspections, shorescaping, and aquatic weed management, as well as additional certification trainings for members. At Hampton Lake in Beaufort County, residents reacted to the conference by setting up a pilot project to plant aquatic buffers along ponds' edges and eventually hired Charleston Aquatics to install more aquatic plants throughout the community.

Recap: The S.C. Sea Grant Consortium and partners organized pond management conferences that provided training and technical assistance to build capacity and inform over 400 stormwater professionals, property and pond management professionals, homeowner associations (HOAs) and local government officials and staff. The training, tools, and resources provided at these events resulted in the implementation of pond best management practices by many HOA communities in the region. Planning for the next conference, scheduled for fall 2018, is underway.



ACCOMPLISHMENTS

S.C. Sea Grant Consortium Research Finds Nutrient Inputs via Groundwater in Estuaries to be Modulated by Salt Marsh/Tidal Creek Features

Alicia Wilson and Erik Smith, University of South Carolina

Studies have shown that water quality in tidal creeks differs in developed and undeveloped watersheds, particularly in headwater areas. These studies on the impact of development on coastal ecosystems have focused primarily on surface waters; however, hydrologic changes associated with development have the potential to affect groundwater as well. In particular, the delivery of nutrients to creeks via groundwater could impact both nutrient concentration and form. S.C. Sea Grant Consortium researchers from the University of South Carolina assessed the impact of coastal development on groundwater inputs of nutrients to 14 representative South Carolina tidal creeks selected during 2016 stakeholder workshop. The samples were analyzed for a variety of nutrients, including nitrogen, ammonium, phosphorus, orthophosphate, and dissolved organic carbon. Initial analyses of individual creeks began to reveal trends. For example, at James Island (a developed site), increasing marsh width correlated with increasing salinity, carbon, and nitrogen. This supports underlying hypotheses that recirculation of saline creek water through salt marshes may present a far larger source of nitrogen to tidal creeks than fresh groundwater discharge from uplands, whether the uplands are developed or not. The research team focused on a subset of six creeks that allowed for seasonal sampling in the summer and winter, and limited variability that was obscuring controlling factors. Results show that salinity correlates with salt marsh width, suggesting that marshes are effective buffers between developed uplands and tidal creeks. This prompted researchers to pose the question of how wide a salt marsh needs to be before it obscures any differences between inputs from developed and undeveloped systems. Two resulting differences between such systems are levels of dissolved oxygen content and total nutrient concentrations. Dissolved oxygen content is higher in undeveloped systems, and total nutrient concentrations are higher in developed systems. Researchers are currently analyzing these additional findings.

S.C. Sea Grant Consortium & Partners Organize Stormwater Pond Conference to Encourage Pond Maintenance in Beaufort County Communities

April Turner and Bridget Cotti-Rausch, S.C. Sea Grant Consortium

In South Carolina, stormwater ponds are the most common structural best management practice for regulating stormwater runoff. This is particularly true for its coastal areas, which are experiencing some of the most rapid growth rates in the United States. Stormwater pond systems can play a significant role in watershed function, providing for flood management, pollution mitigation, and other amenities to communities. They also create a unique set of management challenges, especially as they age. The most common barriers to pond maintenance include lack of awareness of ownership and responsibility. To encourage proper pond maintenance, the S.C. Sea Grant Consortium collaborated with partners to organize a regional pond conference in Beaufort (October 19, 2017), where the latest scientific information on stormwater ponds was shared with both public and private sector pond managers and owners. Building on events held in Charleston during 2015 and 2016, the conference focus was to increase awareness of the purpose of stormwater ponds and their need for regular maintenance; to provide information and tools to overcome common challenges in pond management; and to link pond owners and pond managers with service providers to assist in inspections and management actions. One hundred participants, including community association representatives, property and pond management professionals, stormwater management professionals, homeowner associations, and



county and municipal employees, attended the conference. The event was an opportunity for participants to hear from local and regional experts, interact with organizations and businesses in the pond management industry, and receive continuing education credits. Evaluations indicated 97% of participants increase their knowledge in ponds/pond management, and 90% said they learned something new to apply in their future work. Overall, participant feedback revealed attending this event was a good use of their time (97%). Planning for a similar conference is underway for November 2018 in Charleston, SC.