

SUSTAINABLE COASTAL DEVELOPMENT AND ECONOMY

IMPACT

S.C. Sea Grant Consortium Manages the S.C. Clean Marina Program, Recertifying 4 Marinas in 2022

April Turner, S.C. Sea Grant Consortium

Nick Wallover, S.C. Department of Natural Resources

Liz Hartje, S.C. DHEC–Office of Ocean and Coastal Management and S.C. Clean Marina Technical Advisory Committee (7 industry members)

RECAP: The S.C. Sea Grant Consortium (Consortium) and partners continued to manage the S.C. Clean Marina Program (SCCMP), educating marina owners and staff about best management practices for improving water quality, which resulted in four marinas achieving clean marina recertification designations.

RELEVANCE: Due to the proximity of marinas to water, there is a potential for pollution generated from marina activities such as fueling operations, boat cleaning, maintenance/repair, boat sewage, and stormwater runoff from property parking lots to contaminate marina waters.

RESPONSE: In 2020, the Consortium took over the coordination of the SCCMP and over the past few years has worked with its partners to redevelop and revitalize/reinvigorate the program and increase the number of certified clean marinas in the state.

RESULTS: A certification training workshop was held on May 25, 2022 where eleven participants representing eight marinas were in attendance. As a result of this training, four marinas completed the recertification process and were designated as S.C. Clean Marinas. The Consortium and partners have continued to improve/enhance the SCCMP, by organizing training workshops, hosting technical team meetings, developing promotional and educational materials, and conducting site visits.

PARTNERS: S.C. Department of Natural Resources, Liz Hartje, S.C. DHEC–Office of Ocean and Coastal Management and the marina industry in S.C.

ACCOMPLISHMENTS

Consortium Assists Partners to Develop Concept for Boating Infrastructure Grant Program Economic Valuation Project

Matt Gorstein, S.C. Sea Grant Consortium

Nick Wallover and Ben Stone, S.C. Department of Natural Resources

Dan Gutentag, College of Charleston

RECAP: The S.C. Sea Grant Consortium (Consortium) assists S.C. Department of Natural Resources (SCDNR) in evaluating the economic benefits of the Boating Infrastructure (BIG) Program in South Carolina.

RELEVANCE: The primary purpose of the BIG program is to provide transient boaters with access to amenities that would otherwise be inaccessible due to limited infrastructure. The BIG program has supported the building of infrastructure in S.C. for almost 20 years, with an estimated \$35 million of funds obligated to projects in SC (roughly half of which are complete). SC benefits from the program since SCDNR is able to bring federal tax dollars back into the state. In FY21, they pulled in \$4.5 million dollars (33% of the entire awarded funds).

RESPONSE: SCDNR is interested in understanding the impact the BIG program has on the economy or community in S.C. to be able to put the cost of the program into context of the benefits. The Consortium worked with SCDNR to discuss valuation methods including travel cost surveys and input-output analysis, and connected SCDNR with the Office of Tourism Analysis (OTA) at the College of Charleston.

RESULTS: The Consortium, OTA, and SCDNR worked together to outline a concept of surveying transient boaters through email after their visits to estimate travel expenses for input into an IMPLAN model. Surveys are being implemented in spring and summer 2023. For costs, a selection of marinas (geographically spread, different sizes) that have received BIG funds will be interviewed for a breakdown of their infrastructure investments to capture the economic impacts of these projects.

PARTNERS: S.C. Department of Natural Resources, College of Charleston

S.C. Sea Grant Consortium and Partners Continue to Provide Accredited Training Program to Real Estate Professionals

Susan Lovelace, April Turner, Emmi Palenbaum, and Amanda Guthrie, S.C. Sea Grant Consortium
Katie Finegan, S.C. Sea Grant Consortium and Coastal Carolina University

RECAP: The S.C. Sea Grant Consortium (Consortium) and partners taught a series of accredited continuing education courses for 269 real estate professionals, with 11 trainings providing information and resources about important coastal issues for agents to share with clients. The Consortium is working with partners on program expansion to commercial real estate professionals and additional residential topics for future trainings.

RELEVANCE: As the number of people moving to coastal South Carolina continues to steadily increase, real estate professionals (REPs) are often the primary contact for new residents and business owners. Training REPs bridge an education and outreach gap, providing an opportunity for information and resource sharing. And in turn, REPs can share this knowledge as they interact with coastal newcomers to enhance scientific literacy, especially as it relates to flooding, sea-level rise, erosion, and tides.

RESPONSE: The Consortium with S.C. Coastal Information Network partners continued teaching “Calling the Coast Home.” This four-course series offered to coastal REPs as continuing education electives covers the topics of coastal ecosystem/biodiversity, water quality, flooding and flood maps, and building regulations in coastal zone critical areas. The Consortium continued to coordinate the program, overseeing program administration and renewal process for course modules and instructors. The program expanded coast-wide and is now offered through three realtor associations.

RESULTS: Eleven courses were taught by the Consortium and partners, with 269 attendees in total. Participants indicated that 78% increased their subject knowledge “a lot” and 70% are interested in taking additional courses. In September, the program was nationally recognized with the Superior Outreach Programming Award. These trainings are estimated to have provided an economic benefit of \$15,495. The Consortium is working on program

expansion to address commercial real estate professionals and additional residential topics.

S.C. Sea Grant Consortium Assists with National Working Waterfront Network Conference

April Turner, S.C. Sea Grant Consortium

RECAP: Through the activities of the Coastal Communities specialist as part of the National Working Waterfront Network, the Consortium has continued to support efforts to help ensure the economic viability and sustainability of working waterfronts and waterways.

RELEVANCE: As many traditional working waterfronts become vulnerable to high-end residential development, commercial activity, and climate change, much of the commercial seafood industry has been affected by changes in waterfront property use. The Consortium recognizes the importance of maintaining viable working waterfronts and supports efforts to help ensure the economic viability and sustainability of waterfront-dependent industries.

RESPONSE: The Consortium continued to support sustainable and economically viable working waterfronts through its involvement with the National Working Waterfront Network (NWWN), a nationwide network of businesses, industry associations, nonprofits, local governments, state and federal agencies, universities, Sea Grant programs, and individuals dedicated to supporting, preserving, and enhancing our nation's working waterfronts and waterways. The Coastal Communities specialist has provided technical guidance and leadership service, as part of the NWWN Advisory Committee since 2017.

RESULTS: The Coastal Communities Specialist assisted with conference planning, serving on the Program and Field Trip committees, moderating a panel session, and delivering presentation at the 2022 NWWN Conference, *Working Waterfronts: Traditions and Transitions*, in Boston, MA in July 2022. Nearly 300 attended this national event which provided participants opportunities to interact, share experiences, and advance knowledge, enabling coastal communities/stakeholders to make informed decisions, balance diverse uses, ensure access, and plan for the future of their working waterfronts.

Consortium Provided Oversight for S.C. Coastal Information Network to Coordinate Member Organization Efforts

April Turner and Emmi Palenbaum, S.C. Sea Grant Consortium

RECAP: For the past 15 years, the S.C. Sea Grant Consortium (Consortium) has managed the S.C. Coastal Information Network (SCCIN), which enhances coordination of outreach efforts among various federal, state, regional, and local network members and the strategic dissemination of information to coastal communities (including accredited continuing education courses for real estate professionals and stormwater management trainings and tools).

RELEVANCE: Communication and coordination among coastal South Carolina agencies and organizations providing outreach education to coastal communities has been challenging in the past. Information providers were often unaware of other similar outreach efforts underway targeting community leaders, local government staff, and residents. There was a need to avoid duplication of efforts, leverage scarce resources, and maximize program benefits.

RESPONSE: To improve communication and coordination among coastal outreach providers, the Consortium organized the SCCIN in 2006. SCCIN consists of more than 20 representatives from federal and state agencies, regional and local governments, and private organizations. The Consortium continued to work with SCCIN partners to serve the network's common audiences in a more organized, coordinated, and efficient manner while providing quality trainings and resources to coastal South Carolina constituents.

RESULTS: The Consortium continued to coordinate the accredited continuing education courses for real estate professionals, as well as work with SCCIN partners to provide pond conferences, stormwater management trainings, and tools. The Consortium continued to facilitate and organize network meetings (February 10 and June 20, 2022 and January 6, 2023) and maintain the SCCIN website event calendar and resource portal (www.sccoastalinfo.org), with 5,768 page views from visitors accessing the site's resources, training opportunities, and other events.

Strengthening Partnerships through National Extension Tourism

April Turner, S.C. Sea Grant Consortium

National Extension Tourism Design Team

RECAP: The S.C. Sea Grant Consortium (Consortium) and partners continue to encourage greater integration of research, education, and outreach within Cooperative Extension and Sea Grant as well as strengthen participation among members of the National Extension Tourism (NET) Network.

RELEVANCE: Tourism plays a significant role in the economies of our coastal and Great Lake states, with significant contributions to jobs, tax revenues, and quality of life. Sea Grant working with NET partners has the opportunity to greatly increase the well-being of coastal communities by taking on a prominent role in tourism, outdoor recreation management science, and community training through its research, extension, outreach, and communication programs.

RESPONSE: The Consortium with other state Sea Grant program staff, and NET design team partners worked to build and strengthen relationships with Land Grant Extension and other NET partners engaged in tourism-related programming.

RESULTS: The Consortium's coastal community specialist continued to serve as a regional representative on the NET design team—participating in quarterly meetings, as a member of the communications committee, assisting with NET website enhancements, including developing a resource library section; and is part of the 2023 Conference Planning Committee. More recently, an article highlighting Consortium tourism-related programs and co-authored with the assistant director for development and extension was featured in the extension foundation publication.

S.C. Sea Grant Consortium Provides Leadership to Nature-Based Tourism in South Carolina

April Turner, S.C. Sea Grant Consortium

RECAP: The S.C. Sea Grant Consortium (Consortium) has continued to support the S.C. Nature-Based Tourism Association, through the activities of the coastal communities specialist, providing technical assistance, conference planning, and small business promotion to help ensure the economic viability and resource sustainability of the South Carolina nature-based tourism industry as demand for nature-based and outdoor recreation experiences steadily increases.

RELEVANCE: Tourism is an important economic driver for S.C., with the estimated impact climbing to \$29 billion in 2022. Demand for nature-based tourism and outdoor recreation has continued to steadily increase. Increasing numbers of people are drawn to the state, with both residents and tourists taking advantage of the abundant opportunities South Carolina's natural and cultural resources provide. It is vital to ensure that the S.C. nature-based tourism industry is both economically viable and sustainable.

RESPONSE: The Consortium continued to support sustainable statewide, nature-based tourism and outdoor recreation through its involvement with the S.C. Nature-Based Tourism Association (SCNBTA). The Consortium's coastal communities specialist serves on the SCNBTA board of directors, providing technical guidance and leadership service (including website administration and program planning for quarterly board meetings, annual conferences and workshops, as well as coordinating and developing marketing and membership strategies).

RESULTS: The Consortium's coastal communities specialist served as the conference co-chair responsible for organizing and facilitating the SCNBTA's 2022 conference in Myrtle Beach. The specialist served as website administrator, updating content and assisting new members with getting the most out of website features and other SCNBTA benefits. She continued to serve on the membership and communication committees, focusing efforts on newsletter creation and distribution and member marketing and promotion (including new banners and postcards).

Researchers Demonstrate Utility of Virtual Reality to Study Social Perspectives on Mariculture Development

William Norman, Lauren Duffy, and Jeffrey Hallo, Clemson University

RECAP: Scientists use virtual-reality headsets to demonstrate the potential locations and size of oyster farms on the South Carolina coast to study public perception of this economically important mariculture.

RELEVANCE: South Carolina's shellfish aquaculture industry has increased by 3,326% (2012–2019) in wholesale value. A S.C. Sea Grant Consortium (Consortium) objective is to provide tools and information to enhance waterfront economic growth, including aquaculture, while ensuring the sustainability of coastal environments and local cultural identities. This ongoing research effort informs decision-makers of sustainable mariculture growth by meeting Consortium strategy to "identify the potential economic, societal, and environmental effects of expanding and new uses of the nearshore."

RESPONSE: Consortium researchers administered 372 surveys and conducted 32 assessments using virtual-reality scenarios to measure public acceptability levels of oyster mariculture. This method was tested against traditional use of manipulated photographs. The results of this study will be shared with Charleston County Parks, Beaufort County Parks, the Town of Bluffton, and oyster growers.

RESULTS: Consortium researchers presented initial results at the Southeast, Environmental & Recreation Research Conference in March 2022. A student on the project has been accepted as a visiting professor at Eckerd College. Before the research program concludes in summer 2023, additional surveys will be collected and analyzed. Study information will guide oyster mariculture along SC coastlines; while the research design (using virtual reality to assess stakeholder views) will be applicable to the greater research community.

PARTNERS: Charleston County Parks, Beaufort County Parks, Town of Bluffton, Bluffton Farmers Market, Sea Island Farmers Market, Southeastern Wildlife Exposition

Consortium Researchers Identify Steps to Facilitate Beach and Park Access for Children with Autism Spectrum Disorder

Daniel Guttentag, College of Charleston

Wayne Smith, Toronto Metropolitan University

RECAP: Working with parents of children with autism spectrum disorder (ASD), S.C. Sea Grant Consortium (Consortium) researchers identified solutions to mitigate barriers for children with ASD to visit parks, playgrounds, and beaches. The study identified actions to facilitate park and beach usage, including fencing, easily accessible parking and restrooms, special calming areas, designated spaces and times for special needs children, and education about neurodiversity.

RELEVANCE: Research has demonstrated that children with ASD benefit from outdoor recreation; with outcomes including better communication, social interactions, and positive emotions. However, children with ASD are less likely than their peers to be taken to outdoor activities. This study by Consortium researchers focused on the parents of children with ASD to understand perceived barriers to using parks with playgrounds and beaches in South Carolina and identify solutions to mitigate these barriers.

RESPONSE: Consortium researchers conducted semi-structured interviews with parents of children having ASD and conducted surveys of parents with or without children with ASD. The interviews and surveys focused on family experiences, concerns of safety and public perception, cost, and usability of the public spaces.

RESULTS: The study found that despite barriers, families with children with ASD are frequent users of parks and beaches. The study identified actions to facilitate park and beach usage, including fencing, easily accessible parking and restrooms, special calming areas, designated spaces and times for special needs children, and education about neurodiversity. Study results were presented at the 2022 S.C. Sea Grant Consortium Research Symposium, a peer-review article, and a report for state parks and tourism organizations.

PARTNERS: College of Charleston, Toronto Metropolitan University

Consortium Researchers Work with Counties and HOAs to Establish Nutrient Reduction Study of Stormwater Ponds

Annie Bourbonnais and Erik Smith, University of South Carolina

RECAP: S.C. Sea Grant Consortium (Consortium)-funded researchers are working with residents and county stormwater managers to analyze the potential of nitrogen (N) input removal within coastal stormwater ponds to determine the role that pond vegetation and constructed wetlands can play in the removal of excess N.

RELEVANCE: South Carolina coastal development relies on stormwater pond construction and maintenance to control excess flooding and maintain water quality for receiving water systems and downstream coastal systems. While ponds can effectively remove or retain particle-associated pollutants, dissolved pollutants (such as excess N) can pass to connected waterways and cause issues such as harmful algal blooms and hypoxia (low oxygen in water). Identifying approaches to enable better N retention that are also acceptable to homeowners is critical.

RESPONSE: Consortium-funded researchers are measuring N removal rates in coastal ponds and wetlands to determine which conditions maximize N removal. They are testing the hypothesis that more vegetation around ponds will enhance N removal. The information will benefit pond owners (homeowners associations and property

owners associations) and stormwater engineers/managers to determine whether pond vegetation or other retrofitting can benefit systems by reducing N input.

RESULTS: Preliminary findings demonstrate higher nitrogen removal rates in more vegetated stormwater control measures.

PARTNERS: Georgetown and Horry County (stormwater departments), Waccamaw Management, Willow Bay Home Owners Association, Summerall Oaks Home Owners Association

Consortium Researchers Investigates Socio-Economic Impacts of Flooding in Regional Study

Robert Carey, Marzieh Motallebi, Tom Williams, and Amy E. Scaroni, Clemson University

RECAP: S.C. Sea Grant Consortium (Consortium) researchers are conducting a regional study (from North Carolina to Florida) that uses case studies of extreme weather and “sunny day” flooding to quantify the social and economic impacts of flooding on access to infrastructure through a combination of modeling and community surveys, with a focus on underserved communities.

RELEVANCE: Coastal flooding in the southeast Atlantic (U.S.) impacts communities and businesses through restriction of access to infrastructure—this particularly affects under-resourced communities who may not have access to resources to encumber adaptive strategies or recover after extreme events. A holistic study that encompasses flood event measurements, flood modeling, case studies of impacted communities, and development options is needed for decision-managers to understand decisions that enhance equitable resilience.

RESPONSE: Consortium-funded researchers are participating in a regional (North Carolina to Florida) multi-disciplinary study that examines: 1) observed and predicted flood data and effects within case study areas such as Georgetown County; 2) economic impacts to businesses and residents affected by flood events; and 3) costs associated with grey and green infrastructure strategies. Outreach activities are under development such as focus groups, maps, websites, and case study scenarios based on the Low-Impact Development Suitability Index (clemson.maps.arcgis.com/apps/MapJournal/index.html?appid=175de90065eb4cc1816d57981baa43ba).

RESULTS: Preliminary results suggest that property losses in Georgetown County increases gradually over time due to sea-level rise reaching close to \$500,000,000 by 2060. All industry sectors will suffer with the greatest impact on real estate and the arts, entertainment and recreation sectors experiencing the greatest losses. Government entities will face increasing losses in property tax.

PARTNERS: Georgetown County, Bucksport, SC, Debordieu Colony, North Inlet-Winyah Bay NERR, Winyah Rivers Alliance, American Rivers, Coastal Conservation League, Carolina Wetlands Association, North Carolina Sea Grant, Georgia Sea Grant, Florida Sea Grant