

SCIENTIFIC LITERACY AND WORKFORCE DEVELOPMENT

IMPACTS

S.C. Sea Grant Consortium Graduates First Cohort of Educators from Palmetto Environmental Education Certification Program

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: Thirteen formal and nonformal educators become the first certified environmental educators in the state through the Palmetto Environmental Education Certification Program.

Relevance: In 2013, the S.C. Sea Grant Consortium disseminated a state-wide needs assessment to educators to gauge interest in the creation of an environmental education (EE) certification Program. More than 90% of the 120 responses were in favor, citing benefits such as “professionalizing the field” and “increased networking opportunities”. Following the needs assessment, two focus groups were hosted and a steering committee established to oversee the development of the certification’s content, format, and requirements.

Response: The state’s first EE certification Program, Palmetto Environmental Education Certification (PEEC), officially launched in 2018 and welcomed its first cohort of 18 formal and nonformal educators. Thirteen educators successfully completed the requirements of the two- year Program, including attendance at four workshop trainings, completion of eight online modules, 90 hours of electives, and a capstone project. In August 2020, these 13 educators officially graduated, becoming the first to obtain PEEC certification.

Results: Graduating the 2020 cohort of 13 educators established PEEC as the state’s first successful EE certification Program. This milestone positioned the Program to receive financial stability, such as a \$23,000 sponsorship from the Champions of the Environment Program. In addition, Partnerships evolved, including the official endorsement and recognition of PEEC as the official EE provider by both the Environmental Education Association of S.C. and the North American Association for Environmental Education. The economic benefit of this cohort of the PEEC Program is \$23,705.

Partners: Clemson University; Francis Marion University; Charleston County Parks and Recreation Commission; South Carolina Department of Natural Resources (SC DNR); Lynches River County Park; Kalmia Gardens; College of Charleston; Morehead Planetarium

S.C. Sea Grant Consortium Palmetto Environmental Education Certification Program Becomes Renewal Course Provider by S.C. Dept. of Education

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: The Palmetto Environmental Education Certification Program became an approved Renewal Course Provider for 120 credit hours by the S.C. Department of Education.

Relevance: S.C. formal educators must obtain 120 renewal credits every five years to renew the teaching certificate (S.C. State Department of Education [SDE] <https://ed.sc.gov/educators/certification/professional/>). Renewal credits

can be attained through attendance at workshops/trainings relevant to their field of teaching and receipt of documentation verifying the hours. Finding opportunities and keeping track of renewal hours are time consuming and costly; to assist, the SDE compiles a list of pre-approved Renewal Course Providers that provides the date/topic of training and renewal credit hours.

Response: In 2018, the S.C. Sea Grant Consortium (Consortium) led a team to launch the Palmetto Environmental Education Certification (PEEC) Program - the state's first environmental education certification Program. Because of the time commitment of the two-year Program, the Consortium applied for and was approved by the SDE for PEEC to be listed as an official "Renewal Course Provider" for 120 renewal credit hours. Both August 2020 and 2022 graduates of the Program are eligible to claim these hours.

Results: Because the PEEC Program is pre-approved for 120 renewal credit hours, any formal educator successfully completing the certification can satisfy all of the hours needed to re-up their teaching certificate for one five-year period. Not only does this decrease the amount of time educators need to find and attend Programs offering renewal credits, but it also is more economically efficient with one registration cost (\$450) covering all hours needed for recertification.

Partners: Morehead Planetarium; College of Charleston; Francis Marion University; South Carolina Department of Natural Resources (SC DNR); Charleston County Parks and Recreation Commission

S.C. Sea Grant Consortium Palmetto Environmental Education Certification Program Launches Diversity Scholarship Program

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: Diversity Scholarship Program officially launched in 2020 and awarded four scholarships for educators to enroll in the Palmetto Environmental Education Certification Program.

Relevance: In 2013, the S.C. Sea Grant Consortium (Consortium) disseminated a state-wide needs assessment to educators to gauge interest in developing an environmental education certification Program. More than 90% of the 120 responses were in favor; therefore, a steering committee was established to oversee the development of the certification's content, format, and requirements. To begin, the steering committee developed a title (Palmetto Environmental Education Certification [PEEC]), vision, mission, and objectives that served as the foundation for the entire Program.

Response: One of the PEEC objectives is to "Train educators who are representative of the diverse communities and regions within the state." Based on 2019 U.S. Census Bureau data, S.C. has 37.4% of the population who identify as a person of color; however, there is still a dearth of diversity within the fields of environmental sciences and environmental education/interpretation. To address this objective, the Consortium secured funding from the Spaulding-Paolozzi Foundation and the North American Association for Environmental Education to establish a Diversity Scholarship Program. This opportunity was made available in July 2020 to cover the registration cost for the 2020 - 2022 PEEC session.

Results: Using a scoring rubric and selection committee, four individuals (one nonformal and three formal) from Beaufort, Richland, Kershaw, and Dorchester counties were selected as winners of the PEEC Diversity Scholarship. The selection criteria included racial diversity (personal or target audience) and financial need. The estimated value of this impact exceeds \$2,400 since it covers the PEEC registration and allows for the five-year recertification of a

formal educator's teaching certificate.

Partners: Charleston County Parks and Recreation Commission; Morehead Planetarium; Lynches River County Park; South Carolina Department of Natural Resources (SC DNR); College of Charleston

ACCOMPLISHMENTS

S.C. Sea Grant Consortium Secures \$29,600 in Funding to Expand Palmetto Environmental Education Certification Program

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: The S.C. Sea Grant Consortium secured \$29,600 in funding to create a Diversity Scholarship, support instructors and administrative assistance, and provide additional educational materials for the Palmetto Environmental Education Certification Program.

Relevance: In 2013, the S.C. Sea Grant Consortium (Consortium) disseminated a state-wide needs assessment to gauge educators' interest in the development of an environmental education certification Program. More than 90% of the 120 responses were in favor, citing benefits such as "professionalizing the field" and "increased networking opportunities." Following the official launch of the Palmetto Environmental Education Certification (PEEC) Program in 2018, additional financial support was necessary to support operating costs, Program expansion, and long-term sustainability.

Response: The Consortium successfully secured \$29,600 from state and private foundations, including Harry Hampton Memorial Wildlife Fund (\$5,000), North American Association for Environmental Education (\$1,600), and the S.C. Department of Health and Environmental Control's Champions of the Environment (\$23,000). In addition, the 2020 - 2021 yearly fundraising campaign coordinated by the Environmental Education Association of South Carolina identified PEEC as one Program that would be supported by money raised (the campaign is still ongoing).

Results: With this additional funding, the PEEC Program has a) established a Diversity Scholarship Program and awarded four scholarships, b) provided 10 teaching stipends for the 2020 - 2022 PEEC instructor team, c) extended contractual support for an administrative assistant, and d) provided for additional supplies and resources to the PEEC 2020 - 2022 cohort.

Partners: Harry Hampton Memorial Wildlife Fund; Environmental Education Association of South Carolina; North American Association for Environmental Education; South Carolina Department of Health and Environmental Control (SC DHEC)

S.C. Sea Grant Consortium Curriculum Connection Serves as Model for Coastwatch Magazine's Educational Supplement, Coastwatch Classroom

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: The format and content of Curriculum Connection, the education supplement to the S.C. Sea Grant Consortium's *Coastal Heritage* magazine, serves as the model for the creation of Coastwatch Classroom.

Relevance: The S.C. Sea Grant Consortium (Consortium) produces its flagship quarterly magazine, *Coastal Heritage*,

which is offered free- of-charge as a hard copy or online version. Since its establishment in 1982, *Coastal Heritage* has produced over 150 issues covering a range of topics, including climate change impacts, invasive species, Gullah-Geechee culture, and the connection between arts and science. Many of the featured topics of Coastal Heritage align with S.C. State Standards in science, social studies, and occasionally mathematics.

Response: In spring 2000, Curriculum Connection was developed as an online, educational supplement to each *Coastal Heritage* issue using the content to address S.C. State Standards, highlight activities and resources, and provide guidance on field-based experiences.

Results: Due to the long-term success of Coastal Heritage and Curriculum Connection, North Carolina Sea Grant developed a companion educational piece for their agency's flagship magazine, *Coastwatch*. The new educational supplement, Coastwatch Classroom, launched in fall 2020, and was structured based upon the format and content of Curriculum Connection.

Partners: North Carolina Sea Grant

S.C. Sea Grant Consortium Pivots During COVID-19, Delivers 100% of Professional Development Workshops through Online Platforms

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: S.C. Sea Grant Consortium adapts 100% of face-to-face professional development to online instruction during COVID-19.

Relevance: In March 2020, S.C. public school districts, private schools, and nonformal institutions across the state closed and shifted to online learning platforms in response to the COVID-19 pandemic. For most educators, the abrupt switch from face-to-face instruction to online teaching resulted in numerous challenges, including a) locating quality online student resources, b) becoming adept using technologies for online learning, and c) meeting district- and state-wide requirements for maintaining teaching certification (e.g., renewal credits).

Response: The S.C. Sea Grant Consortium pivoted from conducting in-person professional development (PD) to hosting these opportunities via ZOOM®. Science content was repackaged in the form of live and previously-recorded videos, virtual field trips, small group discussions, demonstrations, and presentations. For most of the PD opportunities, a workshop package was mailed out in advance and included materials so participants could follow along with demonstrations, teacher resources, and student activities/lessons. Continuing education credits also were offered.

Results: Between June 2020 and February 2021, 100% of the previously scheduled, in-person PD opportunities were adapted to an online platform. These Programs included: Educator Science Cafe® Series, From Seeds to Shoreline®, BioDiscovery, Teachers on the Estuary, and Palmetto Environmental Education Certification Program. In total, 193 formal and nonformal educators attended from across the state; approximately 30% of attendees represented inland counties, a record-high metric based on the past five years. The economic impact totals \$37,132.

Partners: Charleston County Parks and Recreation Commission ; Clemson University Cooperative Extension; ACE Basin National Estuarine Research Reserve (US DOC, NOAA, NOS, NERRS); North Inlet-Winyah Bay National Estuarine Research Reserve (US DOC, NOAA, NOS, NERRS); South Carolina Department of Natural Resources (SC DNR); Patriots Point Naval & Maritime Museum

S.C. Sea Grant Consortium Adapts From Seeds to Shoreline® K-12 Program Model for Community-Based Restoration

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: Support from the National Oceanic and Atmospheric Administration National Marine Fisheries Service restoration grant expanded the From Seeds to Shoreline® K-12 model to include community-level, volunteer-based restoration and monitoring.

Relevance: The S.C. Sea Grant Consortium (Consortium) leads the coordination of the From Seeds to Shoreline® (S2S) salt marsh restoration Program, which engages K-12 students in cultivating and transplanting *Sporobolus alterniflorus* (formerly *Spartina alterniflora*) to designated areas of coastline. During this year-long restoration effort, students learn about salt marsh ecology, understand critical ecosystem benefits, and investigate threats to this habitat. Since its inception in 2010, the educational model and cultivation methodology of S2S have been established as best practices.

Response: In 2019, the S.C. Department of Natural Resources was awarded funding (the Consortium was a sub-awardee) from the National Oceanic and Atmospheric Administration National Marine Fisheries Service to engage community volunteers with both Eastern oyster (*Crassostrea virginica*) and *S. alterniflorus* restoration efforts at 13 Charleston, S.C. locations. The Consortium, using the previously established S2S model, coordinated community volunteers by engaging them in the four main restoration and data collection steps of *S. alterniflorus*: seed collection, germination, cultivation, and transplanting.

Results: During this reporting period, more 95 volunteers participated in collecting over 800,000 *S. alterniflorus* seeds at seven locations around the Charleston area. In addition, a platform was created on the Anecdota® open-source, citizen-science app for volunteers to collect and report their data.

Partners: Clemson University Cooperative Extension; South Carolina Department of Natural Resources (SC DNR); National Marine Fisheries Service (US DOC, NOAA, NMFS)

S.C. Sea Grant Consortium Launches New Educational Resources and Opportunities in Response to COVID-19 Pandemic

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: To meet the shifting needs of educators during the COVID-19 pandemic, the S.C. Sea Grant Consortium (Consortium) developed four new online educational resources and opportunities.

Relevance: In March 2020, S.C. public school districts, private schools, and nonformal institutions across the state closed and shifted to online learning platforms in response to the COVID-19 pandemic. For most educators, the abrupt switch from face-to-face instruction to online teaching resulted in numerous challenges, including a) locating quality online student resources, b) becoming adept using technologies for online learning, and c) meeting district- and state-wide requirements for maintaining teaching certificates (e.g., renewal credits).

Response: To meet the needs of online learners, the Consortium developed the following resources and opportunities:

- Facebook Live Educator Help Line: Weekly series demonstrating science activities based on the Ocean Literacy

Essential Principles (OLEPs).

- My Ocean Science Journals for elementary-, middle-, and high-school students: Includes writing prompts for K-12 students based on the OLEPs.
 - From Seeds to Shoreline® Video: Provides an overview of the project and Recaps the 2019 - 2020 school year.
 - Quarantivia: Educator networking opportunity to learn about environmental topics in S.C. using a trivia format.
- Results: The Consortium developed four new online resources to continue engaging educators and students.

Partners: Patriots Point Naval & Maritime Museum; Environmental Education Association of South Carolina; South Carolina Marine Educators Association; College of Charleston; S.C. Department of Natural Resources; Clemson University Cooperative Extension

S.C. Sea Grant Consortium Develops and Adopts Agency-Wide Diversity Plan

Elizabeth Bell and Marlena Davis, S.C. Sea Grant Consortium

Recap: The S.C. Sea Grant Consortium Board of Directors formally approves agency-wide Diversity Plan and actions have improved staff training, increased access to education, and improved diversity among advisory committees.

Relevance: Increasing diversity among staff members, stakeholders, and end-users continues to challenge not only the S.C. Sea Grant Consortium (Consortium) but geosciences-based organizations across the country. Along with increasing diversity, ensuring that Programs, resources, and opportunities foster inclusivity and are equitable adds important layers for consideration and implementation. The statistics have been and continue to be consistently low regarding diversity among career geoscientists. End users of scientific information for personal and community decision-making are often not reflective of the larger community.

Response: In June 2020 the Consortium, led by the former executive director and in collaboration with the agency's human resources manager and marine education specialist, reached out to staff for input on topics to be addressed in a formal Diversity Plan. Those responses were then categorized based on common themes, assigned an anticipated cost range, and an estimated timeframe for completion. Some categories included scheduling quarterly staff diversity trainings, increasing bilingual efforts, and diversifying advisory boards.

Results: The draft Diversity Plan was presented to the Consortium's Program Advisory Board in fall 2020 for suggestions and feedback. Shortly thereafter a revised Diversity Plan was presented to the Consortium's Board of Directors in September 2020 and was formally adopted at that time. A staff diversity statement draft has been crafted, a Diversity Scholarship established, one staff diversity training provided, and Extension advisory committee membership surpassed an initial 10% diversity threshold.

Partners: Clemson University; Coastal Carolina University (CCU); Medical University of South Carolina (MUSC); University of South Carolina (USC); The Citadel; College of Charleston; South Carolina Department of Natural Resources (SC DNR); South Carolina African American Heritage Foundation; South Carolina State University (SCSU); National Centers for Coastal Ocean Science (US DOC, NOAA, NOS, NCCOS); Office for Coastal Management (NOAA, NOS, OCM); Gullah/Geechee Cultural Heritage Corridor

S.C. Sea Grant Consortium Coastal Economics Specialist Gives Guest Lectures at Consortium Member Institutions

Matt Gorstein, S.C. Sea Grant Consortium

Recap: S.C. Sea Grant Consortium (Consortium) Coastal Economics specialist gives guest lectures in Consortium member institution classes on topics related to ecosystem service valuation, South Carolina's blue economy, and how economics and social science techniques can be used to answer environmental questions.

Relevance: In an era of climate change and frequently occurring coastal hazards, addressing complex environmental issues with interdisciplinary science has become increasingly important. This involves the marriage of socioeconomic research with existing natural science research, including a recognition of the need for sustainable uses of coastal and ocean resource to sustain important economic activity, and the further acknowledgment of ecosystem service values in coastal zone management decision making. Ecosystem services refer to the benefits that humans receive from healthy functioning ecosystems; and while their values are often overlooked when making policy decisions, they are important to track.

Response: Consortium Coastal Economics Specialist Matt Gorstein gave three guest lectures to an ecosystem service valuation graduate class at Clemson University; an environmental studies graduate class at the College of Charleston; and a marine policy undergraduate class at the University of South Carolina. These guest lectures also served as an opportunity to share information on student fellowship and other funding opportunities and continue collaborating relationships with Consortium researchers.

Results: Students at member institutions were better informed about the role of the Consortium in the state and region and opportunities available to them at various career stages.

Partners: Clemson University; University of South Carolina; College of Charleston; College of Charleston MES Program

S.C. Sea Grant Consortium Website Continues to be a Significant Source of Science-Based Information

Susan Ferris Hill and Crystal Narayana, S.C. Sea Grant Consortium

Recap: The S.C. Sea Grant Consortium website is a source of science-based information for decision-makers and the public to help them make wise choices regarding coastal natural resource conservation and sustainability. In FY20-21, the website received 86,975 page views, a 21.7% increase from FY19-20.

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Relevance: Decision-makers and the public should be informed about the coastal and marine environment and related community issues, and the S.C. Sea Grant Consortium (Consortium) website continues to be a significant source of this information. The website also gives the users a better understanding of Consortium funded research, education, and outreach Programs.

Response: The Communications staff maintains the Consortium's website (www.scseagrant.org) and updates the

content regularly with input from extension, education, administration, and outreach Partners. This includes writing news articles, research project updates, and information about ongoing outreach projects.

Results: The website received 86,975 page views, a 21.7% increase from FY19-20. Top publications (views):

- *Coastal Heritage*: Carolina's Gold Coast, the Culture of Rice and Slavery (5,930)
- *Coastal Heritage*: Carolina Diarist, the Broken World of Mary Chesnut (2,597)
- Stranded Horseshoe Crabs (2,241)
- *Coastal Heritage*: Emancipation Day, the Freed People of Port Royal (1,457)
- *Coastal Heritage*: Rise and Fall and Rise, South Carolina's Maritime History (1,403)
- *Coastal Heritage*: Communities Under Water, Lessons Learned from Extreme Floods (1,288)

S.C. Sea Grant Consortium's Publications Win Three Prestigious Awards

Susan Ferris Hill, Crystal Narayana, Matt Gorstein, and Roger Drouin, S.C. Sea Grant Consortium

Recap: The S.C. Sea Grant Consortium won three prestigious awards from the Society for Technical Communication-Carolina Chapter, APEX, and the South Carolina State Library.

Relevance: Recognition by communications professionals and librarians from the Southeast region and the State of South Carolina is one metric by which success is measured. Acknowledgment that publications are relevant, interesting, well-researched, and provide significant information to the public confirms the Consortium's public service role is successful.

Response: The Consortium regularly submits publications to various award competitions. The primary contributors to these three publications are staff in the communications, extension, education, and administration departments, as well as university and federal agency Partners.

Results: The S.C. Sea Grant Consortium won three prestigious awards for three publications. *Coastal Heritage*, the agency's flagship magazine, won a Distinguished Award from the Society for Technical Communication-Carolina Chapter and an APEX Award of Excellence in the Magazines and Journals category. The publication, *Assessing South Carolina's Ocean Economy*, won a Notable State Document Award from the South Carolina State Library.

S.C. Sea Grant Consortium Researchers Evaluate Effectiveness of a Science Outreach Program in Increasing Awareness and Interest in Marine and Climate Science

Recap: S.C. Sea Grant researchers' evaluation of a musical theater and science outreach Program demonstrated increased interest among elementary students, teachers, and university students in incorporating science in their career and teaching choices.

Relevance: The next generations will face new challenges related to the effects of climate change on the planet. Humans are connected to the ocean in many ways, including relying on resources from the ocean but also influencing the oceans through their actions. Ocean literacy is essential in empowering individuals to make informed and responsible decisions related to marine resources and ocean sustainability, but is rarely taught in schools not along the coast and many children in upstate South Carolina have never been to the coast. Clemson

University researchers teamed with Educational Entertainment, LLC to present a musical theater and science outreach Program called “Something Very Fishy” to K-5 students in the Upstate, some of whom have never experienced an ocean up close.

Response: S.C. Sea Grant Consortium researchers are evaluating the effectiveness of the “Something Very Fishy” exhibit to change attitudes and behaviors of those who participate and/or attend the performance. With the assistance of the educational staff of the SC Aquarium, Clemson student docents were trained to present hands-on science lesson plans for elementary classrooms. The docents worked with elementary school teachers in public, public Title I, and private schools to teach ocean literacy through virtual dives and live-animal experiments.

Results: Approximately 1200 children and 40 teachers from 15 attended the performance and exhibit. Students, teachers, and undergraduate docent surveys demonstrated an increase in STEM career interest among students, greater intention in teaching marine and climate literacy among teachers, and a stronger desire to choose a career involving science communications among docents.

Partners: Educational Entertainment, LLC; Temple University; South Carolina Aquarium

S.C. Sea Grant Consortium’s Communications and Education Team Creates 10 Publications for K-12 Virtual Learners and Teachers

Elizabeth Bell, S.C. Sea Grant Consortium

Recap: In response to the closure of schools and nonformal education institutions during the COVID-19 pandemic, S.C. Sea Grant Consortium’s Communications and Education Team created a 10-week set of Ocean Science Journals for elementary, middle, and high school grade bands and seven educator Lesson Plans for various grade levels.

Relevance: In March 2020, S.C. public school districts, private schools, and nonformal institutions across the state closed and shifted to online learning platforms in response to the COVID-19 pandemic. For most educators, the abrupt switch from face-to-face instruction to online teaching resulted in numerous challenges including locating quality online student resources.

Response: S.C. Sea Grant Consortium’s Communications and Education Team created a 10-week set of Ocean Science Journals for elementary, middle, and high school grade bands. Each week, one Ocean Literacy Essential Principle (OLEP) is highlighted with a fact page, writing prompt, and a supplemental activity. The Team also created seven educator Lesson Plans with activities for various grade levels based on OLEP, State of South Carolina Education Standards, and Next Generation Science Standards.

S.C. Sea Grant Consortium Fosters Student Support Through Internships, Fellowships, and Research Opportunities

Susannah Sheldon, S.C. Sea Grant Consortium

Recap: The Consortium continues to substantially contribute to workforce development through internships, fellowships, and research opportunities.

Relevance: Supporting undergraduate and graduate students and early career professionals leads to an informed, engaged, and well-trained workforce.

Response: The S.C. Sea Grant Consortium is involved in several initiatives that support education and professional development for these individuals. Fifty-nine Knauss fellows have been selected from South Carolina since 1984, and 20 Coastal Management fellows from South Carolina have been placed with various state agencies nationally since 1997. In addition, the Consortium Partners with the S.C. Space Grant Consortium to support the annual Kathryn D. Sullivan Earth and Marine Science Fellowship, designed to increase the number of highly trained earth and marine scientists and to enable graduate students to conduct NASA- and NOAA-related Earth/marine science research.

Results: In 2020, S.C. Sea Grant supported 12 undergraduates, 22 master's-level students, and 21 Ph.D. students in conjunction with Consortium-funded research, projects, and fellowships. Of these, 21 were new to Sea Grant support and 34 were continuing to receive support. One of the graduate students was a Sea Grant extension intern for the Consortium. Four Sea Grant-nominated students were selected for the Knauss fellowship and one for the Sullivan award. Sea Grant student support has improved ocean and coastal literacy among university students and early professionals and encouraged their success in securing coastal and marine-related employment.

Partners: NASA South Carolina Space Grant Consortium; Office for Coastal Management (NOAA, NOS, OCM)
