

**MARINE EXTENSION AND GEORGIA SEA GRANT
2019 ANNUAL REPORT**





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MESSAGE FROM THE DIRECTOR

We are delighted to share our annual report with you. 2019 was a great year for us with a record amount of private support and student engagement in our program. This report summarizes selected impacts and accomplishments and highlights how we work with our research community and stakeholders to provide solutions for coastal issues in Georgia.

Our efforts continue to have tremendous impacts, not only in Georgia, but also regionally and nationally. Through a comprehensive review process that took place over a period of four days, a national team consisting of representatives from federal and state governments evaluated our program against the goals and strategies outlined in our 2018–2021 Strategic Plan. At the end of a very successful review process, the team recertified the University of Georgia with the status of Sea Grant College Program. The site review also made a few recommendations, and I am happy to report that we have already begun implementing most of them. It is rewarding to receive this external affirmation that validates our research and public service contributions in the state of Georgia. I am extremely proud of the faculty, staff, volunteers, supporters and stakeholders that made this happen.

As you review this report, please note the tremendous successes that our research, education and extension staff have achieved with help from our coastal partners, who are critical to our success. We take pride in the fact that we leverage our federal support with state investments, contracts and grants, income generation, and countless volunteer hours and donations to achieve our mission. We look forward to continuing to work collaboratively with a wide range of partners and stakeholders on a variety of topics that promote the economic, cultural and environmental health of Georgia's coast and prepare citizens to become good stewards of coastal ecosystems and watershed resources.

Thank you for your continued interest in Georgia's coast and support of Marine Extension and Georgia Sea Grant. As always, feel free to contact me if you have any questions or concerns.

Sincerely,
Mark Risse

Director of Marine Extension and Georgia Sea Grant

RESEARCH

Marine Extension and Georgia Sea Grant provides science-based solutions to issues impacting Georgia's coast by conducting applied research and funding interdisciplinary research that advances understanding of Georgia's coastal and estuarine environment. The following projects were made possible through research awards by Georgia Sea Grant.

Microbial research may be the key to salt marsh restoration

Georgia Institute of Technology Professor Joel Kostka is studying the microbes associated with *Spartina alterniflora* to better understand how the plant microbiome supports the health of Georgia's salt marshes. The research team is looking at how the microbial community changes as you move from the interior of the marsh, where the growth of *Spartina* is stunted and the plants are short, to the taller, lush marsh growing near the tidal creeks. Using a number of different parameters, researchers can compare the microbes in healthy plants versus unhealthy plants. Results from the project can be used to develop innovative methods for improving salt marsh restoration practices in Georgia such as creating plant probiotics that could be applied to *Spartina* seedlings when planting new marshes.





Examining groundwater to determine if it is a potential driver of oyster populations within Georgia creeks

Assistant Professor John Carroll at Georgia Southern University is examining the relationship between oyster abundance and groundwater discharge by mapping four tidal creeks. This project expands on preliminary work done in Oyster Creek in Chatham County, Georgia, by quantifying oyster recruitment along discharge gradients and discerning between the effects of groundwater discharge and sedimentation on recruitment, growth and survival of oyster habitat. Examining the potential interactions between oysters, groundwater discharge, and sediment accretion will allow for a better understanding of factors affecting oyster distribution. This knowledge is crucial to the management and restoration efforts of this ecologically and economically important species.

Incorporating future infrastructure decisions into salt marsh migration models

Salt marshes are an important ecosystem that provide coastal communities with many services, such as protection from erosion and flooding. In the past decade, these valuable ecosystems have been threatened by shoreline armoring. Brian Bledsoe at the University of Georgia has been working with an interdisciplinary team to develop improved salt marsh migration modeling tools to show the interactions between shoreline armoring and marsh migration. Results of the study, recently published in *Nature Scientific Reports*, provide data on the extent of hard armoring and the reasons individual landowners turn to hard armoring. The goal is to better inform government officials and city managers of the trade-offs that result between salt marsh habitat conservation, infrastructure protection and future development.



Using virtual reality to communicate storm surge risks

Researcher Sun Joo (Grace) Ahn from the University of Georgia debuted a new virtual reality program at Marine Extension and Georgia Sea Grant's open house at the Brunswick facility in September 2019. Using this program, participants had the opportunity to customize a coastal home and explore different strategies they can implement to prevent storm damage. The program attempts to encourage users to make better preparations and have a plan in place in the event of a major storm event. When implemented as a teaching tool, coastal residents will become more familiar with the dangers of storm surges and better prepared for future hurricanes.

EDUCATION

Marine Extension and Georgia Sea Grant's marine educators engage individuals from across the state of Georgia through field and lab explorations that are designed to develop an understanding and appreciation of marine ecosystems. College students are prepared for careers in coastal and ocean sciences through workshops, internships and fellowships that provide real-world experiences and promote environmental literacy.

ENGAGED

52,554

INDIVIDUALS IN INFORMAL
EDUCATION PROGRAMS

EDUCATED

6,200

P-12 STUDENTS IN GEORGIA

SUPPORTED

49

COLLEGE STUDENTS



Building the Next Generation of Scientists and Leaders

Georgia Sea Grant administers a number of fellowships and internships offered to students and recent graduates that provide on-the-job training and experience in ocean, coastal and marine science disciplines.



KNAUSS MARINE POLICY FELLOWSHIP

Places graduate students from 34 Sea Grant offices in positions with federal government host offices in Washington D.C. that establish and implement national policies related to marine, coastal and Great Lakes resources.



LEGAL FELLOWSHIP

Engages UGA law students in environmental law and policy research. Students gain practical experience in collaborating with local policymakers, scientists and business communities and in performing expert analyses to inform decision-making.



MARINE EDUCATION FELLOWSHIP

Designed for recent college graduates interested in gaining teaching experience in marine science and coastal ecology. Established in 1987, the fellow program has developed into a nationally recognized professional training opportunity in marine science education.



RESEARCH TRAINEESHIP

Provides funding to undergraduate and graduate students pursuing degrees in STEM-related fields. The students work with faculty and professional mentors on Georgia Sea Grant-funded projects, gain new skills in research and acquire training and professional development experiences that will help them prepare for a variety of STEM careers. Involvement in the student research traineeship program also provides the student with a cohort of like-minded students working on coastal and marine research projects around the state.



STATE FELLOWSHIP

Launched in 2019, the Georgia Sea Grant State Fellowship is modeled after the Knauss Marine Policy Fellowship. It is designed to provide recent graduates an opportunity to acquire on-the-job experience in planning and implementation of coastal and marine policies and programs in Georgia.

Kristafer Howard, a master's student at Savannah State University, is the first fellow to participate in the Georgia Sea Grant State Fellowship. As part of his fellowship, he is serving as a sanctuary program specialist at Gray's Reef National Marine Sanctuary where he is helping develop a comprehensive research plan that will include living resources, habitat, oceanographic monitoring and other relevant information.

Training the trainers: Enhancing professional experiences of educators in Georgia



Ongoing professional development and training can help educators be effective in the classroom and improve quality of teaching. Marine Extension and Georgia Sea Grant educators co-facilitated a number of trainings and certification programs, including two for the nationally acclaimed Project Wet, Wild and Learning Tree environmental education programs. Twenty-five educators and 40 volunteers took advantage of these professional development opportunities. Marine Extension and Georgia Sea Grant educators also attended and co-facilitated a volunteer-focused workshop for participants during the International Sea Turtle Symposium in Myrtle Beach, SC, and helped coordinate the 2018 Annual Conference of the Georgia

Association of Marine Education on Sapelo Island, GA. These trainings and professional development opportunities provide opportunities for educators to reflect on their own teaching practices and integrate new knowledge and skills in the classroom.

Technical assistance leads to state's first commercial fishing career pathway course

Marine Extension and Georgia Sea Grant collaborated with McIntosh County Academy and Coastal Pines Technical College to develop an introduction to commercial fishing career pathway program for high school students. After being approved by the Georgia Board of Education in spring of 2019, McIntosh County Academy started offering the program during the fall 2019 semester and five students are currently enrolled in the four-part course. Led by a local commercial fisherman, the course addresses safety at sea, basic navigation and seamanship, common commercial fishing practices, and provides an introduction to fisheries science and management. Historically, rural coastal McIntosh County served as the epicenter of Georgia's commercial fishing industry. Shrimping, crabbing and harvesting of shellfish and finfish have all been major contributors to the area's local economy. The program serves as an innovative and community-based approach that will help sustain Georgia's commercial fishing industry by providing workforce development and improving student retention.



WHERE ARE THEY NOW?



MAEVE SNYDER

2014–15 Marine Education Fellow Meve Snyder is working as the Coastal Training Program Coordinator at the North Inlet Winyah Bay National Estuarine Research Reserve in South Carolina. In her role, Snyder offers trainings on a variety of coastal topics, such as stormwater management and water quality for municipal and local government staff as well as developers, contractors and engineers.



MARY KATE ROGENER

2018 Knauss Fellow Mary Kate Rogener is currently working for NOAA's National Centers for Coastal Ocean Science (NCCOS) Competitive Research Program (CRP) as a Program Analyst with CSS-Inc. In CRP, Rogener works to expand NCCOS's Harmful Algal Bloom and hypoxia external research portfolios. Much of her work focuses on informing and guiding relevant science priorities and projects through identification and application of stakeholder needs.



DANIELLE GOSHEN

2017–18 Georgia Sea Grant legal fellow Danielle Goshen recently began a new position with the Galveston Bay Foundation as their Water Policy and Outreach Specialist. Goshen is working directly with the Texas Living Waters Project to address water quantity issues in the area, as it is a region that suffers from drought and flooding.

EXTENSION

By acting as a bridge between scientists, local governments and marine industries, Marine Extension and Georgia Sea Grant assists coastal communities by reducing risks to coastal resources using sustainable and practical solutions. Extension specialists connect university knowledge with local needs to improve the economic vitality and resilience of coastal communities, and establish long, trusted relationships with the communities that they serve.

Through its extension programs, Marine Extension and Georgia Sea Grant assisted



590

FISHERMEN, SEAFOOD PROCESSORS AND AQUACULTURE INDUSTRY PERSONNEL

to modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities.



8

COASTAL COMMUNITIES

implemented sustainable economic and environmental development practices and policies as a result of Marine Extension and Georgia Sea Grant's extension efforts.

*Ecosystem-based approaches in the management of land, water, and living resources have been implemented by **719** resource managers as a result of Sea Grant activities.*

Investigating sustainable methods of farming horseshoe crabs for the biomedical industry

Horseshoe crabs are an invaluable resource within healthcare. Their blue blood contains a protein used to test medicine and medical devices for bacteria before they are used on humans, saving millions from infection. Marine Extension and Georgia Sea Grant collaborated with Kopley BioSystems, Inc., a North Carolina-based pharmaceutical company, to study more sustainable horseshoe crab farming methods on the Georgia coast. The study has taken the unique approach of housing the horseshoe crabs in outdoor, submerged enclosures, simulating their natural environments where they have access to their regular food sources and experience tidal rhythms. Researchers also tested different bleeding methods in an effort to optimize blood collection procedures. With the implementation of these sustainable farming and bleeding methods, both the medical community and horseshoe crab populations will benefit.



Installing the first large-scale green infrastructure project in Brunswick

Marine Extension and Georgia Sea Grant is improving water quality and reducing stormwater runoff in coastal Georgia through the installation of the first low impact development stormwater practice at Howard Coffin Park in Brunswick, Georgia. The project serves as a case study and educational demonstration of the first bioretention cell in the city. A bioretention cell is a stormwater best management practice that captures and treats stormwater runoff using different types of permeable soils, mulch and vegetation. Stormwater runoff from the park drains directly into a tidal ditch that sits adjacent to the park's soccer fields. The bioretention cell is reducing the volume of runoff and capturing and treating the runoff, resulting in a higher water quality in the tidal ditch, which drains directly into the sound. This project helped build capacity for implementation and maintenance of this type of stormwater practice with municipal employees, alongside other community partners and state agencies. Results from the project are being shared with a variety of audiences illustrating the environmental, social, and economic benefit of utilizing low impact development to manage stormwater. In 2019, this project was one of four community projects across the state awarded the Four for the Future Award, which recognizes communities for their efforts to improve residents' lives through public-private and nonprofit collaborations.

The 3,000 square foot bioretention cell can treat up to 22,000 gallons of stormwater when it rains.



Leveraging partnerships to advance workforce development and build resilience in Savannah

Marine Extension and Georgia Sea Grant worked with city of Savannah on the “Green Infrastructure to Green Jobs” project that promoted workforce development and built resilience through the creation of urban tree nurseries in low-lying, flood-prone neighborhoods. In addition to decreasing flood risk and beautifying barren space, the project focused on training Savannah residents in landscape design and green infrastructure improvements. Since the project launched in 2018, more than 500 trees have been planted at three urban tree nurseries and 19 participants, ranging from 18 to 55 years old, have completed 6,400 hours of training through the Green Infrastructure Apprenticeship Program. Project partners include Marine Extension and Georgia Sea Grant, the city of Savannah, the Savannah Tree Foundation, Victory Gardens, Work Source Georgia and the Chatham County-Savannah Metropolitan Planning Commission.



Estimating the impacts of recreational crabbing in Georgia

A recent study by Marine Extension and Georgia Sea Grant has found that recreational blue crabbing in Georgia is estimated to generate more than \$17 million annually in economic impact and support more than 400 jobs. As part of the study, funded by the Georgia Department of Natural Resources Coastal Resources Division, online surveys and in-person intercept interviews were conducted to estimate effort and harvest rates as well as characterize the economic significance of recreational crabbing. In addition to obtaining data on economic impact, the surveys also collected information on crabbers' opinions and knowledge of blue crab regulations. This information will help resource managers make more informed decisions about managing blue crabs in the future. Throughout the project period, more than 2,650 individuals have been engaged in sustainable crabbing practices through education and outreach events in Savannah and Brunswick.



PARTNERSHIPS

Engaging community scientists in microplastics research

Marine Extension and Georgia Sea Grant is engaging citizen scientists to monitor the abundance and distribution of microplastics along the Georgia coast. Between May 2018 and January 2020, 15 trained citizen scientists have collected a total of 2,880 samples from various locations on the coast. Combined, they have contributed roughly 43 hours each month to the project, valued at more than \$13,000 annually. Data collected will provide a map of microplastic abundances and types that can be used by coastal zone managers and municipalities to identify hot spots of contamination for future planning and decision making. In addition to expanding the program to include more community scientists, Marine Extension and Georgia Sea Grant is partnering with Satilla, Savannah, Ogeechee, and Altamaha Riverkeepers on incorporating the microplastics sampling protocols into monthly water quality sampling as part of the larger Georgia Adopt-A-Stream program.





Expanding the Marine Extension and Georgia Sea Grant volunteer program

Since hiring a new volunteer coordinator, Marine Extension and Georgia Sea Grant has worked to expand its volunteer program to engage more community members in citizen science and environmental education opportunities. Last year, 41 volunteers dedicated 1,249 hours to Marine Extension and Georgia Sea Grant's research, education and extension efforts. Additionally, two new volunteer opportunities have been created, including a new Phytoplankton Monitoring Network (PMN) group based at the Brunswick Facility and a small group of Aquarium Ambassadors focused on working to build new relationships and establish new connections within the coastal community.

Monitoring wetland health with help from coastal residents

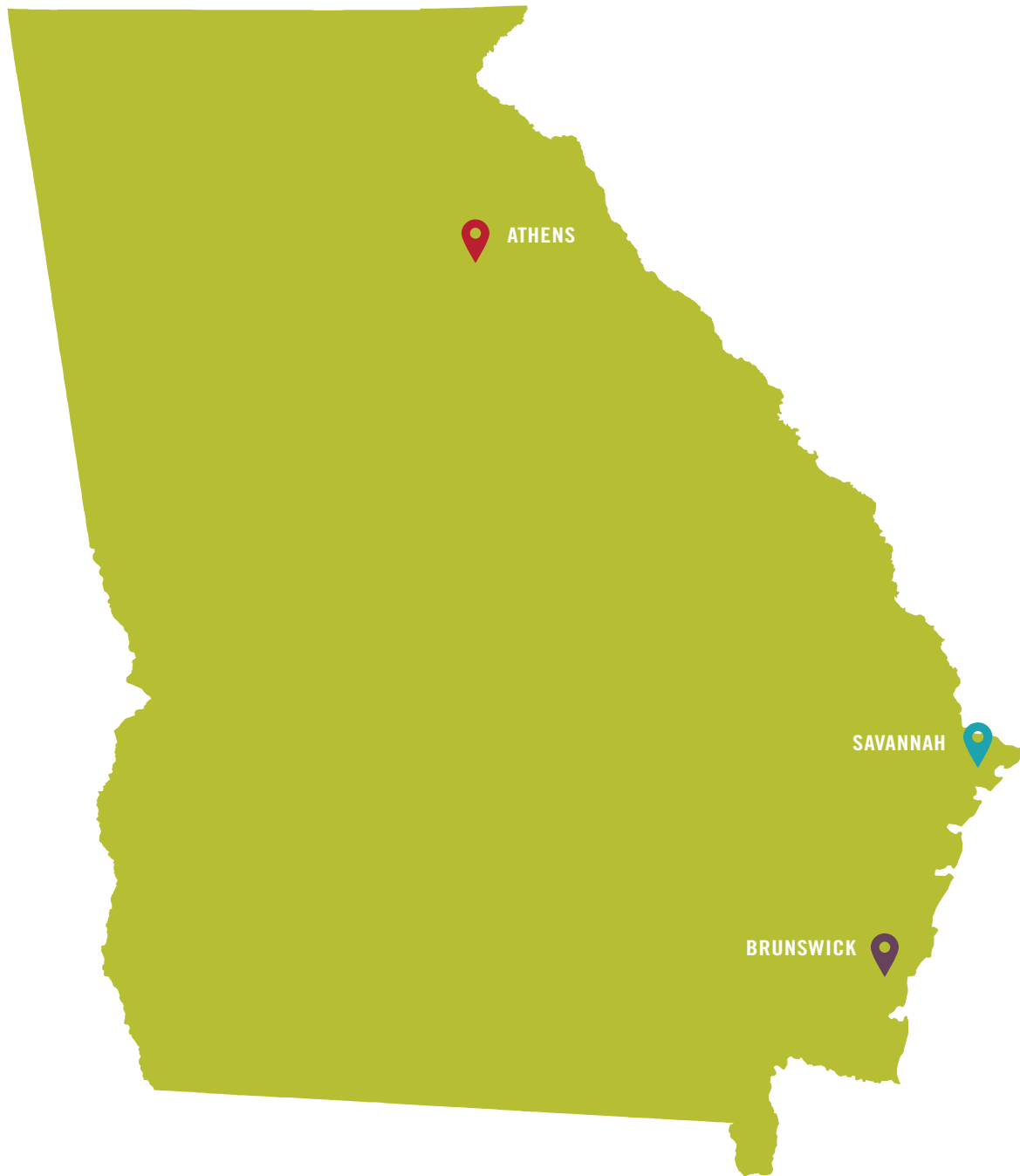
Marine Extension and Georgia Sea Grant has revamped the Adopt-A-Wetland program, originally launched in 2015, by hiring a new Adopt-A-Wetland program coordinator for coastal Georgia in 2019. The goal of the program is to increase public awareness of water quality issues by training citizen science groups in different communities on how to monitor water quality and conduct biological sampling to determine wetland habitat health. All the data that is collected by citizen scientists will be compiled by Marine Extension and Georgia Sea Grant and added to the Environmental Protection Division's water quality database maintained at the Atlanta Adopt-A-Stream office. Each group is provided with an annual report summarizing the data collected at their respective sites.



Cultivating regional and national partnerships on legal and policy issues

Georgia Sea Grant's legal program worked with an interdisciplinary team of experts and students to assist coastal communities in four states – Florida, Georgia, South Carolina, and North Carolina – to prepare for vulnerabilities and projected future conditions based on likely sea level rise scenarios. The regional project funded by the NOAA Office of Coastal Management, Georgia Sea Grant, Florida Sea Grant, South Carolina Sea Grant, and North Carolina Sea Grant used roads as a case study to explore how sea level rise alters planning, maintenance, and funding for public infrastructure. Reducing sea level rise and coastal flooding risks on the coast will be achieved by means of a variety of approaches, including policy and regulatory changes, natural resource protection, structural and non-structural intervention and investment, and adaptive management. Seven white papers produced as part of the project analyze the legal and policy factors affecting adaptation responses, focusing on the state and local levels.





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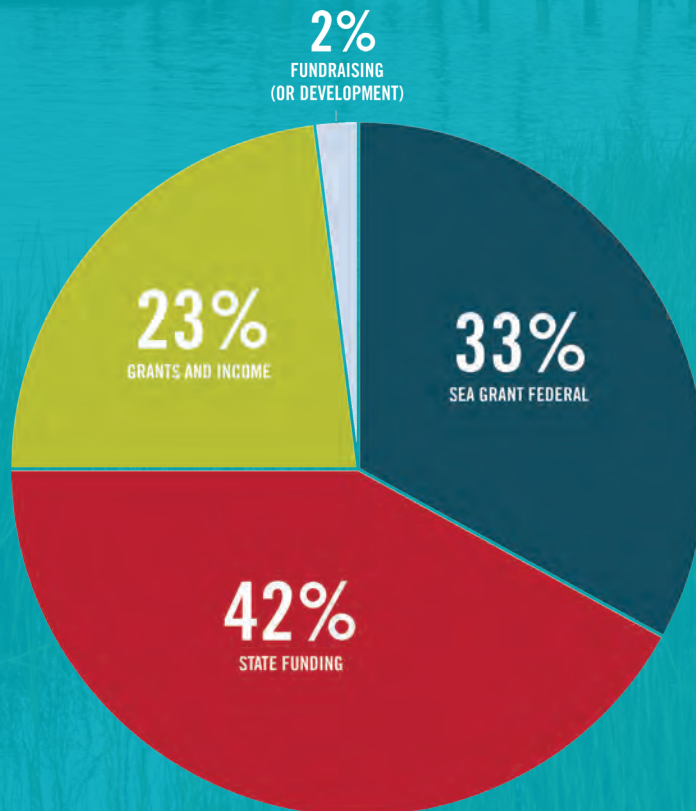
In 2019, Marine Extension and Georgia Sea Grant engaged **52,554** individuals in informal education programs and educated nearly **6,200** P-12 students in Georgia. The program also supported **29** undergraduates and **20** graduate or professional degree students.

Ecosystem-based approaches in the management of land, water, and living resources have been implemented by **719** resource managers as a result of Sea Grant activities.

Through its extension programs, Marine Extension and Georgia Sea Grant assisted **590** fishermen, seafood processors and aquaculture industry personnel to modify their practices using knowledge gained in fisheries sustainability and seafood safety.

Eight coastal communities implemented sustainable economic and environmental development practices and policies through Marine Extension and Georgia Sea Grant's extension efforts.

DISTRIBUTION OF FUNDING FY2019 TOTAL AMOUNT FUNDED \$4.1 MILLION



50
1970-2020



Marine Extension and
Georgia Sea Grant
UNIVERSITY OF GEORGIA



MARINE EXTENSION AND GEORGIA SEA GRANT CELEBRATES 50 YEARS

Since 1970, Marine Extension and Georgia Sea Grant has been committed to improving the environmental and economic health of the Georgia coast through research education and extension. From working with the commercial fishing industry to develop sustainable fishing practices to creating the first sea level rise plan in the state of Georgia, Marine Extension and Georgia Sea Grant has played a key role in finding solutions to diverse challenges facing our coast. With each of these challenges, we are confident that by working with our stakeholders and research scientists, we can continue to adapt and respond to changing environments, guide the development of new coastal industries, and educate future generations about being stewards of our coastal resources for the next 50 years.



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