Sea Grant
North Carolina

STRATEGIC PLAN 2018-2021

TABLE OF CONTENTS

INTRODUCTION....01

CORE VALUES AND PRINCIPLES....02

FOCUS AREAS....02

HEALTHY COASTAL ECOSYSTEMS....03

RESILIENT COMMUNITIES AND ECONOMIES....04

SUSTAINABLE FISHERIES AND AQUACULTURE....06

ENVIRONMENTAL LITERACY AND WORKFORCE DEVELOPMENT....08

CROSS-CUTTING IMPACTS....10

CONCLUSION....10

Cover photos, clockwise from top left: Sunset Beach, Tim Bish; White ibis, Vanda Lewis; Softshell crab, Vanda Lewis; UNCW surf zone research, Jamie Moncrief.

NORTH CAROLINA SEA GRANT STRATEGIC PLAN 2018-2021

MISSION

Through integrated, unbiased research and outreach efforts, North Carolina Sea Grant enhances sustainable use and conservation of ocean, coastal and watershed resources to benefit communities, economies and ecosystems.

VISION

North Carolina Sea Grant is a key leader in addressing the state's urgent and long-term needs in ocean, coastal and watershed resource management. The program shares sound science, develops educational excellence, and builds extensive and effective partnerships.

INTRODUCTION

North Carolina Sea Grant is an inter-institutional program of the University of North Carolina system. This partnership between the National Oceanic and Atmospheric Administration and the state of North Carolina is one of 33 Sea Grant programs across the nation administered by the National Sea Grant College Program. North Carolina Sea Grant focuses on: research to support resolution of state, regional, and national coastal resource-management challenges; outreach via extension and communications teams who support the development and transfer of resulting technologies and applications as well as those from collaborations with local partners; internal program management, including grants administration; and educational programs that support a strong knowledge foundation for varied stakeholders, such as the academic community, government officials, businesses and industries, K-12 teachers and students, and the public.

Across five decades, North Carolina Sea Grant's innovative programs have addressed the state's coastal resource priorities. The program is a nationally recognized leader in forging strong, long-term collaborations linking research portfolios of North Carolina's public and private universities with critical needs. With its headquarters at NC State University and three coastal offices, the Sea Grant team readily shares expertise with many partners, reinforcing its outstanding track record in communicating science and policy information to varied audiences via a cadre of specialists, targeted products and engaging events.

North Carolina continues its overall growth trajectory. The total population went over the 10-million mark in 2015, thus ranking the state ninth in the nation. This new tally reflects an increase of 5.3 percent between 2010 and 2015, according to the U.S. Census Bureau. Much of the growth is in inland metropolitan areas that are home to headwaters for watersheds of coastal rivers. The largest coastal city, Wilmington, at the mouth of the Cape Fear, grew to nearly 116,000 people, an increase of 8.9 percent in five years.

But, in fact, we have a tale of two states in one. A few oceanfront counties — such as New Hanover County, home to Wilmington, and adjoining Brunswick County — are seeing significant population increases expected to continue through 2020. That growth includes an influx of retirees, a group that also may bring social, health and economic needs in the long run. At the same time, 10 of the 20 counties in the state's Coastal Area Management Act region are expected to have population losses by 2020, according to projections from the N.C. Office of Budget and Management. Most of the coastal plain does not reap the benefits of oceanfront tourism. Those counties are losing many early-career adults in search of jobs, while local officials continue to seek sustainable economic development. North Carolina and its coastal region also are becoming more ethnically diverse. Sea Grant research coupled with integrated extension and communication efforts will reflect such changes and strive to meet varied information demands.

Our varied population challenges and economic growth demands carry additional environmental stresses and hazards across watersheds and in coastal environs. These critical areas are already stressed due to many unique features of environmental settings. With the Pamlico, Albemarle and Currituck sounds combined, North Carolina contains the largest lagoonal estuarine system in the United States, waters that serve as important nursery areas for many species. These ecosystems have limited tidal exchange and are very sensitive to changes in nutrient levels. The state and adjoining waters also serve as boundaries between two biogeographic provinces, with many species already at the limits of tolerance levels. The coastal region also has susceptibility to nuisance and major storm-event flooding due to the low-lying coastal plain. To respond to these challenges, North Carolina Sea Grant is uniquely positioned to facilitate research, transfer technology advances in the sciences and social sciences, and deliver education and training opportunities.

CORE VALUES AND PRINCIPLES

This strategic plan will guide our program's investments to respond effectively to urgent and long-term challenges and opportunities. Those efforts will benefit communities, ecosystems and economies across the state, region and nation. Our program is committed to executing its mission based on core values and crosscutting principles including:

- Supporting and collaborating with a multitude of partners and communities that represent the diversity of North Carolina;
- Identifying emerging topics and ongoing needs within coastal communities, as well as innovative opportunities and solutions;
- Embracing interdisciplinary and collaborative approaches that incorporate research, outreach and education to address complex challenges;
- Supporting sound science through merit-based peer review of research results;
- Developing cadres of cross-trained students across multiple disciplines to develop the next generation of experts on coastal topics; and
- Transferring and communicating information in an unbiased, inclusive and transparent manner to a range of stakeholders so that they can make informed decisions and educate future generations.

These values are integral to the program's organizational approaches and constant self-evaluation. These include workforce development within our team, as well as the strong connections across our portfolio of projects and activities. Overall program direction is updated regularly via multiple avenues, including, but not limited to, input from the North Carolina Sea Grant Advisory Board, state and federal resource-management agencies, academic institutions within North Carolina, local government and community leaders, business and industry partners, and non-governmental entities.

FOCUS AREAS

In support of meeting our mission and to continue to expand our impacts in supporting the natural resource management needs of the state, North Carolina Sea Grant will concentrate efforts in the following strategic areas:

- **Healthy Coastal Ecosystems**
- **Resilient Communities and Economies**
- **Sustainable Fisheries and Aquaculture**
- **Environmental Literacy and Workforce Development**

These focus areas, along with respective goals and outcomes, arose from a series of seven facilitated, stakeholder strategic-planning focus groups held in coastal and inland locations in 2015-16; in-depth discussions with the North Carolina Sea Grant Advisory Board and North Carolina Sea Grant team members; a statewide online survey that reached new audiences; and national perspectives from the National Oceanic and Atmospheric Administration and National Sea Grant College Program. This plan was refined through the program's experienced research, extension and communication team members to ensure state-based applicability and relevance. The North Carolina focus areas align with those of the National Sea Grant College Program.

North Carolina Sea Grant is committed to ensuring deliberate approaches towards program advancement in each focus area by explicitly integrating varied activities. Thus, our goals and desired outcomes position the program to leverage current capacity, expand and develop new partnerships in support of program goals, and extend program investments to new challenges and opportunities in North Carolina's natural resource management. As designed, these focus areas are synergistic, each building and complementing another for program efficiencies and effectiveness where possible.

HEALTHY COASTAL ECOSYSTEMS

Healthy coastal ecosystems are the foundation for life along the coast. However, coastal development, current land-use practices and other human activities are contributing to water-quality degradation and human health impacts, as well as decline of aquatic and terrestrial habitat for fish and other species, wetlands loss, and proliferation of invasive species. As many partners work to restore and maintain these ecosystems, such threats, along with potential challenges including climate change, need to be better understood — thus providing initial steps toward developing adaptation and mitigation strategies.

Seeing the links between healthy ecosystems and sustainable economic development, North Carolina Sea Grant is a key partner in drawing attention to the emerging concept of the Blue Economy — a sustainable ocean and coastal economy that reflects the long-term capacity of those ecosystems not only to support human activities but also to remain resilient and healthy. Considering the significant economic investment and potential returns, it is vital to provide protection and restoration efforts that seek to achieve ecosystem function and deliver value. Working with partners in academia, industry and agencies, our Sea Grant team plays a key role in identifying and assessing impaired ecosystems, and supporting development of potential policies, technologies and processes that lead to improvement of watershed, coastal and ocean ecosystems. This will be accomplished through rigorous natural, physical and social science approaches that work synergistically to advance the knowledge of coastal ecosystems. Regional or multi-state projects also will be a part of our Sea Grant portfolio, to recognize that watersheds and ecosystems extended beyond government boundaries.

The final thrust for ensuring healthy coastal ecosystems is successful outreach. Sea Grant staff and partners across the state involved in research work closely with our extension and communications specialists. Together, they actively engage citizens, community leaders, and policy makers to translate the latest ecosystem knowledge into practice, maximizing the benefit to humans and the ecosystem, including those located at the coast as well as upstream.

Healthy Coastal Ecosystems Goal 1:

A combined human-natural systems watershed approach, focused on present-day and emerging ecosystem conditions, creates and supports the generation of new knowledge generation and applications.

Outcomes

- Applied and interdisciplinary research is developed and supported to assess the health, function, threats to, and resilience of, coastal ecosystems and communities.
- Upstream outputs (e.g., sediment, nutrients, toxins, flows) are coupled to downstream impacts to improve watershed scale understanding and impacts on coastal ecosystems and communities.
- Habitat changes through time are quantified and linked to drivers, such as climate change, changing land-use, and restoration practices.
- Ecological and economic impacts of adaptation, restoration and policy activities are better understood using existing and newly developed methodologies and technologies.

Healthy Coastal Ecosystems Goal 2:

Habitat protection, restoration and economic benefit are maximized through applied research and resulting outreach regarding new ecosystem knowledge.

Outcomes:

- Resource managers, design professionals, coastal citizens, community leaders, industries and local officials are educated on habitat functions to increase understanding of ecosystem benefits — environmental, social and economic — via innovative communication products and engagement techniques.
- Demonstrations of innovative technologies, sustainable designs and restoration practices are executed and evaluated in collaboration with diverse partners across the coast and inland.
- New partnerships are developed to identify coastal ecosystem issues and opportunities, cultivate citizen scientists and community-driven projects, and increase awareness of our program's products and expertise.
- New tools and outreach programs based on research results support decision-making on multiple levels.

These goals and outcomes correspond with performance measures of the National Sea Grant College Program:

- Number of resource managers who use ecosystem-based approaches in the management of land, water and living resources as a result of Sea Grant activities.
- Number of acres of coastal habitat protected, enhanced or restored as a result of Sea Grant activities.

RESILIENT COMMUNITIES AND ECONOMIES

Offshore, nearshore, coastal, estuarine and watershed environments shape the social and economic characteristics of North Carolina's coastal communities — including, but not limited to, incorporated and unincorporated municipalities, homeowners' associations, cities and counties. Related economies depend upon the water, and increasingly these communities are recognizing that ecosystems must be healthy and robust to support varied uses.

Natural and human-made risks can threaten lives and livelihoods of those who live, work and play along our coast. Natural risks include erosion and extreme weather events, such as coastal storms, flooding and drought. Risks with human-made causes or components include chemical and other spills, long-term climate change, and economic crises. Risks may be short-term events or unfold over longer time scales, with impacts felt locally, throughout North Carolina and beyond. Communities' and industries' abilities to remain resilient to those dynamic risks may require adaptations, or adjustments to the ways they plan, develop, and do business, thus preventing damage from, or taking advantage of, changes. This is especially challenging as populations and economic drivers continue to change along the coast. North Carolina Sea Grant will provide physical and social science research to support coastal economies — and offer them technical assistance to plan for and adapt to natural and man-made risks.

Communities and industries need assistance to identify balances between supporting existing uses and public coastal access, and attracting innovative emerging industries. Such strategies would seek to preserve the coastal sense of place while increasing the diversity of local economic sectors. North Carolina Sea Grant's long-standing relationships with coastal communities and industries make it an ideal partner to provide information and research on sustainable use of marine and coastal resources. Sea Grant facilitates conversations with economic development organizations, varied industries, local officials and community organizations on best practices and implementation of sustainable management strategies to ensure coastal ecosystems remain healthy to sustain vibrant coastal economies.

The potential for increased number and intensity of extreme weather events, sea-level rise, flooding, oil spills, and other natural and human-made hazards places N.C. coastal communities at greater risk. That results in greater vulnerability for citizens, particularly for the poor, the elderly and the disabled, as well as for businesses and critical infrastructure. Coastal communities, citizens and businesses need an objective understanding of their risk to make informed decisions that best protect lives and property and promote the sustainable use of resources and resilient economies. Individuals, businesses and communities need to develop comprehensive emergency preparedness and response plans to increase resiliency — and enable them to implement and, when necessary, respond effectively.

Sea Grant can contribute to this planning by building a sound knowledge base to improve forecasting capabilities, by identifying development and best management practices that reduce the vulnerability of people, buildings, businesses and communities to coastal hazards, and by advancing ways communities can mitigate, adapt, manage and recover from these events. Sea Grant works with partners to identify barriers — financial, informational, cultural and legal — to effective planning, as well as challenges in implementing local policies and solutions when multiple property owners, decision-makers and managers are involved.

Resilient Communities and Economies Goal 1: *Resilient coastal economies are supported by a diverse range of existing and emerging sectors that make sustainable use of marine and coastal resources.*

Outcomes:

- Research results assist coastal communities to identify, evaluate and support the roles of traditional business and industry, as well as emerging sectors in diverse coastal economies.
- Communities understand needs and opportunities for preserving cultural heritage and coastal access; increasing the value of sustainable water-dependent industries, including working waterfronts, recreation and tourism; and encouraging emerging sectors.
- Communities engage in technical planning based on best available information that will support diversified, sustainable and resilient economies.
- Outreach programming helps communities understand how planning and management decisions affect ecosystem and human health, how degraded coastal ecosystems can negatively impact human health, and how healthy coastal ecosystems can support profitable local business and industry.

- Communities receive technical assistance and decision-support tools to allow them to consider integrated strategies for resource management, along with best management practices.

Resilient Communities and Economies Goal 2: *Communities understand risks associated with living, working and doing business on the coast, and make informed decisions for efficient use of land, energy and water resources to sustain coastal ecosystems and economies.*

Outcomes:

- Interdisciplinary research and outreach — including natural and social sciences, law, policy and the arts — are used to evaluate risks to communities, including physical and social vulnerabilities to natural and human-made hazards.
- Communities are better prepared to plan and implement adaptation strategies to increase resilience, including assessments of how vulnerability to hazards may impact local economies, infrastructure and populations.

Resilient Communities and Economies Goal 3: *Communities and economies have capacity to effectively prepare for, respond to, and adapt to the current and anticipated risks and impacts of hazards and catastrophes.*

Outcomes:

- Interdisciplinary research and outreach focusing on emerging and potential hazards provides strategies for coastal decision makers, communities, businesses and other stakeholders to plan, remediate, adapt and/or mitigate against damage exposure, or to accelerate recovery when/where the impacts are unavoidable.
- Communities have ready access to research-based information and best management practices through outreach efforts that assist them in identifying and planning for existing and future hazards.
- Local leaders, at the community, county and/or regional scale, understand opportunities to lower insurance costs, such as through the Community Rating System.

These goals and outcomes correspond with performance measures of the National Sea Grant College Program:

- Number of communities that adopt/implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities.
- Number of communities that adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events.

SUSTAINABLE FISHERIES AND AQUACULTURE

With increasing population growth and U.S. seafood consumption rates, expanding a domestic seafood supply is of great importance. North Carolina waters provide seafood to consumers via three main sources: the commercial fishing industry, a developing marine aquaculture sector and recreational fishing. A continued safe and sustainable seafood supply means each of these industries must be responsive to social and environmental needs, along with changing expectations of markets. Effective conservation and management strategies of seafood resources are dependent upon the collection of basic, applied, and sometimes novel, scientific information. Currently, some North Carolina fish stocks lack sufficient data, particularly a direct index of abundance, on which to base policy decisions.

North Carolina's commercial fishing industry lands wild-caught seafood, and in many cases is part of the cultural fabric of smaller coastal communities. That annual harvest — tallying about 66 million pounds, worth about $104 million at the docks in 2015 — strives to meet demand for freshness, flavor and nutrition in seafood that consumers often find lacking in imports. Top species by dock value include blue crabs and shrimp. Meanwhile, marine aquaculture presents an opportunity to meet growing in-state consumer demand while also creating new jobs and helping local coastal economies. North Carolina's small, but growing, marine aquaculture industry now has a farm gate value of $2.9 million, based mainly on soft crabs, oysters and clams.

Each year, the for-hire recreational fishing industry, including charter and head boats, affords access to seafood to multitudes of anglers. Expanded research and extension programming with this sector would advance for-hire business operations, fishery management decisions, as well as tourism and marketing efforts for coastal communities. Private marine recreational angling represents the largest fishing method by number, with 4.6 million trips in 2015. Top species landed include mahi mahi, bluefish and yellowfin tuna. For every fish landed by an angler, two are caught and released. Partners note that improved communication with these groups could enhance understanding and compliance with regulations, boost conservation efforts, and improve local economies in coastal communities and beyond.

This focus area represents a research and engagement strategy with commercial harvesters, aquaculture producers, recreational anglers, fishery managers, seafood consumers, commercial seafood buyers, and other stakeholders. These efforts seek to ensure a safe, sustainable seafood supply for the coming years.

Sustainable Fisheries and Aquaculture Goal 1: *Improved science and management will advance conservation and sustainability of North Carolina living marine and estuarine resources and dependent ecosystems.*

Outcomes:

- New research approaches and strategies to collect essential fishery information and fill identified data gaps for managing living marine resources and aquatic ecosystems.
- Research and pilot testing of advanced technologies and techniques in fisheries science and data management will reduce research costs and support efforts by resource managers.
- Citizen-science projects collect monitoring and management data that would not be feasible using standard research practices, while also fostering marine stewardship and greater trust in scientific data.
- Research and outreach regarding technologies and fishing practices that reduce commercial bycatch and recreational fishing mortality are encouraged, developed, refined, and/or are implemented by partners and the public.
- Research that assesses environmental impacts and/or threats related to human activities, including seafood harvest, quantifying impacts of fishing activities, marine aquaculture, and introduction of non-native species are supported, with results and data shared among partners to support and implement responsible and sustainable practices.

Sustainable Fisheries and Aquaculture Goal 2: *North Carolina wild-caught seafood and marine aquaculture industries employ optimal business strategies, become more competitive in the marketplace, and provide economic benefits to coastal communities.*

Outcomes:

- Members of the public and fishing interests have varied opportunities to learn about competing uses for public-trust waters, including the process for shellfish leases.
- Research, development, and transfer of new and refined

wild-caught seafood harvest and aquaculture production technologies are supported for existing and candidate species.

- Workforce and business development efforts result in stakeholders who are better equipped to initiate and manage new and expanding opportunities.
- Innovative marketing and supply-chain approaches are shared with coastal and inland businesses, to encourage services and products that enhance the economic value of N.C. seafood to fishermen and producers, restaurants, retailers and consumers.
- Businesses identify and define opportunities and problems by using qualitative and quantitative market-research techniques, including learning principles for adding value to marine seafood commodities, and resources for public- and private-sector guidance regarding various stages of product development.
- Harvesters, growers, processors, restaurant chefs, and regulators have opportunities to learn to prevent, eliminate, or reduce to safe levels various biological, chemical, and physical hazards that have public-health significance.

Sustainable Fisheries and Aquaculture Goal 3: *Marine recreational anglers and other waterway users receive greater enjoyment, appreciation and understanding of aquatic resources.*

Outcomes

- Individual anglers, fishing clubs and organizations better understand management practices of, and opportunities for, stewardship in recreational fisheries.
- Infrastructure and business opportunities are identified in efforts to enhance marine recreational fishing opportunities, including improved community awareness of the social and other benefits associated with recreational fishing, such as participation by younger, disabled and minority people.
- Recreational boaters have new sources of information regarding safety, compliance with water-quality regulations, and efforts to reduce the loss of fishing-related gear and other marine debris challenges.

Sustainable Fisheries and Aquaculture Goal 4: *Consumers are better educated about the value of eating North Carolina's wild-caught and cultured seafood, with related businesses building upon connections consumers have to seafood products and communities.*

Outcomes

- Seafood consumers are educated and have the knowledge to evaluate the variety of seafood choices available to them including wild-caught and aquaculture fisheries management, as well as seafood harvest and production practices.
- Seafood consumers better understand the nutritional benefits of seafood products, how to judge seafood quality at the point of purchase, and how to handle seafood safely in the home.
- Chefs and other business leaders build business strategies related to N.C. seafood, including but not limited to tourism related to seasonality of seafood choices, cooking instructions and fishing community heritage.

These goals and outcomes correspond with performance measures of the National Sea Grant College Program:

- Number of fishermen, seafood processing or aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities.

ENVIRONMENTAL LITERACY AND WORKFORCE DEVELOPMENT

North Carolina's future relies on the nation's ability to make choices that sustain our coastal and ocean resources for the benefit of communities, economies and ecosystems. By engaging with the public, North Carolina Sea Grant fosters an environmentally literate citizenry that understands, appreciates and considers the health and sustainability of our coastal and ocean resources. We engage a wide diversity of participants and recipients for our environmental literacy and workforce development efforts, as we recognize that preserving, protecting and managing our state's coastal resources involve everyone living in and visiting North Carolina. We will continue to broaden our program's reach to piedmont and mountain audiences, and visitors to our coast. Our team works with partners to develop educational programs for a diversity of learners from young students to continuing education participants and lifetime learners.

We will continue our education investments, in and out of the classroom, by providing access to talented educators, skill-building experiences, career-enhancing opportunities and tailored educational products. With those efforts, we will help develop a citizenry and workforce skilled in science, technology, engineering, arts and mathematics — also known as STEAM — to understand and solve complex coastal- and ocean-resource issues, and thus help to position North Carolina to compete economically at a global scale.

Fostering a spectrum of communications and engagement among a breadth of educational professionals and numerous stakeholders, including government, businesses and communities, will ensure effective information sharing. Outreach provides support needed for consensus building and also encourages informed decision making that considers a balance of economic and environmental priorities. North Carolina Sea Grant will continue to support existing partnerships and seek new avenues and partners to strengthen educational investments and impacts across the state, region and nation.

Environmental Literacy and Workforce Development Goal 1:

An environmentally literate public, elected officials and environmental decision makers understand, appreciate and consider the health and sustainability of our coastal watersheds, inner and outer coastlines, and near-shore ocean resources in their activities.

Outcomes:

- Access to up-to-date coastal and ocean research, extension and environmental educational materials is increased through a range of North Carolina Sea Grant outreach products (e.g., *Coastwatch* magazine, newsletters, and print, video and online products) that are developed, or adapted, and regularly used as education materials for multiple audiences in homes, classrooms, informal education facilities, festivals and other locations.
- User-defined workshop content (e.g. presentations, trainings) and continuing education programs are developed and disseminated in collaboration with formal and informal education facilities, and coastal industries. Materials are archived for future access.
- Outreach programs are developed to expand our reach to new and diverse audiences, including piedmont and mountain regions, underserved communities, and coastal businesses and industry.
- Local and state officials and policymakers are engaged, with appropriate partners, through targeted programming and communication platforms, to discuss and build greater understanding of scientific information; to provide law and policy briefings; and to share available tools to support decision making that incorporates social, environmental and economic considerations.

Environmental Literacy and Workforce Development Goal 2:

Educators in K-12 classrooms and less formal settings have access to resources and training to bring coastal science, policy and history to future generations.

Outcomes:

- Curricula are developed and workshops and trainings delivered (e.g. "train the trainer") that will equip educators with tools to build environmental literacy in classrooms and with other audiences. Those materials are archived for recurring access.
- An educational advisor group is established to inform the direction of North Carolina Sea Grant's educational programming as well as to evaluate use and utility by

stakeholder groups to ensure ongoing adaptations to changing needs and requirements.
- Local, state, regional and national educational organizations partner with North Carolina Sea Grant to utilize educational products, thus magnifying the effectiveness and reach of educational products and activities.
- Hands-on research experiences and interactions with investigators and graduate students are developed for teachers and students across the state.
- Current and emerging distance-educational technology is explored and developed to broaden the reach of educational training across multiple audiences throughout the state including, but not limited to, colleges, community colleges and high schools that serve underrepresented groups.

Environmental Literacy and Workforce Development

Goal 3: *The next generation of coastal and ocean professionals have scientific, technical and communication skills needed to solve complex resource problems, support a robust coastal economy and be competitive globally.*

Outcomes:

- Opportunities for interdisciplinary fellowships and research experiences for undergraduate and graduate students are expanded as a result of partnerships with diverse institutions and organizations across the state, region and nation.
- A greater pool of graduate and undergraduate students who represent a breadth of diversity (e.g. gender, race and ethnicity) are aware of, and apply to, program research funding and outreach opportunities.
- Professional training opportunities for students are developed and delivered to strengthen employability and opportunities for leadership roles after graduation (e.g. communication, grant-writing and interview skills).
- Industry and business partners expand existing, or develop new, professional intern programs to support technical training and employment pipelines for current and post-graduate students at various levels — high school, community colleges and universities.
- Professionals receive or renew professional licenses and certificates as a result of North Carolina Sea Grant education and outreach programming.

These goals and outcomes correspond with performance measures of the National Sea Grant College Program:

- Number of Sea Grant products that are used to advance environmental literacy and workforce development.
- Number of people engaged in Sea Grant-supported informal education programs.
- Number of Sea Grant-supported graduates who become employed in a job related to their degree within two years of graduation.

CROSS-CUTTING IMPACTS

North Carolina Sea Grant's integrated research and outreach programs are designed to be cross-cutting and address multiple state focus areas, goals and outcomes as well as the national performance measures identified by the National Sea Grant College Program.

In addition to the national performance metrics included within specific focus areas described above, North Carolina Sea Grant programming will address two additional performance measures of the National Sea Grant College Program:

- Number of Sea Grant tools, technologies and information services that are used by our partners/customers to improve ecosystem-based management.
- Economic and societal impacts derived from Sea Grant activities (market and non-market; jobs and businesses created or sustained).

CONCLUSION

North Carolina Sea Grant is committed to providing timely research regarding coastal resources and policy, as well as dissemination of research results, products, tools and technologies to multiple stakeholders, including but not limited to state and local decision-makers, industry practitioners, community leaders and the public. Our program is committed to working collaboratively with diverse partners across the state, region and nation towards a triple bottom line: North Carolina's communities, ecosystems and economies will thrive, now and into the future.

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