

South Carolina Sea Grant Consortium



The Changing Face of Coastal South Carolina: Enhancing Understanding – Informing Decision-making

STRATEGIC PLAN 2014-2017

October 29, 2012



South Carolina Sea Grant Consortium
287 Meeting Street
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Table of Contents

SETTING.....	5
The Changing Face of Coastal South Carolina	5
Mission	7
Our Niche.....	7
Motto.....	8
Vision for the Coast.....	8
Vision for the Consortium.....	9
Core Values.....	9
Operational Principles.....	9
Planning Process.....	10
Strategic Plan: A Framework for Action.....	11
Definitions.....	12
PLAN OF ACTION.....	13
Programmatic Areas	13
I. THE COASTAL AND OCEAN LANDSCAPE	13
II. SUSTAINABLE COASTAL DEVELOPMENT AND ECONOMY	17
III. SUSTAINABLE FISHERIES AND AQUACULTURE.....	22
IV. HAZARD RESILIENCE IN COASTAL COMMUNITIES.....	26
V. SCIENTIFIC LITERACY AND WORKFORCE DEVELOPMENT	31
Management Areas	35
I. PLANNING, PROGRAM MANAGEMENT, AND OVERALL PERFORMANCE	35
II. CONNECTING WITH USERS.....	38
III. HUMAN RESOURCES	42
NATIONAL CONTEXT	44
WHAT IS THE S.C. SEA GRANT CONSORTIUM?	46
CONSORTIUM MEMBERSHIP.....	47
CONSORTIUM ORGANIZATION	47



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STRATEGIC PLAN

2014-2017

Setting

The Changing Face of Coastal South Carolina

Every day, more and more people are competing for the use of the coast's natural resources. Today, the state's challenge is to conserve those resources while accommodating growth, economic development, environmental quality, and the heritage and quality of life for all of the citizens of South Carolina. This is a crucial challenge because the state's abundant natural resources contribute much more than just scenic mountain views and beach vistas. A 2009 study by the Darla Moore School of Business at the University of South Carolina documented that the state's diverse natural resource sectors contributed \$29.1 billion and 236,110 jobs to the state's economy in 2008.

What are coastal South Carolina's natural resources? The state boasts 2,876 miles of tidal shoreline, 504,450 acres of salt marsh (20 percent of the East Coast's total), 500,000 acres of tidal bottomlands, 165 linear miles of beaches, more than 40 barrier/sea islands, and 10,000 square miles of continental shelf, the latter a region of growing economic and resource interest. One of today's challenges is the potential for oil and gas exploration and alternative energy development off our coast; regional planning in the coastal ocean will be particularly important.

This diverse, complex region supports a wide range of living resources and human activities, including shipping, tourism, fishing, manufacturing, residential and commercial development, just to name a few.

But in just one decade (2000 to 2010), however, South Carolina's coastal population increased by an average of 21 percent, exceeding the state's overall population increase of 13.6 percent. People are increasingly drawn to the coast, placing especially great pressures at the margins of urbanized areas.

So, where do we put all of the new arrivals to the coast, and how do we maintain the environmental, cultural, and historical qualities that continue to draw people there? In the 2010 Charleston Metro Chamber of Commerce Legislative Agenda, growth management is listed as one of the top issues and is a legislative priority for the Chamber.



Recent patterns of growth have resulted in changes in land use and an increased demand on our resources. Already, pollution, erosion, coastal storms, and poorly planned development have left their mark.

The economy of coastal South Carolina continues to change. Although commercial fisheries (for fish, oysters, clams, shrimp and crabs) represent a decreasing portion of the state's economy, they remain an important waterfront use and a functional component of local economies and way of life. In 2005, 1,500 to 2,000 commercial South Carolina fishermen harvested 11.2 million pounds of seafood worth about \$17.5 million. Stable aquaculture operations in hard clam and other shellfish aquaculture have already been established. Recreational fishing and boating are making larger contributions to the state's economy. According to the S.C. Department of Natural Resources, the annual impact of marine recreational fishing in South Carolina significantly exceeds \$300 million. Since July 1992, more than 1,839,483 saltwater fishing licenses have been sold.

In addition, tourism is now a \$15 billion industry, with the eight coastal counties accounting for approximately 50 percent of that total and supporting almost 81,000 jobs. Three of the eight coastal counties led all of South Carolina's 46 counties in domestic travel expenditures in 2010.

The Port of Charleston is one of the busiest container ports on the East and Gulf coasts, and ranks eighth in the nation for dollar value of international shipments, with cargo valued at more than \$50 billion in 2010. The South Carolina State Ports Authority (SPA) served over 1,800 vessels and had a total operating revenue of \$112 million in 2010. The SPA also supports nearly 300,000 jobs across the state, providing an economic impact of \$45 billion annually.

South Carolina's challenges are not unique. State boundaries are political boundaries; however, rivers, watersheds, and the movement of pollutants and people are not restricted to individual states.

Similar to other coastal states from Texas to Maine, naturally occurring coastal erosion threatens homes and businesses built along our shoreline. If scenarios of sea level rise due to global climate change and land subsidence play out as predicted, erosion impacts will be exacerbated in the future. Episodic hazards events, such as wind, surge, and flood associated with hurricanes, tropical storms, and nor'easters will also continue to threaten developed portions of our coast. Historically, major tropical storms have struck the South Carolina coast every seven to eight years. Many long-range climate forecasters argue that we are now entering a cycle of more severe coastal storms.

Accommodating the various needs of those who use and enjoy coastal and marine resources presents an enormous challenge. The S.C. Sea Grant Consortium is committed to optimizing the balance among economic, social, and environmental potential of the state's coastal and marine resources through the support of integrated research, education, and extension programs. The Consortium is also interested in addressing the uncertainty that change brings with it to the coastal



region, and how we can adapt and prosper. It does so by engaging the talents and expertise found at South Carolina's leading university and research institutions to increase our knowledge about the natural, cultural, and social environments of South Carolina and the region.

Mission

The S.C. Sea Grant Consortium's mission statement is:

"South Carolina Sea Grant Consortium generates and provides science-based information to enhance the practical use and conservation of coastal and marine resources that fosters a sustainable economy and environment for the state of South Carolina and its citizens."

Our Niche

The Consortium is well aware of the many organizations and institutions that are engaged with coastal and ocean resources issues and opportunities. But the Consortium is unique in that it provides mechanisms by which many interests can come together to identify, discuss, study, and share information about our coastal and ocean environment and its economic, environmental, and socio-economic importance to the state. We do this through partnerships, and we recognize that "the value of working with partners from all sectors is critical to our success." In fact, one element of the Consortium's South Carolina legislative mandate is to "encourage and follow a regional approach to solving problems or meeting needs relating to ocean and coastal resources in cooperation with appropriate institutions, programs and persons in the region."

We find our partners everywhere, from working waterfronts to the research laboratories of our Consortium members. We partner in research, extension, education and communication programs. As a partner, sometimes our role may be to organize and manage multi-disciplinary/institutional research programs. For example, the South Atlantic Bight Land Use–Coastal Ecosystem Study (LU-CES), a five-year, multidisciplinary research and outreach program funded by the NOAA Coastal Ocean Program, S.C. Sea Grant, and GA Sea Grant engaged scientists from South Carolina and Georgia working collaboratively to examine how land use and land use change affects marine resources, to provide a better understanding of the cause-and-effect relationships of land use activities on coastal ecosystems, and to inform decisions being made by state resource managers and local communities every day.

In other cases, our partnership efforts take the form of facilitating communication between and among parties. For example, our fishery extension specialist continues to work with South Carolina fishermen to help them better understand and navigate through the many Federal and state fishery regulations, as has been the case with turtle excluder devices, by-catch reduction, and more recently marine protected areas.

The Consortium also partners by serving as a bridge between parties the need data and information to assist in making management decisions, and scientists that can generate and acquire it. For example, the South Carolina Coastal Erosion Study,



managed by the Consortium with funding provided by the U.S. Geological Survey, has served coastal managers and local communities by documenting shoreline change over time (due to erosion and accretion), the effectiveness of nourishment projects, and locations of sand resources for future nourishment projects. Although initiated as a research program, components of it continue to provide information to these audiences to inform their decision making processes.

Finally, sometimes we help initiate programs which then grow and become something much larger than anyone ever envisioned. This was the case when in the 1980s the Consortium made a very small grant to the Roper Mountain Science Center in the upstate to acquire a 'touch-tank' to begin a marine science program, and then sent us a letter 15 years later acknowledging that our investment served as the foundation for the creation of a new expansive marine science wing at their facility.

The bottom line is that the Consortium and its programs serve to address specific and unique needs of coastal stakeholders, and help initiate efforts that take on lives of their own.

Motto

"Coastal Science Serving South Carolina"

While the focus of S.C. Sea Grant is on coastal and ocean resources and communities, we are mindful of the interrelationships between the mountains, piedmont, and coastal plain of South Carolina. Therefore, our work has impact throughout the state.

Vision for the Coast

Looking toward the future (next 25 years), the Consortium envisions a thriving South Carolina where the following are true:

1. Communities are employing strategies to manage growth associated with coastal population expansion in ways that conserve coastal and marine resources, support a vigorous economy, and preserve a high quality of life for their citizens.
2. Decision-makers are incorporating scientific information as they make choices about coastal growth, coastal health, and public safety.
3. Coastal and marine resources are healthy, vital, and abundant.
4. Children are knowledgeable about the importance and limitations of coastal and ocean resources.
5. People across the state and region are informed about coastal and marine resource issues, and practice good resources stewardship.
6. Individuals, businesses, and governments fully understand and anticipate the coastal risks that confront them and act to reduce those risks.



Vision for the Consortium

The South Carolina Sea Grant Consortium is...

- The best Sea Grant College Program in the Nation.
- One of the most efficiently and effectively managed State (South Carolina) agencies.

Core Values

The S.C. Sea Grant Consortium operates on a core set of values that are essential for successful performance.

The Consortium values:

- *Trust, Honesty, and Respect* in our professional interactions.
- *Integrity and Objectivity* of program activities.
- *Partnerships and Teamwork* critical to meet increasing demands for products and services.
- *Excellence* in quality of work by staff and partners.
- *Public Service* to our stakeholders throughout the state, region, and nation.

Operational Principles

The S.C. Sea Grant Consortium achieves excellence in its mission by adhering to the following operational principles:

1. People are our greatest asset.
2. Stakeholder input drives programs and activities.
3. The value of working with partners from all sectors is critical to our success.
4. Consortium research, extension, education, and training programs require full integration of resources.
5. Accountability and transparency are key components of the agency's performance and achievement of results.
6. Equal access to opportunities will be afforded to all constituencies.
7. Agility and flexibility create strategic opportunities for addressing emerging and contemporary issues important to South Carolina and the region.
8. Quality of work is assured through a competitive peer-reviewed process for selection of activities.
9. Science-based information will be expressed in an objective fashion and delivered in formats and terms suitable for diverse audiences.
10. An active role will be taken in local, state, regional, and national partnerships and collaborations.



Planning Process

The goal of the Consortium's strategic planning process is to optimize the ability of S.C. Sea Grant Consortium's research, education, and outreach programs to address the coastal resource needs of South Carolina.

Strategic Planning for 2010-13

An extensive review of other Sea Grant strategic plans, an on-line survey and a review by the Consortium's Program Advisory Board formed the basis for the Consortium's 2006-10 strategic plan. Likewise, a review of the 2006-10 plan led us to the conclusion that the programs identified in it were still relevant and thus a revision and alignment were the necessary steps to developing a comprehensive Consortium strategic plan for 2010-13.

In the 2010-13 planning process, the NOAA National Sea Grant College Program Office (NSGO) alignment took a stepwise approach, with the first phase focusing on the strategic plan and the second phase on implementation plans. One of the requirements of the NSGO was that the strategic and implementation plans be developed on four-year cycles starting in 2010. The NSGO required the Consortium to (1) identify how each of its strategies fit into the National Sea Grant strategies (strategy) and (2) identify outcomes, performance measures, and targets (implementation) for the four-year period. The Consortium's senior management team completed these two alignment activities and received favorable comments from the National Sea Grant office regarding the Consortium's plan for alignment.

The Consortium's 2010-13 strategic and implementation plan was developed based on the alignment process. The Consortium's Program Advisory Board (PAB) met on September 4, 2009 to review and discuss the plan. The PAB provided input on the strategic areas, visions, goals, and strategies. The PAB unanimously endorsed the plan for submission to the Consortium Board of Directors for approval.

The Consortium's Board of Directors met on September 21, 2009. The Board provided a few comments which were incorporated in the plan, including a statement that the plan recognize the fact that the Consortium must be flexible and nimble enough to be able to address emerging issues in the state and the region and to take advantage of funding opportunities within and outside of Sea Grant when they available. The Board unanimously approved the Consortium's 2010-13 strategic and implementation plan.

Strategic Planning for FY2014-17

Much the same process that was implemented in the 2006-10 and 2010-13 periods was followed in the current 2014-2017 planning process. Our 2014-17 strategic planning effort engaged our constituents and collaborators beginning in the fall of 2011 and throughout the winter of 2012. Four Extension Advisory Committees, corresponding to the Consortium's program focus areas, were convened for annual meetings. At these meetings, activities and accomplishments of the previous year as well as priorities for the upcoming year were presented, and current and emerging issues on the horizon for the next several years were discussed. Information gleaned from this process was then captured and formed the basis for



drafting the initial version of the FY14-17 plan. This input was also synthesized and provided as input into the National Sea Grant strategic planning process via a questionnaire in April 2012.

Based on the structure and organizational elements of previous plans and up-to-date constituent input on current needs, the Consortium staff met throughout the spring of 2012 to work on the draft plan. Then, in September 2012, the Consortium convened five stakeholder/partner focus groups, organized according to the Consortium's five program areas, to provide additional input into the substance of the plan. After final revisions, the Consortium presented its proposed 2014-17 strategic plan to its Program Advisory Board on September 26, 2012 at which time it was endorsed to be sent to the Consortium's Board of Directors for final review and approval. The Consortium Board met on October 2, 2012 and formally approved the plan.

The structure and organization of the plan remains very similar to that of the FY2010-13 plan. With regard to its programmatic content, the 2014-17 plan is also similar. The Consortium's five programmatic areas remain the same, while the issues, goals, objectives, and strategies sections have been modified only slightly in response to stakeholder input, for further clarity, or for improved focus. It differs mainly in its integration of the previously separate implementation plan into the main body of the strategic plan. In addition, the performance measures and program metrics, previously located in the implementation plan section, have been significantly consolidated and are now integrated within each program area.

Implementation of this plan will be partially achieved through the Consortium's biennial Sea Grant Omnibus proposal solicitation and review process. To assist the agency in identifying specific projects and activities that it will pursue over the next two biennia, the Consortium will convene engagement groups consisting of representatives of a diversity of public and private sector interests. These engagement groups will help Consortium staff identify the specific issues and opportunities, based on this strategic plan, which will serve as the basis for the Consortium's efforts over the next four years.

Strategic Plan: A Framework for Action

The S.C. Sea Grant Consortium has developed a strategic plan for the next four years to address contemporary coastal and marine resource issues facing South Carolina. These goals and objectives will serve as a guide and filter for the activities that the S.C. Sea Grant Consortium will undertake over the next four years.

Within each of these sections, the strategic areas are divided into Programmatic and Management focus areas. The programmatic areas include the Consortium's plans for research, education and outreach-based activities. The management areas include process-based activities that dictate how the Consortium will support its mission, assess customer satisfaction, ensure financial performance, and document human resource activities.



The strategic plan section includes the vision, goals, objectives, and strategies for each strategic area. Within each area, the Consortium has identified major strategic areas of emphasis. Each strategic area includes a background statement, identification of key issues, and a single agency goal. For each goal, one to three objectives are identified; for each objective, a set of strategies, outcomes, and indicators are listed. The purposes for each are as follows:

- *Background Statement* - context and historical information for each Strategic Area.
- *Issues* - the underlying justification for the identification of activities to be undertaken for each Strategic Area.
- *Vision* - the overall anticipated outcome for each Strategic Area.
- *Goals* - the overall anticipated results within each Strategic Area.

For each Goal, a set of objectives and strategies, intended outcomes, performance measures and targets are listed, and are defined as follows:

- *Objectives* - specific program/management areas of emphasis that will be addressed.
- *Strategies* - activities to be conducted to achieve the objective.
- *Outcomes* - The end results or consequences of the strategies employed.
- *Performance Measures* - The measures to be used to evaluate success in achieving objectives.
- *Targets* - The predicted level of each performance measure over the four year period.

The Consortium's 2014-17 strategic plan will serve as the template for future strategic plans. The strategic areas, goals, and objectives are expected to continue to be relevant for a number of years to come. The strategies the Consortium utilizes to achieve these goals and objectives are expected to be re-evaluated during each subsequent revision of the plan. New strategies will be included as current strategies are addressed and new issues arise. The outcomes and performance measures will be assessed on two-year cycles.

Definitions

Within this document there are several terms that are used repeatedly that encompass greater meaning than may be immediately apparent. For this reason, we will provide our definitions for these terms here.

1. "community/ies" is a term of reference used in the broadest, small "c", sense to include: people, local governments, organizations, associations, businesses, etc. For example, the community of Charleston, the environmental community, the commercial fishing community, etc. We use this general term 'communities' to avoid unnecessary repetition, and are confident that for most people the context in which the term is used will sufficiently identify the referenced community.
2. "decision-maker" is a term of reference used to include anyone who makes decisions at any level. This would include home/property owners, community groups/organizations, local/state/federal government, business/industry, etc.



For our purposes, ‘decision-maker’ is synonymous with “stakeholder”. Our rationale for the broad use of ‘decision-maker’ is again, to avoid repetition. More importantly, our intent is to emphasize that everyone is a decision-maker. We all make choices about what we do, how we vote, what we manage, what we study, what we value, and what laws we enact. One of the most important roles of Sea Grant is to inform the decision making process at any and all levels, with science-based information.

3. “sustainability” is defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. Sustainability has three equally weighted components: economic, environmental, and societal.

Plan of Action

Programmatic Areas

Five programmatic areas have been identified by the Consortium:

1. The Coastal and Ocean Landscape
2. Sustainable Coastal Development and Economy
3. Sustainable Fisheries and Aquaculture
4. Hazard Resilience in Coastal Communities
5. Scientific Literacy and Workforce Development

Programmatic areas outlined in this plan will not necessarily be completed within the four-year time frame, but rather reflect research, education, and outreach priorities that the Consortium will use to take advantage of opportunities. For example, the Consortium will issue requests for proposals related to the Programmatic topic areas; however, the strategies that will be pursued will be determined in part by those proposals received and favorably considered, through the agency’s rigorous peer review process.

I. THE COASTAL AND OCEAN LANDSCAPE

The natural features of the State of South Carolina are diverse and striking. South Carolina contains 2,876 miles of tidal shoreline, 500,000 acres of tidal bottoms, 504,450 acres of salt marsh, (representing 20 percent of the East Coast total), some 4.5 million acres of freshwater wetlands (covering about 24 percent of the land area of the state), and 10,000 square miles of coastal ocean. The South Carolina coastline is characterized by more than 165 linear miles of beaches and dotted with more than 40 barrier and sea islands. Five major estuaries drain major watersheds originating from as far away as western North Carolina. Plantation lands and managed wetlands, remnants of the once flourishing rice culture industry of the late 18th and 19th centuries, remain remarkably intact today; many form the basis for significant refuge holdings and hunting and agricultural pursuits, while others have provided the “raw material” for resort development and tourism.



Collectively, these lands represent the importance of the state's coastal heritage in shaping growth and development along the coast.

The coastal and marine resources of South Carolina are directly affected by both human influences throughout the watersheds in the coastal zone and by the physical and natural processes of the state's adjacent coastal ocean. The focus of this program area is to support research efforts to assess and document the natural coastal and oceanographic processes, the valuation of resources, and the services they provide to inform targeted constituencies and decision-makers. Consortium stakeholders identified an improved understanding of natural processes, coastal and ocean ecosystem health, and long-term conservation of natural and cultural resources as high priority areas. In addition, they suggested that the development of predictive tools for coastal ocean processes and estuarine water quality events, and determination of the economic and social value of resources to be priority areas. Generating this baseline information is critically important in order to gain a better understanding of the effects and impacts that natural and anthropogenic influences are having on how our coastal and ocean environments function.

Issues

- The South Carolina coastal landscape is rapidly changing, with potential for significant alterations in the structure and function of the natural environment. Before the effects of this change can be determined, the physical, chemical, geological, biological, and socio-demographic environment along the South Carolina coast must be documented.
- In the course of history, humans have impacted natural environments and as a result fisheries and their associated habitats may experience negative impacts (e.g., decline in fisheries). Restoration efforts, both habitat and stock, are critical to offset these impacts. (incl. marine debris, climate, fisheries)
- Upland watershed processes drive estuarine and coastal ocean ecosystems through freshwater input and groundwater discharge. Issues of scaling and variability must be taken into account.

Vision: The ecological and economic value of coastal and ocean ecosystem functions are documented and resultant information and tools are delivered to state and local decision-makers, resource managers, and interested public.

Goal 1: Sound scientific information is available to support ecosystem-based approaches to management and decision-making for the coastal environment.

Objective 1.1: Generate information on the biotic and abiotic processes that affect the long-term ecosystem condition and communicate this information to coastal decision-makers.

**Strategies:**

- Assess the boundary dynamics and biogeochemical processes that influence the source, transport, fate, exposure, and effects of materials on ecosystem and living marine resource condition.
- Develop models of productivity, effects of estuarine interactions with the shelf system, and sensitivity of the system to variability and change, which can be used in the development of ecosystem-based approaches to living marine resources management.
- Refine the understanding of ecological relationships between living marine resource production in estuaries and tidal creeks, and the quantity and quality of critical habitat areas (e.g., essential fish habitat for state- and federally-managed species).
- Identify the ecological relationship of upland watershed ecosystems on estuarine and coastal ocean productivity (e.g., changes in flow dynamics).
- Identify the causes of and develop mitigation strategies for marine biotoxin production and exposure.

Objective 1.2: Integrate baseline data, standards, and key indicators to support ecosystem-based management of land, water, and coastal and ocean resources.

Strategies:

- Identify relevant baseline data, standards, and indicators of land, coastal, and ocean resources useful in support of ecosystem-based management.
- Identify and assess the cumulative effects on key “indicators” of low-level, sub-chronic exposure to chemical contamination and/or physical changes (e.g., low dissolved oxygen [DO]) to the marine ecosystem.
- Determine the socioeconomic value of coastal and marine resources and ecosystem benefits (e.g., value of coastal wetlands in supporting fisheries and barrier islands in buffering storm hazards).
- Establish partnerships at the local, state, regional, and federal levels to share and make information accessible to a broader population of users.

Goal 2: Widespread use by decision-makers of ecosystem-based approaches to managing land, water, and living resources in coastal areas.

Objective 2.1: Work with partners to develop and share data products, models, and training activities that support ecosystem-based planning and management approaches.

Strategies:

- Examine and identify ecological interrelationships between upland, river, estuarine, and coastal ocean productivity, transport, and cycling.
- Assess and model pathways and mechanisms for transport of pollutants from the landscape into coastal waters.



- Construct and evaluate the effectiveness of models of coastal ocean processes (e.g., upwelling) and water quality events (e.g., hypoxia) to assist resource planning and management decision-makers.

Objective 2.2: Support state and regional coastal and ocean planning, offshore energy development, and ocean observing activities.

Strategies:

- Support the efforts of the Southeast Coastal Ocean Observing Regional Association (SECOORA) through participation on its Board (on behalf of the Southeast Atlantic Sea Grant College programs).
- Assist the Governor's South Atlantic Alliance (GSAA) as it transitions to an independent, non-profit organization.
- Work with the S.C. Energy Office to foster a policy and regulatory environment conducive to the sustainable development of traditional and alternative sources of offshore energy.
- Work with the South Atlantic Fishery Management Council (SAFMC) on issues related to ecosystem-based management and essential fish habitat.

Goal 3: Restored function and productivity of coastal and ocean ecosystems

Objective 3.1: Support enhancement and restoration of coastal and ocean ecosystems.

Strategies:

- Foster effective protection and restoration of coastal and ocean habitats (especially oyster reefs, salt marsh) through the development of demonstration projects and use of new approaches and technologies.
- Facilitate stakeholder-driven and community-based approaches to habitat enhancement and restoration.
- Encourage implementation of science-based restoration, incorporating the evaluation of restoration efforts through the comparison of metrics across habitats.
- Support research, education, and outreach programs that seek to prevent, remove, repurpose, and dispose of marine debris.

Objective 3.2: Develop and provide new information, methods, and technologies that help minimize the introduction, spread, and negative impacts of coastal and ocean invasive species.

Strategies:

- Working collaboratively with regional partners, assess and mitigate the impacts of invasive species on coastal ecosystems and human communities.
- Assess the impacts of reduced water quality and quantity on coastal ecosystem biodiversity and support efforts to mitigate these impacts.



Anticipated Outcomes

- Baseline data, standards, and indicators developed by the Consortium and its partners are used to support ecosystem-based approaches to management.
- Models are made available to and used by the scientific community and natural resource agencies to assess and predict coastal and ocean processes (e.g., water quality).
- South Carolinians are more knowledgeable about the natural processes that influence South Carolina's estuaries and coastal ocean waters.
- Science-based information is provided to natural-resource managers and decision-makers to support national, regional, state, and local resource-management objectives.
- Economic valuation of resources is performed based on priority needs.
- Coastal South Carolina property owners and communities are aware of the problems associated with invasive species such as *Phragmites* and lionfish.

Performance Measures and Four-year Targets

- Number of communities that incorporate results of Consortium research to address habitat management goals.
 - 5
- Number of tools and technologies developed with Consortium support for use in ecosystem-based management, habitat restoration applications, and economic valuation.
 - 2
- Number of ecosystem "indicators" developed through Consortium support.
 - 2
- Number of scientific, technical, and educational products produced by Consortium related to healthy coastal ecosystems and aquatic invasives.
 - 20
- Attendance at Consortium-sponsored ecological services workshops and information events.
 - 120
- Number of management policies developed by state natural resource agencies as a result of work supported through Consortium.
 - 2
- Number of website downloads of coastal and ocean landscape-related pages and products.
 - 750,000
- Number of information requests for coastal and ocean landscape-related projects and products.
 - 876

II. SUSTAINABLE COASTAL DEVELOPMENT AND ECONOMY

Population growth along the South Carolina coast is increasing at a rapid rate, with approximately 700,000 new residents expected to move to coastal South Carolina by 2025. This has and will continue to result in an explosion of residential and



commercial development and concomitant pressures on the state's coastal and marine resources. Several examples of this growth highlight the magnitude of change that will occur in coastal South Carolina. Some 135,000 housing units are planned and will be constructed in the Charleston metropolitan region. The small Town of Bluffton, current population of 12,500 (based on 2010 census data), expects its population to increase to 62,000 based upon the number of planned units. Recent growth projections in Jasper County, based on approved developments, estimate that 31,000 acres will be developed and bring over 150,000 new residents to the county in the next 20 years (based on a 2007 Clemson University study), a more than six-fold increase over the current population.

Coastal resource management and economic development issues in South Carolina continue to challenge coastal zone planners, resource managers, developers, and those involved in commerce, industry, recreation, and tourism. The Consortium plans to continue to examine coastal development and management issues and explore sustainable economic development opportunities in cooperation with state and local management agencies and coastal resource users. In this way, the needs of the state and region will be served simultaneously in terms of decision-making, planning, and assessment related to all facets of coastal development. The coastal-dependent economy in South Carolina includes a wide variety of businesses including commercial fishing, recreational fishing, aquaculture, tourism, and future endeavors such as energy development.

Traditional, water-dependent uses of coastal waterfront property are drastically changing as more of the U.S. population moves to the coast, and pressure for 'highest and best use' development increases. For example, commercial fishermen are finding it difficult to find and afford docking space, fuel, and ice. Sustaining traditional working waterfronts and balancing the changing needs of coastal communities is a challenge for individual property owners, commercial/recreational fishermen, developers, and resource managers. Solutions are needed to help preserve the historical profiles of coastal communities while allowing for community-driven economic development.

Offshore energy development is becoming a consistent topic of discussion. Two of the prominent discussions have been directed towards the development of wind energy and oil and gas exploration. The private energy sector is engaged in discussions about the potential for offshore wind energy development in the coastal ocean of South Carolina, and yet we have little foundational information about the environmental and societal issues that may arise as this potential is realized. Additionally, for years, the information available stated that the South Carolina coastal ocean was not suitable for gas or oil extraction; however, new information has indicated that it may have significant natural gas reserves. In addition, the ability to extract these resources has been limited by Federal policies which are currently being re-evaluated. Therefore, the prospect for gas and oil exploration and eventual extraction are raising expectations and related questions regarding coastal access and support, and economic and environmental sustainability.



The focus of this program area is to provide information through the Consortium's research and outreach programs that document the impacts of land use change and coastal and ocean resource development on marine and coastal resources, and address production and resource economics, policy, law, regulation, preservation, and development of coastal resources in support of a balanced resource-based economy, environment, and society.

Issues

- Traditional uses of coastal waterfront property are drastically changing as more of the U.S. population moves to the coast. Sustaining traditional working waterfronts and balancing the changing needs of coastal communities is a challenge for coastal communities and decision-makers.
- User conflicts over public access to beaches and waterfront areas are increasing as more property is privately developed. There are policy implications related to the private use of public trust resources (e.g., marinas, dockminiums, conservation leases) and user conflicts (e.g., private and commercial uses of public trust resources).
- Recent interest among many sectors in the potential for energy development (e.g., oil, gas, wind, wave, and current) offshore of South Carolina has raised a series of environmental, economic, and land use questions.
- The effects of ever-increasing coastal development and related pressures on the state's coastal and marine resources, and its aging infrastructure, remain poorly understood, and thus challenge communities as they cope with land-use planning decisions.
- The lack of direct cause-and-effect information on how marine ecosystems may be affected by human activities restricts the use of science in decision-making processes.
- The economic and societal value of South Carolina's coastal resources and the ecosystem services (i.e., their benefits and functions) that they provide are not well documented. This information is critical if appropriate use and protection of these resources and services are to continue.
- The need to accommodate a robust coastal recreation and tourism industry within a healthy coastal ecosystem is a challenge for coastal communities.

Vision: Decision-makers balance growth and resource conservation by applying ecosystem science-based information and management tools and techniques to problems related to demographic and land-use changes.

Goal 1: Healthy and viable coastal communities and economies that include robust working waterfronts, abundant recreation and tourism opportunities, and coastal access.

Objective 1.1: Provide information and tools to coastal communities to enhance waterfront-related economic opportunities (e.g., commercial and recreational fishing, aquaculture, tourism, and energy and port development) without diminishing the long-term health of the natural coastal environment.



Strategies:

- Characterize the socio-economic and demographic factors that impact South Carolina's traditional coastal economic activities and identify options for sustaining these uses.
- Support the development of economically-viable and environmentally-sustainable recreation and tourism practices and operations.
- Develop and apply models in collaboration with decision-makers of how climate variability and change may affect working waterfronts.
- Design and deliver outreach programming to the public on potential uses of the coastal and ocean environment (e.g., offshore sand resource management and offshore energy development).

Objective 1.2: Support local, state, regional, and national efforts to preserve and increase public access to the South Carolina's beaches, waterfronts, and waterways.

Strategies:

- Evaluate the public policy and legal dimensions of submerged lands use and management and ocean planning.
- Develop and/or provide coastal communities with planning and policy tools to evaluate current and future coastal access needs.
- Foster a coastal community network to aid in information exchange with regard to coastal access and working waterfront issues and initiatives.

Goal 2: Coastal communities make effective use of land, energy, and water to conserve the resources needed to sustain coastal ecosystems and quality of life.

Objective 2.1: Work with federal, state, and local partners to develop and disseminate assessment tools, model plans and ordinances, best management practices, alternative development approaches, and other techniques that will enable the citizens to develop coastal economies in environmentally-sound ways.

Strategies:

- Assess and develop practical and realistic models that predict and forecast the impacts of land use change and practices on coastal watersheds (e.g., rivers, estuaries, salt marsh, tidal creeks) and the resources therein.
- Evaluate the effectiveness, efficiency, and durability of stormwater management techniques, including existing and sustainable development practices, and inform target audiences, such as individual landowners, of the results.
- Inform community leaders, decision-makers, and staff about land use planning and non-point source pollution control alternatives that address impacts on coastal and marine resources.



- Identify and evaluate regionalized approaches to land use, watershed, and coastal ocean planning to support integrated community and economic development projects.

Objective 2.2: Assist coastal communities to determine the carrying capacity of their land, water, and energy to enhance and better inform community resource management decisions.

Strategies:

- Communicate research and information related to land-use change and population growth impacts on coastal and ocean ecosystems to coastal communities to support decision-making.
- Develop tools that illustrate possible changes in land use and land cover in response to projected population growth.
- Identify, test, and deliver local and regional information on the effectiveness, efficiency, and durability of watershed planning and management techniques to control nonpoint source pollution.
- Generate and distribute information, management tools, and technologies on beach, marsh, and dune systems that can help communities to manage coastal environments for recreation, tourism, and other uses.

Goal 3: State and local decision-makers possess the knowledge about the complex inter-relationships among the social, economic, and environmental characteristics of the state's coastal ocean (offshore) environment, and the tools necessary to manage emerging uses and optimize economic and environmental sustainability.

Objective 3.1: Document the ecological, economic, policy, and societal implications of offshore energy development (e.g., oil, gas, and wind) on the South Carolina coastal landscape.

Strategies:

- Identify offshore energy issues, policies, technologies, infrastructure needs, and impacts.
- Communicate science-based information on offshore energy development to communities in South Carolina.
- Continue engagement on issues of energy development through the Regulatory Task Force of the South Carolina Energy Office and other efforts (e.g., BOEM Task Force).

Anticipated Outcomes

- Traditional working waterfront uses become a prominent subject in the public dialogue on waterfront development.
- South Carolinians and decision-makers are more knowledgeable about the "cause-and-effect" impacts and influences of humans on South Carolina's estuaries and coastal waters.
- Existing population growth and land-use change models are refined and improved.



- South Carolina decision-makers understand the impacts of development on coastal and ocean resources and develop strategies to address them.
- Regional approaches are incorporated into coastal land-use/watershed planning efforts by local governments.
- Decisions related to offshore energy and ocean uses and planning are addressed at a regional scale using science-based information.

Performance Measures and Four-year Targets

- Number of communities that incorporate strategies to maintain and enhance working waterfronts.
 - 2
- Number of scientific, technical, and educational products produced by Consortium related to sustainable coastal communities.
 - 28
- Number of coastal communities engaged in planning and development activities that address economic and environmental sustainability.
 - 15
- Number of coastal communities who have adopted and/or implemented economically and environmentally sustainable development practices and policies.
 - 5
- Number of regional ocean governance initiatives fostered by the SC Sea Grant Consortium.
 - 1
- Number of website downloads of sustainable coastal development and economy-related pages and products.
 - 1,050,000
- Number of information requests for sustainable coastal development and economy-related projects and products.
 - 1,224

III. SUSTAINABLE FISHERIES AND AQUACULTURE

Historically, South Carolina's commercial fisheries have played an important role in the state's economy, providing jobs and fresh sources of seafood harvested from the abundant waters of the state. Today, the three primary commercial fisheries in South Carolina are penaeid shrimp, blue crabs, and oysters, with a commercial value of \$5,648,848, \$3,407,540 and \$1,241,925, respectively. Since 2001, however, the influx of imported seafood products, particularly shrimp and swimming crabs, has dramatically changed the face of the domestic seafood industry. With a rise in imports and the high cost of fuel and labor, the domestic commercial shrimp and blue crab industries experienced a significant economic downturn. Additionally, these ailing industries suffered from a decline in seafood industry-related infrastructure that is necessary to maintain viable commercial fishing operations. Seafood processing plants, ice plants, cold storage facilities, and commercial dock space have all been in decline over the past 10 years due to changes in the market place and catastrophic natural hazard events in the form of



hurricanes. All of these factors have combined to form what is often dubbed “The Perfect Storm” for the domestic seafood industry. These challenges have brought about the need to develop innovative methods and rapid response programs for the commercial seafood industry to assist them in effectively adapting to the continually changing environment and marketplace.

While the commercial industries struggle with increasing regulation, competition from imports, low domestic prices, rising operational costs, and changing land use patterns, the role of recreational fisheries in the tourism economy has grown. There has been an increase in population along our coasts which has placed unprecedented pressure on our living marine resources. South Carolina’s inshore and offshore recreational fishing industries contribute significantly to the local, state, and tourism economies. As more people retire to the coast, recreational boating and fishing has moved to the forefront as one of the largest economic drivers in South Carolina. The need for targeted programs dealing with living marine resource management and conservation has arisen out of this coastal growth pattern. These issues are also connected to non-traditional coast-dependent businesses that are forming to meet the growing recreational needs of coastal residents, such as charter fishing, eco-tour operations, and kayaking businesses.

The South Carolina aquaculture industry is diverse and, unlike other southern states, marine aquaculture produces greater farm-gate receipts than its freshwater counterparts. The South Carolina shellfish aquaculture industry, after progressing through its many developmental iterations, is now the largest sector of the aquaculture industry in the state with an over \$8 million farm-gate value. Clam and oyster hatchery, nursery, and grow-out comprise more than 50% of the state’s aquaculture production value. Furthermore, grow-out is conducted on permitted state bottoms, and growth potential exceeds other marine species requiring high priced waterfront property in the near term. The aquaculture industry has also been threatened by disease, competition from overseas imports, and concerns with regulations.

The focus of this program area is to generate and disseminate information through research, education, and extension on the development of sustainability in the fisheries and aquaculture sectors. In particular, the development of viable and sustainable marine fisheries (commercial and recreational) practices and operations, dynamics and processes for the development of ecosystem-based approaches to fisheries management, innovative practices to foster sustainable aquaculture of shellfish, and restoration programs to enhance fisheries populations are significant areas of interest.

Issues

- Fishery managers, scientists, fishermen, and citizens must be prepared to take a pro-active approach to addressing economic and environmental threats to wild fisheries, water-dependent industries, coastal landscapes, beaches, and humans.



- The changing global marketplace has forced many fishermen to seek alternative selling and marketing practices or to simply exit the fishery.
- The era of managing single species in fisheries has progressed into a holistic and comprehensive strategy of ecosystem-based approaches to fisheries management that include the interactions of multiple species, habitats, and humans. The complexity of these management approaches proves to be challenging and will need innovative techniques that incorporate both natural sciences and human dimensions (e.g., socio-economics).
- As wild fish populations continue to be exploited and sustainable fishing and management practices are still being developed, there is a potential for the development of marine aquaculture practices to offset the loss of wild stock harvests (e.g., shrimp). There is, however, the potential for negative impacts of aquaculture development on the natural environment and there will be a need to develop environmentally sustainable aquaculture practices (e.g., offshore aquaculture).
- Throughout the course of history, humans have impacted natural environments and as a result fisheries and their associated habitats may experience negative impacts (e.g., decline in fisheries). Restoration efforts, both habitat and stock, are critical to offset human and environmental impacts.

Vision: Sustainable fisheries and aquaculture in the coastal region compatible with changing demographics, business development, regulatory environments, and long-term conservation of natural and cultural resources.

Goal 1: Sustainable fisheries and aquaculture that balance the ecological needs of the resource and socioeconomic needs of communities.

Objective 1.1: Support the identification and development of innovative fisheries management strategies and other approaches to minimize natural and human threats to the long-term viability of wild fish populations.

Strategies:

- Improve knowledge of the linkages among fisheries populations in support of ecosystem-based management.
- Understand the relationships between fisheries production in estuaries and the quality of habitat.
- Document the dynamic short-term and long-term processes (e.g., climate, circulation) that regulate fisheries (finfish and shellfish) recruitment and migration patterns.
- Enhance and facilitate communication between commercial and recreational fishermen and among state fisheries managers and policymakers, non-governmental conservationists, and fisheries scientists.
- Disseminate information about natural and human threats to the long-term viability of wild fish populations.

Objective 1.2: Support a sustainable domestic aquaculture industry.



Strategies:

- Support the development of economically viable and environmentally sustainable aquaculture practices and operations at a variety of scales, with an emphasis on shellfish aquaculture.
- Evaluate and assess the environmental and economic feasibility of stock enhancement programs for key commercial and recreational fisheries in South Carolina.

Goal 2: A healthy domestic seafood industry that harvests, produces, processes, and markets seafood responsibly and efficiently.

Objective 2.1: Assist the seafood industry in understanding fisheries and aquaculture regulations and policies, how the management and policy processes work, and how it can effectively participate in those processes.

Strategies:

- Assist the seafood industry in developing cooperative research projects to address key data collection, management strategies and policy issues.
- Work with the aquaculture industry, state and federal agencies, and other interested parties to document the current regulatory environment for marine aquaculture in South Carolina, and to inform the policy and regulatory dialogue.

Objective 2.2: Develop new products and innovative marketing approaches to increase seafood availability and profitability.

Strategies:

- Enhance the economic viability of South Carolina seafood producers through partnerships that support local direct sales and marketing, including Community Supported Fisheries, cooperative marketing and web-based initiatives (i.e., MarketMaker).
- Improve the capacity of South Carolina seafood businesses to meet the buying, packaging, delivery, and legal needs of buyers through market-ready training.

Anticipated Outcomes

- The fisheries community has an increased understanding of fisheries ecology, fisheries management strategies, and the regulatory process.
- The fisheries community participates in cooperative research leading to a greater awareness of more sustainable fisheries practices.
- The South Carolina seafood industry is using marketing tools to optimize direct sales.
- Improved communication, understanding, and collaboration are developed among commercial fisheries stakeholders, managers, and scientists.
- State and federal fisheries managers use Consortium information in essential fish habitat and marine protected areas management.

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- Aquaculture and fishing industries are economically stable, environmentally sustainable, and diverse.
 - Innovative shellfish aquaculture and restoration strategies are evaluated, tested, and implemented.

Performance Measures and Four-year Targets

- Number of new and/or enhanced industry and management partnerships.
 - 3
- Number of scientific, technical, and educational products produced by Consortium related to safe and sustainable seafood.
 - 20
- Number of fisheries and seafood businesses which adopt and implement responsible harvesting and processing techniques and practices.
 - 10
- Number of seafood producers and retailers educated about and adopted local, direct sales techniques to enhance market competitiveness.
 - 35
- Number of seafood industry members that received technical assistance from S.C. Sea Grant extension
 - 50
- Number of state and federal fisheries managers engaged in planning and developing activities and strategies that address essential fish habitat and marine protected areas management.
 - 10
- Number of new SC shellfish aquaculture producers.
 - 6
- Number of website downloads of sustainable fisheries and aquaculture-related pages and products.
 - 450,000
- Number of information requests for sustainable fisheries and aquaculture-related projects and products.
 - 524

IV. HAZARD RESILIENCE IN COASTAL COMMUNITIES

Coastal regions of the United States continue to attract residential, commercial, and industrial development. More than half of the country's population resides within 50 miles of the coastline and that percentage is expected to continue to increase. Many residents who have moved to the coastal zone have done so within the last three decades and are not experienced with the associated hazards as they exist on an assortment of temporal scales and threat levels. Event-scale hazards such as coastal storms and interannual events like drought or long term weather alterations in response to gradual climate change are all threats, but have varying temporal scales. In addition to atmospheric hazards, the constant threat of the ocean's impact on the beach is evident in the dynamic shorefront due to erosion, accretion, and inlet and barrier island migration. Planning for these coastal hazards that range from the short-term (6 to 12 hour) storm surges, rip currents and wind and



erosion events to the slow but pervasive rise in sea level, land subsidence, and resultant shoreline retreat over a period of decades becomes a major concern for coastal residents.

South Carolina is vulnerable to most known natural hazards, including rip currents, tornadoes, fires, hurricanes, flooding, drought, heat waves, shoreline change, and earthquakes, each of which has the potential to cause loss of life and substantial damage to the residential, economic, and natural coastal communities.

Additionally, a modest increase in sea level would have profound impacts on low-lying and minimal-relief landscapes in coastal South Carolina; areas presently subject to short-term storm events and spring tides that significantly affect natural systems. When global phenomena are superimposed on these hazards, the range of possible impacts is exacerbated and includes increased vulnerability to coastal storms, more frequent and severe flooding, accelerated erosion of ocean and waterfront areas, saltwater intrusion of surface and groundwater supplies, marsh destruction, and habitat alteration. While their occurrence cannot be prevented, there is much that can be done to minimize exposure to these damages and facilitate recovery processes.

To minimize the exposure and facilitate recovery, attention to both the natural environment and human infrastructure are required. When severe storms threaten large portions of the coast, infrastructure often accounts for most of the damage, and the individuals, families, communities, and businesses that it supports suffer severe social and economic disruption. In addition to the direct impact the storms may have in altering the natural environment, the resultant wide-spread damage to infrastructure can also result in severe environmental degradation through debris deposition and the release of toxic materials.

The focus of this program area is to provide science-based information through research, technical, and educational programs that examine natural hazards and their effects on physical infrastructure, the natural environment, society and people, including the influence that long-term climate patterns may have on influencing the severity of these hazards. The Consortium will also provide information to the public and private sectors on the nature of these diverse hazards and the appropriate methods to mitigate their impacts and facilitate recovery.

Issues

- South Carolina has exposure to most known natural hazards. These hazards have the potential to cause substantial risk to natural habitats, public health, safety, infrastructure, private property, and the economy.
- Hurricane Hugo (1989) was the last significant hurricane to make landfall in South Carolina, causing approximately \$7 billion in damages. Recent hurricanes and tropical storms such as Katrina, Ike, and Irene raised awareness in America about the reality of coastal risk and vulnerability, and the need to plan for the mitigation of damages, timely response, and speedy recovery.



- As hurricanes from Hugo through Irene have demonstrated, hazards have a broad impact on every sector of a community – physical, economic, and social. There is a need to broaden the scope of hazards management to engage all of these sectors in a community-wide approach to hazards resiliency.
- There is a continuing need for hazards research and outreach to help those who plan for and manage hazards, those who design, build, insure, and regulate the development of infrastructure, and to aid policy makers at all levels to better understand the impacts of coastal hazards.
- Many buildings, especially residential homes and small commercial structures, continue to be especially vulnerable to hazards. Research is needed to develop and evaluate innovative construction-oriented hazards mitigation techniques for residential and commercial structures and infrastructure.
- Efforts to reduce greenhouse gases will not change the global warming trends for several decades. Greenhouse gas reductions will not address factors like land-use change that also influence local scale climate variability and change. In the short term, adapting to climate variability and mitigating the long-term effects of climate change is and will be a challenge for coastal communities.

Vision: Coastal residents, communities, and businesses understand the risks and vulnerabilities associated with both chronic and episodic coastal hazards, and are prepared for and able to recover from these hazards with minimal disruption to social, economic, and natural systems.

Goal 1: Widespread community understanding of the risks associated with living, working, and doing business along the South Carolina coast.

Objective 1.1: Increase the base of scientific knowledge regarding hazards and the associated risks and impacts for citizens, industries, and decision-makers in coastal communities in South Carolina.

Strategies:

- Assess the effects of event-scale hazards, short-term weather, and long-term climate change on the coastal communities of South Carolina.
- Assess risk perception of key audiences specific to hazards in South Carolina to inform human response and improve communication
- Develop information on cost-effective, structurally sound hazard-resilient building siting, design, and construction.
- Evaluate the effects of hazards on estuarine and tidal marsh shorelines (non-beachfront), including the impacts from hardened structures.
- Conduct economic analyses of hazard mitigation incentives, including market, insurance, and tax and regulatory incentives, as possible motivators for public and private mitigation measures.



Objective 1.2: Disseminate science-based information to improve community capacity to prepare for, adapt to, mitigate, and recover from hazards.

Strategies:

- Use data analysis to develop hazard mitigation planning tools for coastal communities.
- Conduct community-scale analyses of the vulnerability of South Carolina's infrastructure, resources, and people to hazard events.
- Develop and convey scenarios for hazard preparation, adaptation, mitigation, and recovery to reduce the negative impacts and increase any benefits to communities.
- Develop and apply decision-support tools that enhance local community awareness, mitigation and adaptation planning.
- Provide technical assistance to apply risk perception and risk communication research, and best practices to improve response and communication about risk before, during, and after a hazard event.
- Convey science-based information to resource management agencies and the public on direct impacts that hazards can have on property.

Goal 2: Public and private decision-makers create and adopt policies, plans, and ordinances to reduce risks, manage hazard events, and speed recovery.

Objective 2.1: Facilitate the use of science-based research outcomes in the implementation of adaptive hazard management at varying governmental levels.

Strategies:

- Establish and maintain partnerships to develop and identify effective standards and metrics for assessing hazard resiliency.
- Develop interdisciplinary approaches to hazards that integrate findings from social and natural science to support effective policy and management decisions at all levels of government.
- Implement public education programs on short- and long-term climate variability and long-term hazards (e.g., sea level rise).
- Generate and deliver information materials on the risks of chronic and episodic events (e.g., rip currents) and hazard impact reduction practices (e.g., signage) to enhance community preparedness.

Objective 2.2: Generate and distribute information, management tools and technologies on beach, marsh, and dune systems that can help communities prepare for and mitigate the impacts of shoreline changes.

Strategies:

- Assess and predict long-term and episodic trends in beach change accounting for anthropogenic responses (e.g. nourishment, hard structures, and dune alterations).



- Establish and evaluate model criteria necessary to determine the efficacy of beach nourishment programs.
- Deliver outcomes of assessments to both decision-makers and the community-at-large.
- Identify and convey information to coastal communities about beach nourishment options, including permitting and funding issues.

Anticipated Outcomes

- Coastal communities increase their awareness of socio-economic, structural, and natural resource impacts of hazards.
- Hazard mitigation and adaptation techniques are developed and used in response to changing conditions in hazard-prone areas.
- Data visualization and decision-support tools provide communities with pertinent, comprehensive, and timely information for planning and response.
- Coastal decision-makers have the capacity to incorporate science-based data and information in hazard planning and response efforts.
- Data and results are readily available to and usable by scientists, emergency managers, first responders, citizens, and policymakers.
- State and federal resource management agencies in South Carolina are utilizing shoreline change information in management and policy decision-making.

Performance Measures and Four-year Targets

- Number of coastal communities and resource managers provided with information and/or trained in hazard resiliency, mitigation tools, techniques, and best practices.
 - 10
- Number of coastal communities that have implemented hazard resiliency practices.
 - 4
- Number of tools and technologies developed with Consortium support for use in short-term hazards and long-term climate change applications.
 - 2
- Number of scientific, technical, and educational products produced by Consortium related to hazard resiliency in coastal communities.
 - 16
- Miles of South Carolina beaches surveyed to assess erosional/accretional patterns and risk to property and infrastructure.
 - 110
- Number of website downloads of hazard resilience-related pages and products.
 - 150,000
- Number of information requests for hazard resilience-related projects and products.
 - 176



V. SCIENTIFIC LITERACY AND WORKFORCE DEVELOPMENT

The **scientific literacy program component** of this Focus Area provides quality coastal and marine information reflective of current research to K-12 students, informal and formal educators, and the general public. Careers in ocean sciences, as well as STEM (science-technology-engineering-math) disciplines, are highlighted during program planning and delivery. Through professional development programs for formal and informal educators, community action projects, and robust classroom lessons aligned with South Carolina State Science Standards and the national Ocean Literacy Essential Principles, the Consortium provides access to resources and training that facilitates the inclusion of marine, coastal, and natural resources information in the classroom and at informal science education centers such as aquariums, science centers, and museums.

Program efforts include the development and implementation of strategies and products that provide ocean and coastal information to formal and informal educators, K-12 and college students, and the general public concerning sustained use, conservation, and management of coastal and marine resources. A well-informed constituency has proven to be essential for balanced coastal and marine resource management and economic growth. Education and stewardship were identified by an earlier constituent survey as being very important, particularly innovative curricula and programs for K-12, professional development opportunities for K-12 teachers, and environmental literacy of coastal residents and visitors.

Workforce development efforts are geared towards providing research and training opportunities for undergraduate and graduate students through Consortium-funded research projects. With more than one-half of the marine-related federal work force eligible for retirement within the next five years, the continuing emergence of new marine technologies and discoveries, and the increasing pressures on the nation's coastal and ocean resources due to population growth, the need for highly qualified and adequately trained professionals will continue to increase. Furthermore, the Consortium will continue to assist with the diversification of the ocean-based work force by promoting ocean and coastal related careers to under-represented groups.

Issues

- South Carolina state standards for innovative science learning curricula do not identify ocean sciences as being relevant.
- Few long-term supported STEM based training opportunities and programs exist for K-12 students and teachers.
- When compared to national scores, South Carolina consistently ranks lower on standardized science test score rankings than other states.
- There is a need to engage early career higher education faculty and graduate, and undergraduate students in Sea Grant research and fellowship opportunities.
- Diverse populations are under-represented in the ocean sciences workforce.



- A workforce unprepared for practical work results from a lack of technical skill development.
- Students need early exposure to and experience manipulating authentic, large data sets to be able to navigate in the data-rich environments of the ocean sciences workforce.
- Undergraduate students do not understand regulatory processes due to a lack of integrated research and policy at this level.
- The future of the conservation and management of our coastal resources depends upon a robust effort to foster stewardship and increase public awareness about the societal value and ecological function of South Carolina's coastal resources.

Vision: A scientifically literate public, at youth and adult levels, understands the value and vulnerability of coastal and marine resources, makes wise decisions regarding these resources, and supports the development of a well-trained and diverse workforce in coastal and marine related careers.

Goal 1: Coastal and ocean K-12 education programs foster scientific literacy, stewardship, and exposure to STEM-based careers in both formal and informal settings.

Objective 1.1: Design, implement, and/or enhance K-12 ocean and coastal resource educational programs that focus on STEM disciplines and align with Ocean Literacy Essential Principles and South Carolina Science Standards.

Strategies:

- Deliver existing K-12 marine science educational lessons and program support materials that align with state education standards.
- Leverage existing and develop new educational resources that reflect the current Consortium research and outreach agenda to further the implementation of Sea Grant's K-12 educational programs.
- Align and develop programmatic areas that support the seven Ocean Literacy Essential Principles.
- Establish stronger connections between Consortium-led educational activities and Consortium-funded research projects.
- Introduce K-12 students to opportunities in higher education, to begin linking early education to workforce development.

Objective 1.2: Design, implement, and/or enhance professional development opportunities for educators that provide content and resources for incorporating ocean sciences concepts.

Strategies:

- Coordinate professional development opportunities focused on relevant Sea Grant research topics.
- Offer professional development opportunities to incorporate STEM and ocean science topics into the classroom.



- Provide opportunities for scientist-educator collaboration in research and education.

Objective 1.3: Design, implement, and/or enhance stewardship-focused programs, including student-action and community action projects.

Strategies:

- Develop community-based, student action environmental programs that focus on coastal issues and serve the community-at-large.
- Engage the general public and communities with student-action projects.
- Develop public and social media outlets to promote programs and projects.

Goal 2: Coastal and ocean education programs foster the development of a scientifically trained workforce.

Objective 2.1: Undergraduate and graduate populations are trained to meet workforce needs in ocean sciences fields.

Strategies:

- Encourage the involvement of new faculty, professional staff, and students in Consortium-supported programs and activities.
- Provide research, education, and training experiences in coastal and marine research to graduate and undergraduate students at South Carolina universities and colleges.
- Offer educational and professional development opportunities for outstanding South Carolina undergraduate and graduate students through national fellowships.
- Offer education and professional development opportunities for outstanding South Carolina university students through in-state internships (Consortium, private industry, NGOs).
- Assess, predict, and communicate current and potential workforce needs and opportunities in the southeast.

Objective 2.2: Support the development of a diverse workforce.

Strategies:

- Implement strategies to recruit and retain underrepresented and underserved (UR/US) groups into the coastal and ocean sciences at the college/university level.

Goal 3: Improve public understanding about the coastal and marine environment and related community issues.

Objective 3.1: Provide engagement opportunities for adult learners.

Strategies



- Engage adults in local discovery and stewardship activities.
- Inform local constituencies of research relevant to their communities.
- Collaborate with formal and informal institutions to develop new or enhance existing programs, exhibits and outreach designed for the general public and families.
- Develop public and social media outlets to extend products and programs.

Anticipated Outcomes

- K-12 educational materials, including curricula, are developed and promoted by the Consortium.
- K-12 educational materials developed through the Consortium are being used in classrooms and at informal education facilities throughout South Carolina.
- Formal and informal education communities are engaged in stewardship projects.
- Cultivation and engagement of young and new faculty are supported through the Consortium.
- Graduate and undergraduate student training continues to be a priority for Consortium-supported research projects.
- South Carolina graduate and undergraduate students successfully compete for national and state fellowship and internship opportunities.
- Cultivation of culturally diverse undergraduate and graduate students to pursue ocean science careers.
- *Coastal Heritage Curriculum Connection* is accessed by formal and informal educators.

Performance Measures and Four-year Targets

- Number of new or revised educational materials developed and promoted by the Consortium
 - 20
- Number of K-12 teachers using Consortium-based scientific information and educational products in their classrooms.
 - 400
- Number of K-12 educators participating in professional development opportunities.
 - 200
- Number of informal education facilities using Consortium-based scientific information and educational products.
 - 50
- Number of informal educators participating in professional development opportunities.
 - 100
- Number of formal and informal education communities (i.e. schools, museums, aquariums) engaged in stewardship projects.
 - 75
- Percentage of new/junior faculty supported by Consortium.
 - 20
- Number of graduate/undergraduate students supported by Consortium.



- 100
- Percentage of graduate and undergraduate students who apply and are selected for national fellowships and internships.
 - 50
- Number of website downloads of scientific literacy and workforce development-related pages and products.
 - 600,000
- Number of information requests for scientific literacy and workforce development-related projects and products.
 - 700

Management Areas

Three management areas are identified as priorities for the Consortium over the next four years:

1. Planning, Program Management, and Overall Performance
2. Connecting with Users
3. Human Resources

I. PLANNING, PROGRAM MANAGEMENT, AND OVERALL PERFORMANCE

The development and success of our Programmatic Areas is contingent on the success of our planning, program management, and overall performance. These serve as the foundation of effective and efficient programs.

The Consortium identified priority coastal and marine resource needs through its strategic planning process. These needs will be addressed through research, education, communication, and extension programs. The strategic plan will also help to solicit and secure funding to support these activities and to generate and provide resultant information to the agency's stakeholders in forms that they can use (covered in the Connecting with Users area). To ensure that Consortium activities are consistent with public needs and are of high quality, the Consortium:

1. Conducts strategic planning every four years and implementation planning every two years,
2. Employs a rigorous peer review and evaluation process of all proposals submitted to the agency for support,
3. Solicits formal evaluations from all Consortium conferences and workshop participants, and
4. Is formally evaluated by the NOAA National Sea Grant College Program Office through its Program Assessment process every four years.

Program management and accountability are important components of the success of the South Carolina Sea Grant Consortium. The Consortium must manage its program in accordance with State of South Carolina requirements as well as those of the National Sea Grant College Program. Therefore, the Consortium is accountable to both programs and receives both internal (state) and external (federal) evaluations of its programs and finances. Strategic Planning, National



Program Assessments (PATs), State Accountability Reports, State and Federal audits, and other reporting are all part of these reviews.

Issues

- The Consortium depends on its annual state appropriation to support many operational and management functions, which also serves as matching funds for the core Sea Grant program. These funds must be justified on an annual basis before the South Carolina General Assembly, and any request for increased funding comes under more scrutiny.
- Consortium programs are supported through the successful acquisition of competitive grants from federal, state, and other sources of funds (now approximately 90 percent of the agency's total budget). As the competition for federal funding (from ever-decreasing federal discretionary funds) continues to increase, the Consortium must expend additional staff time and energy to successfully secure extramural grant funding.
- The importance of strategic planning has become more critical to the Consortium as demands for Consortium program activities and services continue to increase and many constituencies seek agency assistance; however the resources (human and fiscal) are not there to satisfy all needs for maintaining and expanding the agency's programs and activities.
- The Consortium's success is predicated on its ability to maintain an efficient, timely and responsive administrative and program management capabilities, including a rigorous peer review process for Consortium proposals and good communications with its member institutions.
- Competition for federal and state dollars requires strict accountability and performance metrics.

Vision: The Consortium is the best Sea Grant program in the nation and is the most efficiently and effectively managed state agency in South Carolina.

Goal 1: Effective planning, financing, and performance efforts in support of the mission and programmatic goals of the Consortium.

Objective 1.1: Ensure the programmatic mission of the Consortium is accomplished through planning activities and an efficient administrative and management system which supports its programmatic themes.

Strategies:

- Identify priority areas, engage users, develop programs, and assess proposed priority areas.
- Continually update the Consortium's strategic plan (including performance indicators) and biennial implementation plan based on constituent needs; this requires continued engagement of staff in strategic and implementation planning to ensure revisions are made and indicators are tracked.
- Engage the Consortium's Program Advisory Board in setting overall program priorities and developing strategies for program development.



- Maintain communications with the Consortium's liaisons at the university levels to promote open and viable interaction among university officials, faculty, and Consortium staff.
- Maintain a rigorous technical peer review process for all competitive research, education, and outreach proposals received by the agency.
- Continue the activities of the Consortium management team (Core Group) to facilitate communication and information exchange to set the agency's short- and long-term directions.

Objective 1.2: Develop, maintain, and enhance the Consortium's funding levels and financial and reporting system to support the programmatic goals of the research, education, extension, and communications programs of the Consortium.

Strategies

- Adhere to Consortium Board and State leadership directives to maintain, and where possible, enhance state funding.
- Compete for public and private extramural funding in support of Consortium programs and activities to benefit the citizens and state of South Carolina.
- Obtain research and outreach funding through National Sea Grant Core and other National competitions.
- Ensure that the Consortium's accounting and fiscal management procedures meet or exceed federal, state, and local policies, regulations, and guidelines.
- Develop and implement a Consortium-wide Web-based Management Information System (MIS) to track program progress and document performance.
- Prepare annual State Accountability and National Sea Grant Annual Reports.
- Ensure that the most current software and equipment are used to enhance efficient operations.
- Prepare for the external National Sea Grant Program Assessment review.

Anticipated Outcomes

- Strong short- and long-term planning is conducted by agency Core Group with support of the Consortium Program Advisory Board, extension specialist advisory committees, and other user input.
- Viable research and education programs which meet constituent needs are funded through the Consortium.
- Increased levels of both state and non-state financial support to further the Consortium's program goals are obtained.
- A strong and diverse funding base to support Consortium programs, activities, and administrative needs is established.
- Sound fiscal practices are maintained and statewide single agency audits will have no significant findings.



- Annual state and federal accountability reports will document the agency's performance.
- The Consortium will be rated as one of the highest performing Sea Grant College Programs in the nation.

Performance Measures and Four-year Targets

- State and federal approval of Consortium strategic plan.
 - 2
- Number of external peer reviews received per proposal.
 - 4
- Percentage of Sea Grant core research and education proposals submitted to the Consortium that are funded.
 - 25
- Percentage of extramural proposals that are submitted by the Consortium that are funded.
 - 40
- Return on investment of core Sea Grant funding (percentage).
 - 300
- Level of extramural (competitive and otherwise) funding in dollars secured from non-state sources.
 - 12,000,000
- Number of significant findings in statewide single agency audit.
 - 0
- Number of approved annual state accountability reports submitted.
 - 4
- Rating by the external National Sea Grant Program Assessment process.
 - 4

II. CONNECTING WITH USERS

The South Carolina Sea Grant Consortium has two ways to connect with users: (1) input from our constituents; and (2) output to our constituents. This two-way communication is imperative to the success of the agency.

The South Carolina Sea Grant Consortium, by definition, continuously and consistently seeks involvement and input from its constituents, its Board of Directors, liaisons at the Consortium's member institutions, and Sea Grant Extension Program Advisory Committees to help shape Consortium priorities and programs. This ensures that our activities are responsive to the needs of the Consortium's stakeholders and allows us to determine:

1. Priority needs pertaining to coastal and ocean resources use and conservation;
2. Current activities that are underway to address these needs;
3. Priority needs that are not being adequately addressed by current activities; and
4. Most importantly, specific potential actions that the Consortium can take to address these unmet needs.



In addition to obtaining input from its constituents, the Consortium also provides output to our varied constituents in the form of two primary “products” – program support and science-based information. Linking information “generators” with information “consumers” through feedback mechanisms ensures the timely delivery of research information to a variety of user groups. These interactions manifest themselves in several ways. Sea Grant Extension Program efforts are directed to specific user groups and involves the development and delivery of publications, workshops, and direct contact. Informal education and awareness efforts are also developed for the general public; vehicles for information transfer include brochures, slide shows, group presentations, media interaction, and others.

The agency has no management or regulatory responsibilities. This allows the agency to maintain a non-advocacy role and serve as a neutral third party. The products, activities, and services generated and disseminated by the Consortium are at the request of its constituencies. Consortium funded-research projects also produce quality scientific publications.

Issues

- One of the primary functions of the Consortium is to identify priority coastal and marine resource needs as mentioned in the Planning, Management and Overall Performance section. To do this effectively requires ongoing interaction with and engagement of its constituents.
- To function effectively, the Consortium must partner with a diverse group of organizations, institutions, and individuals representing universities; federal, state, and local natural resource and economic development agencies; business and industry; state and local governments; community groups; non-governmental organizations; K-12 educational institutions; and others.
- In the world of the Internet, accessibility to information through the Web is an essential addition to more traditional information media. Keeping up with evolving communications technology, for both internal and external communications is, and will be, a significant challenge in the foreseeable future.
- The human landscape of the coast is changing. With coastal growth and development also come demographic shifts. For example, 20 years ago the Hispanic population of the coast consisted mainly of migrant farm workers for the spring tomato harvest. Today Hispanics account for a large segment of the permanent labor force serving the tourism, landscape and other industries. The Consortium must attempt to address the needs of all coastal stakeholders with its programs.
- Science can and should play a role in informing the decision-making process in natural resources policy. To do so requires the collaboration of scientists and resources managers in the identification of research issues, and the extension and communication of research results in forms which can be easily understood and used by decision-makers at all levels.
- According to a 2006 National Science Foundation survey, the public is “science-starved.” To promote enhanced coastal stewardship, there is a



need to release more scientific and technical information to the public in digestible formats.

- Due to the limited availability of resources and the increasing need for public awareness and education programs, the engagement of professionals and citizens alike in volunteer activities must be pursued.
- Overall strategic and policy guidance from outside the agency in the development and continual refinement of the agency's strategic plan is a critical need for the Consortium.

Vision: The Consortium is the primary source for applied coastal and ocean resource information in South Carolina.

Goal 1: Needs of the Consortium's diverse constituencies throughout the state and region are well-documented and addressed.

Objective 1.1: Ensure that issues and needs of those who live and work along the coast are accurately identified.

Strategies:

- Periodically engage constituents in the identification of coastal and marine resource issues and needs through a range of activities such as surveys and individual contact.
- Periodically engage the Consortium's Program Advisory Board, as representatives of our constituents, in setting overall program priorities and developing strategies for program development.
- Seek programmatic guidance from extension specialist advisory committees.
- Seek programmatic guidance from *ad hoc* program area advisory groups.
- Maintain and expand partnerships with federal, state and local governments, business and industry, non-Consortium universities, and NGOs.

Objective 1.2: Ensure that Consortium programs are effective in providing the necessary science-based information and that this information is delivered to target audiences in a timely fashion and in appropriate formats.

Strategies:

- Produce and distribute quarterly issues of *Coastal Heritage* magazine, which covers relevant issues pertaining to coastal- and marine-resource policy, science, and history.
- Produce and distribute bi-annual issues of *Inside Sea Grant*, a newsletter that reports on the programmatic highlights of the agency, to local, state, regional, and national key decision-maker.
- Enhance the knowledge and awareness of coastal residents and visitors of the value of coastal and ocean resources through Consortium communications efforts.



- Serve as the co-coordinators of the S.C. Beach Sweep/River Sweep litter cleanup program with the S.C. Department of Natural Resources.
- Publicize Consortium-funded research, education, and outreach through print, broadcast, electronic, and web-based media.
- Regularly maintain and enhance the information on the Consortium Web site and ancillary Web sites.
- Produce and distribute electronic and hard copy publications and products, targeted to constituent needs.
- Engage community volunteers in Consortium outreach activities.
- Solicit formal evaluations from Consortium conference and workshop participants.

Objective 1.3: Bring diverse perspectives together to facilitate interactions and discourse on critical coastal and ocean issues.

Strategies

- Periodically engage constituents in discussions of emerging issues affecting coastal South Carolina and the region.
- Coordinate multi-investigator partnerships working together to solve critical resource needs.
- Broker resolutions to resource management questions.
- Provide leadership on committees and other forums that seek to resolve coastal and ocean resource challenges.

Anticipated Outcomes

- The problems and needs of those who live and work along the coast are accurately identified.
- Consortium is partnering with a diverse group of organizations, institutions, and individuals.
- Consortium demonstrates leadership and catalytic roles in addressing and resolving coastal and ocean resource issues.
- Consortium information is delivered to target audiences in a timely fashion and user-friendly formats.
- The demand for the Consortium's publications is increased.
- High quality scientific and outreach publications are produced.
- Consortium Web site continues to be a significant source of coastal and ocean information.
- Volunteers are engaged in Consortium stewardship activities, including Beach Sweep River Sweep.
- Consortium activities are covered in mass media outlets.

Performance Measures and Targets

- Number of Program Advisory Board and Extension Advisory Committees meetings for setting priorities.
 - 20
- Number of program partnerships.
 - 400
- Number of committees/workgroups that Consortium staff lead or participate on.



- 40
- Number of *Inside Sea Grant* and *CoastalScience@Work* newsletter issues produced and distributed.
 - 52
- Number of extension workshops and presentations.
 - 700
- Attendance at extension workshops and presentations
 - 18,600
- Number of agency publications and products produced and distributed.
 - 100
- Number of Web hits.
 - 5,000,000
- Number of unique visits
 - 800,000
- Number of downloads
 - 3,000,000
- Number of professional awards/recognitions for Consortium programs.
 - 5
- Number of awards for *Coastal Heritage*.
 - 8
- Number of unsolicited information requests.
 - 3,500
- Number of Beach Sweep/River Sweep coastal site captains.
 - 100
- Number of Beach Sweep/River Sweep coastal locations cleaned
 - 125
- Number of Beach Sweep/River Sweep coastal volunteers
 - 16,000
- Total value of volunteer hours in dollars
 - 697,280
- Number of news releases distributed
 - 48
- Number of media placements as a result.
 - 800
- Number of unsolicited media placements.
 - 80

III. HUMAN RESOURCES

The Consortium staff demonstrate excellence both within the agency and among its various partners. This excellence is achieved through dedication, loyalty, industry, and integrity. In addition the Consortium staff also work to demonstrate leadership skills and agency engagement of the agency's diverse stakeholder community. One critical way that this is achieved is through its involvement in leadership roles with a number of public, private, and non-governmental organizations (NGOs).

Consortium staff assume key leadership roles in organizations, professional



societies, and activities that advance the mission of the Consortium and the visibility of Sea Grant in the state of South Carolina, which enables it to better serve the needs of its constituencies.

Issues

- The Consortium’s success is predicated on its ability to maintain a solid administrative and program management capability. The challenge of recruiting and retaining high caliber staff in an environment of static budgets is a significant one that senior management endeavors to address.
- Limited financial resources to support both administrative and program staff present a barrier to effective program administration, as well as program delivery. This is a challenge that must be overcome for the Consortium to continue delivering high quality administrative and program services that support its research and outreach programs.
- The Consortium is a relatively small agency with limited staff resources and seemingly unlimited program opportunities. To optimize the potential of the agency, each staff member “wears many hats” and thus each staff member performs multiple tasks that are critically important to the agency’s success.
- Highly qualified, trained and experienced professional and support staff are essential to maintaining high quality administrative and program performance.
- Rapid changes in technology, accountability, etc. require an increasing commitment to provide training opportunities for staff.

Vision: The Consortium is fully staffed with professionals of diverse skills to effectively serve the varied interests of our constituencies.

Goal 1: A highly qualified, well-trained, and professionally recognized agency staff.

Objective 1.1: Encourage an “environment of excellence” to maintain and hire talented staff and support the development of professional and other skills among the Consortium staff in partnership with other Federal, state, and local agencies and professional organizations.

Strategies:

- Hire highly qualified staff through a rigorous recruitment and selection process.
- Seek partnerships with other organizations to jointly support key management and/or programmatic staff.
- Retain extension specialist staff to effectively provide science-based information to their constituents.
- Enhance skills, capabilities (including the possibility of cross-training), and professional development goals of the Consortium staff through attendance at workshops, seminars, and development events and activities.



- Promote performance excellence through incentive-based efforts and program competition, and encourage staff through staff recognition and awards.
- Encourage staff to become actively involved in professional organizations pertinent to their staff positions (e.g., as committee members, elected officers).

Anticipated Outcomes

- Staff retention is high.
- Staff are well-trained and engaged in internal and external agency activities.
- Staff assume leadership roles within relevant professional institutions and organizations.
- Staff are regionally and nationally recognized by peers and professional organizations.

Performance Measures and Targets

- Staff retention rates (e.g., FTE/TGE vacancy rate).
 - 90
- Number of staff professional development opportunities.
 - 90
- Number of program-related state, regional, and community-based committees and task forces populated with Consortium staff and extension specialists.
 - 28
- Number of professional awards/recognitions for Consortium staff.
 - 10

National Context

The Consortium is an academically based state agency and a member of the NOAA National Sea Grant College Program (NSGCP) network of 33 Sea Grant College Programs, administered by the National Sea Grant Office (NSGO). The Consortium participates as an active member of the NSGCP network, and continues to be committed to aligning its statewide programmatic activities with those of NOAA and the NSGCP.

NOAA's Next Generation Strategic Plan, released in December 2010, lays out four long-term goals and outcomes for the nation: (1) Climate Adaptation and Mitigation, where an informed society is able to anticipate and respond to climate and its impacts; (2) Weather-Ready Nation, where society is prepared for and responds to weather-related events; (3) Healthy Oceans, where marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems; and (4) Resilient Coastal Communities and Economies, where coastal and Great Lakes communities are environmentally and economically sustainable (<http://www.ppi.noaa.gov/ngsp/>). The Consortium's FY2014-17 plan elements fall within the NOAA Mission Goals.

The NSGO is presently completing its National Strategic Plan for 2014-17, which has four Focus Areas: (1) Healthy Coastal Ecosystems, (2) Sustainable Fisheries and Aquaculture, (3) Resilient Communities and Economies, and (4) Environmental



Literacy and Workforce Development. The NSGO is requiring that each state Sea Grant College Program align its plan with the National Plan. The Consortium’s Plan has five programmatic areas, which are in very good alignment with the national focus areas; we have decided to maintain two of our thematic areas – Sustainable Coastal Development and Economy and Hazard Resilience in Coastal Communities – that have been combined into one in the National Plan.

The NSGCP Strategic Plan outlines 11 performance measures that are specific to one of the plan’s focus areas, and 7 additional performance measures that cross-cut the four focus areas. The Consortium staff has evaluated these measures and identified four-year targets for each of the 17 measures, as follows:

Focus Area/ Cross-cut	National Performance Measure	S.C. Sea Grant Consortium 4-Year Target
Healthy Coastal Ecosystems	Number of Sea Grant tools, technologies and information services that are used by our partners/customers to improve ecosystem-based management.	4
Healthy Coastal Ecosystems	Number of ecosystem-based approaches used to manage land, water and living resources in coastal areas as a result of Sea Grant activities.	2
Healthy Coastal Ecosystems	Number of acres of coastal habitat protected, enhanced or restored as a result of Sea Grant activities.	0
Sustainable Fisheries and Aquaculture	Number of fishermen, seafood processors and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities.	100
Sustainable Fisheries and Aquaculture	Number of seafood consumers who modify their purchases using knowledge gained in fisheries sustainability, seafood safety and the health benefits of seafood as a result of Sea Grant activities.	0
Resilient Communities and Economies	Number of communities that implemented sustainable economic and environmental development practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of Sea Grant activities.	22
Resilient Communities and Economies	Number of communities that implemented hazard resiliency practices to prepare for, respond to or minimize coastal hazardous events as a result of Sea Grant activities.	16
Environmental Literacy and Workforce	Number of Sea Grant facilitated curricula adopted by formal and informal educators.	16



Development		
Environmental Literacy and Workforce Development	Number of people engaged in Sea Grant supported informal education programs.	575
Environmental Literacy and Workforce Development	Number of Sea Grant-supported graduates who become employed in a career related to their degree within two years of graduation.	50
Cross-Cut	Economic (market and non-market) benefits derived from Sea Grant activities.	0
Cross-Cut	Businesses created as a result Sea Grant activities.	6
Cross-Cut	Businesses retained as a result Sea Grant activities.	2
Cross-Cut	Jobs created as a result Sea Grant activities.	10
Cross-Cut	Jobs retained as a result Sea Grant activities.	4
Cross-Cut	Patents derived from Sea Grant activities.	1
Cross-Cut	Number of peer-reviewed publications.	20

What is the S.C. Sea Grant Consortium?

The S.C. Sea Grant Consortium (www.scseagrant.org) is an independent state agency created in 1978 through Act No. 643, South Carolina Code of Laws, to manage and administer the NOAA National Sea Grant College Program and similar programs for the state of South Carolina and regionally. The Consortium generates and applies science-based information on issues and opportunities to enhance the practical use and conservation of coastal and marine resources to foster a sustainable economy and environment.

The S.C. Sea Grant Consortium became an operating entity in January 1980. With the submission and acceptance of its initial program proposal for Sea Grant support, the S.C. Sea Grant program was designated an Institutional Program that year. In April 1985, application was made to the Secretary of Commerce for Sea Grant College designation; Sea Grant College status was conferred on the Consortium in August 1986 by then-Secretary of Commerce Malcolm Baldrige.

The Consortium develops and supports balanced and integrated scientific research, formal and informal education, extension, communications, and education and outreach programs that are driven and determined by our stakeholders. Programmatic efforts focus on addressing critical issues and opportunities in the five programmatic areas identified in this plan. These programs support economic opportunity (business and jobs), ensure wise use and development of the state's marine and coastal natural resources, and improve the social well-being of those who live, visit, and depend upon South Carolina's coastal and ocean resources.

The Consortium employs a team of extension, communications, and education personnel to identify the information needs of the state's stakeholders and effective



delivery methods, and leverages state appropriations to secure non-state competitive grants to support research and education programs.

Consortium Membership

Institutions that hold membership in the Consortium include Clemson University, College of Charleston, Coastal Carolina University, the Medical University of South Carolina, S.C. Department of Natural Resources, S.C. State University, The Citadel, and University of South Carolina. Consortium institutions provide the expertise of their respective faculty and professional staffs, as well as a wide range of facilities and equipment, necessary to carry out the diversity of programs supported by the S.C. Sea Grant Consortium program. Over the last six years, member institutions contributed over \$2 million in matching funds to the agency.

Consortium Organization

The S.C. Sea Grant Consortium is structured to optimize communication and feedback linkages necessary for the proper development and implementation of its programs. Its offices are headquartered in Charleston, with additional extension agents in Beaufort and Conway. Activities of the Consortium are governed by authorizing committees of the S.C. General Assembly and a Board of Directors to which the Executive Director reports. The Board of Directors includes the chief executive officers of the Consortium's member institutions.

The Board meets annually to review Consortium program policies and procedures. The Board also provides a direct line of communication between the Consortium Executive Director and the higher administrative levels of its eight member institutions.

The S.C. Sea Grant Consortium maintains direct contact with coastal and marine user groups and the general public, and serves as a conduit between institutional knowledge seekers and coastal and marine knowledge users, through S.C. Sea Grant Extension Program (SGEP), marine education, and Communications and Information Services (CIS) activities. These outreach programs assure that (1) problems and needs of those who live and work along the coast are accurately identified, (2) research projects and programs are effectively providing the necessary information, and (3) this information is delivered to target audiences in a timely fashion and user-friendly format.