

Introduction & Background

With 130 miles of Atlantic coastline and 1,792 miles of tidal shoreline including Delaware Bay, New Jersey is truly coastal-centric. Seventeen of New Jersey's 21 counties border tidally-influenced estuarine or ocean waters and, under Section 6217 of the Federal 1990 Coastal Zone Management Reauthorization Act, all of New Jersey is considered coastal since all watersheds drain to the coast.

As with many other coastal states, New Jersey's economy is largely dependent upon its marine and coastal resources. In addition to the Atlantic Ocean and Delaware Bay and River shoreline which supports New Jersey's tourism, boating, and recreational fishing industries, the state is home to nine commercial fishing ports and two of the nation's largest commercial ports. The value of the industries supported by these environments is extraordinary, with port commerce supporting a \$50 billion industry, coastal tourism at \$28 billion, and commercial fisheries and aquaculture accounting for more than \$1 billion. These industries support a workforce of more than 1.5 million individuals at a per capita income among the highest in the nation. The coast is also the primary recreational outlet for New Jersey's nearly 9 million residents and the 91 million-plus potential visitors living within a four hour drive. The coastally-dependent economy of New Jersey is dependent on the quality and condition of the state's beaches, coastal infrastructure, accommodations, water quality, fishery health, deep-draft harbors and port facilities. Science-based management and effective public policy are essential to ensuring human health and safety and to preserving these ecological services and economically essential uses.

The health and management of New Jersey's coastal waters is also tied to a number of extraordinary demographics. Although fourth smallest in size, New Jersey is the most densely populated state in the nation. The state is also located fully within the New York-New Jersey Metropolitan area, one of the most highly urbanized and industrialized regions in the world. Numerous competing issues and uses have created intense competition for New Jersey's coastal lands, waters and resources. The state's coastal communities face enormous pressure to balance the demand for growth with the protection of marine and coastal resources. In addition, because New Jersey's coastline is largely developed, human safety and coastal hazard mitigation is an area of ever-increasing importance. Balancing economic growth, development, re-development with coastal resource quality is therefore the critical issue for the future of New Jersey's coastal communities.

History and Structure of New Jersey Sea Grant Consortium

The New Jersey Sea Grant Consortium (NJS GC) was founded by six state colleges in 1969 as a cooperative center for the study of marine and marine-related environmental science. Today it boasts a large, multi-institutional membership of colleges, universities and other groups that share and support the vision and mission of the organization, making it one of the most successful and largest alliances of its kind in the state, region and the nation.

Since its inception, the Consortium has served the state and the region by developing programs designed to resolve coastal issues, develop marine technologies, improve marine science literacy among its citizens and formulate science-based policy. NJS GC has also contributed leading

research in the fields of marine and coastal related environmental science since 1976 and in recognition of its academic and scientific achievements, NJSGC was awarded full Sea Grant College status in 1989.

Vision & Mission of the NJSGC

NJSGC continues to be focused on its vision for a sustainable future for New Jersey's coastal environment and is committed to its mission to promote responsible use of New Jersey's coastal and marine resources. Throughout its long history, the NJSGC has worked to accomplish this through innovative research, education and extension programs.

Planning Process & Strategic Approach

The process of building NJSGC's 2014-2017 Strategic Plan was part of a Sea Grant network effort to produce the 2014-2017 National Sea Grant Program Strategic Plan. This collaborative effort brought the wealth of expertise and experience of all of the nation's state Sea Grant Programs to the task of creating the national plan. In New Jersey, participation in this process ensured that New Jersey's priorities were reflected in the national plan.

NJSGC stays informed of stakeholder needs through personal interaction, program related meetings, workshops, public forums, interaction with the Stakeholder Advisory Board and through collaborative projects with partner institutions and agencies. To build the 2014-2017 strategic plan, four stakeholder workshops were convened at locations throughout the state, three meetings were held with municipal personnel from New Jersey's coastal communities and several surveys were conducted. For the stakeholder workshops, Consortium member institutions provided venues to engage coastal stakeholders including coastal industry and nonprofit environmental groups, local and state government agency representatives, scientists, educators and other interested parties. Dialogue was initiated on the basis of a summary provided by NJSGC and through documents (current strategic plan and other NJSGC reports) made available to attending stakeholders. An extensive survey evaluating previous goals, outcomes and priorities was given at end of each session. Following the completion of the workshops, the survey was broadcast to the larger stakeholder community. In a separate effort, NJSGC's Coastal Issues Caucuses targeted select coastal counties and their communities. Invited stakeholders included local and state agency representatives from community planning boards, environmental commissions, emergency management and the like. Information from these meetings was summarized into a needs assessment document. Additionally, the shellfish aquaculture industry was targeted at a workshop that produced a needs assessment document. Finally, a short public survey to rank the top ten coastal issues was implemented as part of NJSGC's Top Ten Beaches project. Input was also solicited from NJSGC's various boards and advisory committees.

Information gathered was summarized in response to questions posed by the National Sea Grant Office for the development of the national plan. The information for the national plan was vetted through the Sea Grant network, national stakeholder groups, representatives from NOAA programs, other federal agencies and non-profit environmental organizations. Subsequent draft

plans were reviewed through the Sea Grant network, other NOAA line office programs and national stakeholder groups.

Using the outcomes of these workshops, caucuses, and surveys, and with guidance from the National Sea Grant Office including the draft national plan, NJS GC then developed its own state strategic plan. As a result, NJS GC's goals and outcomes align with the four focus areas of the 2014-2017 National Sea Grant Strategic Plan. The resulting plan continues a commitment to the integration of research, extension, education, and communications to reach stated outcomes and goals.

Marine and coastal issues that are important to stakeholders across the state are emblematic of those across the nation. As such, NJS GC has selected and modified a subset of national goals, outcomes and strategies that match the needs of New Jersey and are within our capability and capacity. These goals, outcomes and strategies will guide our research, education and outreach activities. The feedback received from our various boards and stakeholders has helped us develop a comprehensive plan that will guide the work of NJS GC over the next four years. Continued guidance will maintain the vitality of this document in order to respond to any changes in stakeholder needs over time.

Overall, our strategic approach is to support the management of the coastal resources of New Jersey in ways that balance human use with environmental health. This includes science-based information on coastal ecosystems function and the impacts of human activities; providing for an informed citizenry who understand the complexities of coastal environments; and, incorporation of social science into ecosystem-based management decisions.

Focus Areas

To help New Jersey and the nation understand, manage and use its coastal resources wisely, Sea Grant has identified four focus areas central to the needs of the nation's coast and NOAA's goals and Sea Grant's strength and core values. The focus areas are:

1. Healthy Coastal Ecosystems (HCE)
2. Sustainable Fisheries and Aquaculture (SFA)
3. Resilient Communities and Economies (RCE)
4. Environmental Literacy and Workforce Development (ELWD)

These focus areas provide the foundation for implementing a successful four-year plan. Each focus area has goals, outcomes and performance measures. The goals describe the desired long-term direction for each focus area. These four focus areas are not mutually exclusive. Many of the activities and programs we plan to implement over the next four years will cut across each of these focus areas. For example, climate change and sea level rise are cross-cutting themes that will be addressed within each focus area. NJS GC will be an active participant in delivering climate change education, outreach and research to its coastal constituents and will work with its partners to increase awareness and understanding of climate change and sea level rise impacts (e.g., coastal vulnerability and resilience indices) and to implement adaptation strategies, ocean planning, and response planning.

Bringing the results of scientific research through outreach (extension and communications) and education to the people and decision makers of New Jersey is the surest way to secure our vision of a sustainable future for the state's coastal environment. The following describes NJSGC's goals, outcomes, and strategies for each of the four national focus areas in relation to the needs of New Jersey.

1. Healthy Coastal Ecosystems (HCE)

Healthy coastal ecosystems are the foundation for life along the coast. However, New Jersey's coastal ecosystems are increasingly challenged by development, non-point source pollution, and other human activities that contribute to degraded water quality, habitat loss, a decline in fisheries, the spread of invasive species, and a number of other challenges. The responsible management of such critical resources must be addressed through the implementation of innovative ideas and actions. The ability to balance economic growth and other human needs while maintaining ecosystem health is critical to sustaining New Jersey's coastal communities.

In order for coastal stakeholders to make informed decisions, they must understand the importance and value of healthy coasts and oceans. They must also understand the connection between human activities and their effects on the coastal environment. NJSGC plans to accomplish this by conducting activities within the HCE focus area that address impacts associated with stormwater discharges, improving operation practices at waterfront facilities, reducing impacts from various water related activities, restoring function to impaired water bodies, improving the use of ecosystem based approaches among managers and educating the citizens of New Jersey including schoolchildren and their teachers, on how their actions impact coastal and ocean resources.

Overall strategies for implementation of planned outcomes and objectives in HCE:

- Distribute scientific information from NJSGC funded research to coastal residents, resource managers, businesses, and industries and facilitate the understanding of such information so that it may be used effectively when making decisions and managing resources.
- Promote the implementation and maintenance of best management practices, innovative approaches, and technologies to help restore function to coastal ecosystems.
- Develop innovative methods and programs to help coastal residents, resource managers, businesses, and industries understand the effects of human activities and environmental changes on coastal resources.
- Provide technical support for citizens, government officials and businesses that need help with specific coastal resource related problems, giving them access to the latest information and techniques.
- Provide life-long learning programs for people of all ages – learning that enhances understanding of coastal ocean environments and thus promotes the strongest possible sense of stewardship and awareness.

2. Sustainable Fisheries and Aquaculture (SFA)

New Jersey, like the nation, continues its increase in seafood consumption in the face of the decline of many of its major fisheries. This trend is unsustainable. In terms of seafood, this means catching or farming seafood responsibly with consideration for the long-term health of the environment and the livelihoods of the people who depend upon the environment. It is unlikely that the gap between seafood demand and domestic harvest can be filled as global wild fisheries harvests have reached a plateau. As such, the United States imports 86% of seafood consumed. With a stagnant wild catch, aquaculture is considered the best method to reduce the demand gap as well as the trade gap. In fact global aquaculture is predicted to increase by 33% over the next decade, so there is an opportunity for United States aquaculture industry expansion and innovation through production and marketing strategies. The wild fisheries industry will need to innovate as well. For example, this industry will need to continue to develop value-added products.

New Jersey has a long history as a major center for commercial and recreational fisheries. Its fishery and aquaculture resources contribute more than \$1 billion annually to the state's economy. The natural capital of these resources is estimated at \$32 billion. Commercial fisheries in New Jersey rank among the most productive on the East Coast and in the nation. Cape May, New Jersey is the second most valuable East Coast fishing port. In addition, New Jersey's recreational fisheries lead the nation in terms of catch, angler expenditures, revenue generated, and angler participation. New Jersey also has a long history with oyster culture that has been supported by a century of research and industry cooperation through the Haskin Shellfish Research Laboratory. NJSGC has and does support research at Haskin through state Sea Grant funds and National Strategic Investments that currently supports NJSGC's Shellfish Aquaculture Program Coordinator. This research and extension supports an oyster industry that generates nearly \$30 million annually and employs nearly 200 people directly.

NJSGC continues to support fisheries-related research that assists resource managers in the management and conservation of commercial and recreational species. Through research, outreach and education NJSGC will continue to lead and support developments in innovative technologies, consumer safety, and safe and sustainable seafood supply in all sectors of the industry (commercial and recreational fishing, aquaculture, and processing) now and in the future. Our goal is a healthy fisheries (commercial and recreational) and mariculture industries within New Jersey that harvest seafood responsibly, ethically, efficiently, and sustainably. Furthermore, we seek to inform stakeholders to understand the importance of ecosystem health and sustainable harvesting, appreciate the health benefits of seafood consumption, and support sustainable management and consumption practices to protect and increase our supply of safe and sustainable seafood. Support and guidance of our activities is augmented by the participation of representatives of the fisheries industry on our Stakeholder Advisory Board.

Overall strategies for implementation of planned outcomes and objectives in SFA:

- Partner with NMFS, NJDA, state fisheries managers, seafood producers and processors, fishing associations and consumer groups to advance environmentally responsible and sustainable fisheries and aquaculture.
- Enhance the seafood industry and public understanding of the importance of a healthy ecosystem for a vibrant seafood industry in New Jersey.

- Utilize traditional and new media platforms to make individual and group contacts; develop meetings, workshops, forums and training; produce written documents including manuals, articles, brochures, fact sheets and survey and evaluation materials that increase awareness and understanding of sustainable fisheries and aquaculture in New Jersey.
- Support research that enables scientifically sound fisheries management (including ecosystem based management) or develops new technologies or products that are both environmentally responsible and contribute to a competitive and viable mariculture industry.
- Identify and transfer research results and new mariculture technologies and methodologies that are environmentally responsible, ensure seafood safety, improve production and promote ecosystem-based fisheries management to managers, fishers, aquaculturists and consumers.
- Promote sustainable water-dependent industries (marinas, boaters, charter industry) and responsible or ethical recreational fishing.
- Work directly with oystermen in cooperative research, but also in developing seafood cooperatives to help reduce costs of production (materials, insurance, and marketing) and promote sustainability.
- Develop community supported fisheries to improve the economic success of the industry and encourage consumer awareness of sustainability and health issues, and provide local product to local consumers.
- Develop future fisheries or aquaculture scientists, managers or outreach specialists through training and scholarship programs.

3. Resilient Communities and Economies (RCE)

Hazard resilience is a topic that has received an extraordinary amount of well-deserved attention in the past decade. The devastation experienced in faraway places, like Japan, Indonesia and Haiti, as well as events closer to home such as the landfall of Hurricanes Katrina and Ike along the Gulf Coast, and even the current global financial crisis, have ushered in a new era in American history in which the term “resilience,” has become an important part of the American political, economic, and social vernacular. Recent devastating events, such as the November 2009 “Friday the 13th” Nor’easter, Hurricane Irene in 2011, and, of course, Superstorm Sandy as well as more day-to-day phenomena such as increased local tidal flooding, have highlighted the relevance of coastal hazards and coastal hazard resiliency to the State of New Jersey.

At the local level, resilience refers to a community’s ability to understand, plan for, and respond to a given hazard or set of hazards, whether they are natural or man-made. In coastal communities, the concept of hazard resilience is of particular importance due to the number and assortment of hazards unique to the coastal zone and their frequent significant impacts on the local economy. The devastation caused by Superstorm Sandy only reinforced what coastal scientists have known for quite some time – choosing to live, work, and recreate in the coastal zone is accompanied by numerous risks that must be balanced against the economic and social benefits. NJSGC’s overall goal in RCE is to ensure that New Jersey’s coastal communities, including residents, business owners, visitors, and others understand these risks and are prepared to take the appropriate measures to reduce their vulnerability and respond quickly and effectively to events as they arise. The Consortium will achieve this by capitalizing on its existing

infrastructure and strengths in the areas of research, education and outreach to provide information and tools designed to assist citizens, businesses and decision-makers to plan for hazardous events and optimize the ability of their communities to adapt, respond and rebuild.

NJSGC will support cutting-edge research in the areas of marine-related energy sources, climate change, coastal processes, energy efficiency, hazards, stormwater management, coastal hazards and coastal hazards messaging, ocean planning, and tourism. The NJSGC Extension Program will engage New Jersey's diverse and ever-growing coastal population to assist them in applying the best-available scientific knowledge to address coastal resiliency. Ultimately, NJSGC will bring its unique research and engagement capabilities to support the development of resilient coastal communities that sustain diverse and vibrant economies, effectively adapt and respond to and mitigate natural and technological hazards and function within the limits of their ecosystems.

Overall strategies for implementation of planned outcomes and objectives in RCE:

- Develop and deliver a broad set of education and outreach services that address RCE issues relevant to New Jersey's citizens, visitors and coastal stakeholders.
- Through forums, surveys and other means, encourage on-going dialogue regarding stakeholder need to achieve well-informed management of coastal resources.
- Work with the NOAA Climate Change Program, the NOAA Coastal Services Center, and other public, private and academic partners (e.g., MARCO, MARACOOS, NJDEP) to develop and deliver comprehensive research and education programs that improve public understanding of ocean related global change, climate variability and hazardous ocean and ocean weather effects on coastal communities.
- Work with the New Jersey Coastal Protection Technical Assistance Service to ensure that the latest information on shore protection technologies and tools are available to New Jersey's coastal communities.
- Work with New Jersey's coastal communities to ensure that post-Sandy reconstruction and planning is done with hazard resiliency in mind and an eye toward an uncertain future.
- Assist marinas to adopt best management practices and realize the economic benefits associated with being recognized as responsible stewards of the environment.

4. Environmental Literacy and Workforce Development (ELWD)

Education at the NJSGC is focused on assuring that New Jersey's citizens and visitors understand, value, and appreciate the state's marine and coastal environment and are able to apply sound evidence and science-based information to make well-informed decisions regarding its use, management, and care. NJSGC's education programs contribute towards ocean and coastal literacy and the development of a strong and competent science, technology, engineering and mathematics (STEM) workforce by providing compelling, inquiry-based experiences to a wide range of learners and by partnering with like-minded groups to leverage available resources in ocean and coastal education.

Activities range from field trip programs that build ocean literacy and stewardship through "hands and minds-on" investigations to internships and professional development for pre- and in-

service educators. In addition to workshops and school district consultations, professional development activities include the creation and dissemination of standards-based teaching tools that explicitly connect ocean and coastal content to STEM education goals and national and state learning standards. The latter is especially critical since marine and coastal science is not mandated in New Jersey's core curriculum content standards. Lastly, NJSGC's educators engage tens of thousands of citizens and visitors each year through their participation in numerous public and professional outreach events which provide large-scale opportunity for free-choice learning and, very frequently, a showcase for NJSGC's research, education and extension personnel and programs.

Overall strategies for implementation of planned outcomes and objectives in ELWD:

- Advance coastal and marine literacy across generations by providing a diversity of environmental learning, career awareness and stewardship building tools for schoolchildren, teachers, and other interested parties.
- Use NJSGC's strong university, extension and K-12 partnerships to enrich existing coastal and ocean literacy programs, to motivate students to pursue marine science and related STEM careers, and to advance greater understanding of best practices for compelling ocean, estuarine and coastal education.
- Foster opportunities and create tools for formal and informal educators to advance STEM education and STEM career awareness through ocean, estuarine and coastal educational content and experiences.
- Engage a wide variety of like-minded partners and supporters to build public awareness on priority ocean, estuarine and coastal issues including coastal storm messaging and preparedness, coastal hazard awareness and resilience, climate change implications and conservation and protection of water resources.
- NJSGC's Communications Program will implement initiatives to increase awareness and participation in NJSGC's education programs.