

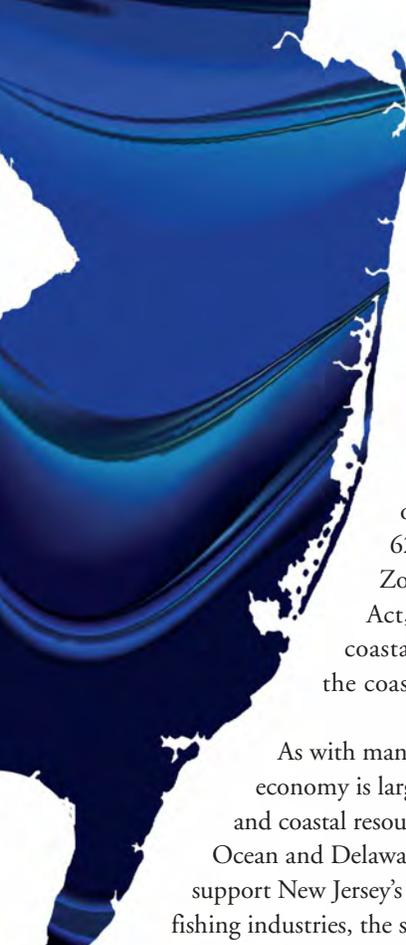


# Strategic Plan

**New Jersey Sea Grant Consortium  
2014-2018**

  
**Sea Grant**  
NJ Sea Grant Consortium





# 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 shorelines which support 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 (NJSGC) 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. NJSGC has contributed leading research in the fields of marine and coastal related environmental science since its founding and in recognition of its academic and scientific achievements NJSGC was awarded full Sea Grant College Program status in 1989.

## Planning Process and Strategic Approach

The process for building NJSGC's 2014-2018 Strategic Plan was part of a Sea Grant network effort to produce the 2014-2018 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 the priorities for New Jersey were reflected in the national plan.

NJSGC stays informed of stakeholder needs through routine 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 our 2014-2018 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

# Vision & Mission of the NJSGC

NJSGC continues to focus 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 its research, education and extension programs.

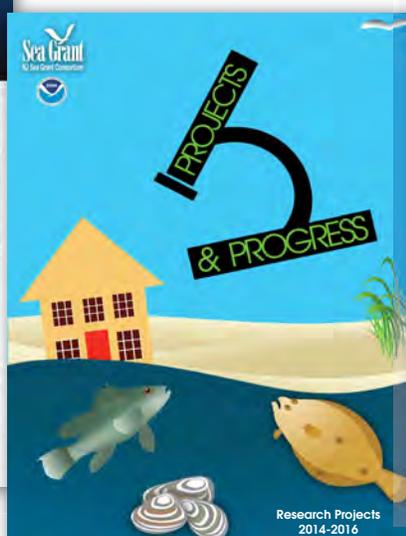
provided venues to engage coastal stakeholders including coastal industry and nonprofit environmental groups, local and state government agency representatives, scientists, educators, and other interested parties. Dialogue was initiated on the basis of a summary provided by NJSGC and through documents (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 committees.

All of this information was summarized in response to questions posed by the National Sea Grant Office for the development of the national plan. 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, NJSGC developed its own state strategic plan. As a result, NJSGC's goals and outcomes align with the four focus areas of the 2014-2018 National Sea Grant Strategic Plan. The resulting plan continues a commitment to the integration of research, extension, education, and communications to reach our outcomes and goals.

Marine and coastal issues that are important to our stakeholders locally and across the state are emblematic of those across the nation. As such, we have 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 NJSGC 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. In general, 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 our coast reflecting NOAA goals and Sea Grant's strengths 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 functional 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 in this strategic plan that will be addressed within each focus area. NJSGC will be an active participant in delivering climate change education, outreach and research to its coastal constituents. NJSGC 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 our state is the surest way to secure our vision of a sustainable future for New Jersey's coastal environment. The following describes our strategies, goals, outcomes and performance measures 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 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.

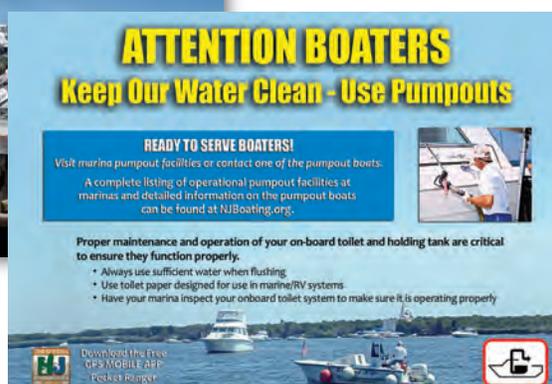
In order for coastal stakeholders to make informed decisions, they must understand the importance and value of healthy coasts and oceans. They must also understand the connection between human activities and their effects on the coastal environment.

NJSGC plans to accomplish this by conducting activities within the HCE focus area that address impacts associated with stormwater discharges, improve

operation practices at waterfront facilities, reduce impacts from various water related activities, restore function to impaired water bodies, improve the use of ecosystem based approaches among managers and educate 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.



## HCE GOALS AND OUTCOMES

**Goal: Ecosystem-based approaches are used to manage land, water and living resources. (HCE National Goal #2)**

### Learning Outcomes

1. Through Mid-Atlantic Sea Grant regional and New Jersey specific education programs, coastal residents, visitors, and other coastal users understand how their actions impact the Mid-Atlantic region and New Jersey's coastal water quality and how coastal water quality impacts them. (HCE 2.1.L, 2.3.L)

### Action Outcomes

2. Resource managers and businesses integrate scientific information into resource management practices. (HCE 2.8.A)

### Consequence Outcomes

3. Watershed function to coastal estuaries and coastal water quality in New Jersey is managed using ecosystem-based approaches. (HCE 2.9.C)

**Goal: Ecosystems and their habitats are protected, enhanced or restored. (HCE National Goal #3)**

### Action Outcomes

4. Effective implementation and maintenance of best management practices to allow for the infiltration or treatment of storm and waste water, thus restoring watershed function to coastal estuaries. (HCE 3.5.A; HCE 2.7.A)

5. Community-based oyster restoration program enhances habitat and increases abundance of depleted oysters. (HCE 3.5.A)

### Consequence Outcomes

6. Improved watershed function to coastal estuaries in New Jersey. (HCE 3.6.C)

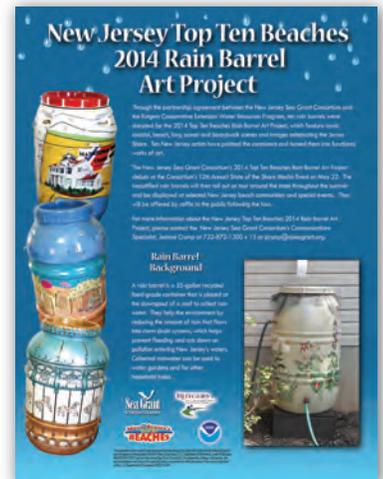
## HCE PERFORMANCE MEASURES

1. Number of best management practices (tools, technologies and information services) being implemented to improve ecosystem based management. (HCE 2.9.C) National Performance Measure #1 (Target 3)

2. Number of stormwater best management practices implemented and maintained; clean marinas certified or recertified; and marinas adding or improving pumpouts facilities. (HCE 2.9.C) National Performance Measure #2 (Target 95)

3. Number of acres of habitat enhanced through the implementation and maintenance of rain gardens, rain barrels, living shorelines and oyster reefs. (HCE 3.6.C, RCE 9.8.A) National Performance Measure #3 (Target 5)

4. Number of gallons of water infiltrated or treated by a municipality, individual or business through the implementation and maintenance of best management practices such as rain gardens, pumpouts and wash wastewater capturing systems. (HCE 2.7.A, HCE 3.5.A) State Performance Measure (Target 1,000,000)



## 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. With global aquaculture predicted to increase by 33 % over the next decade, there is opportunity for U.S. 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 support 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 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 so they 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.

## SFA GOALS AND OUTCOMES

**Goal: A safe, secure and sustainable supply of seafood to meet public demand. (National Goal #4)**

### Learning Outcomes

1. Shellfish aquaculturists gain awareness of best management practices and approaches, seafood health and safety issues and business strategies and models that promote sustainable aquaculture. (SFA 4.2.L)

### Action Outcomes

2. Shellfish aquaculturists implement best management practices to promote sustainable aquaculture practices and expand market opportunities. (SFA 4.8.A, 4.9.A)

### Consequence Outcomes

3. Implementation of shellfish aquaculture best management practices increases production, providing economic benefits to their businesses and the region. (SFA 4.14.C)

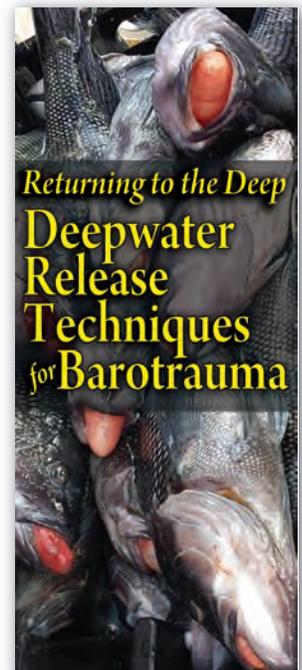
**Goal: Informed consumers who understand the health benefits of seafood consumption and how to evaluate the safety and sustainability of the seafood they buy. (National Goal #5)**

### Learning Outcomes

4. New Jersey's citizens understand the nutritional benefits of oysters and the ecological benefits of sustainably grown aquacultured shellfish. (SFA 5.3 L)

## SFA PERFORMANCE MEASURES

1. Number of shellfish aquaculturists that implement new technologies and approaches and best management practices and expand market opportunities. (SFA 4.8.A)  
National Performance Measure #4 (Target 15)



2. Economic value of increase in shellfish aquaculture production. (SFA 4.14.C) National Performance Measure #11 (Target \$400,000)

3. Number of residents receiving information on the nutritional benefits of oysters and the ecological benefits of sustainably grown aquacultured shellfish. (SFA 5.3.L) National Performance Measure #5 (Target 1000)

### 3. RESILIENT COMMUNITIES AND ECONOMIES (RCE)

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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 BMPs and realize the economic benefits associated with being recognized as responsible stewards of the environment.

#### **Goal: Development of vibrant and resilient coastal economies. (National Goal # 6)**

##### Learning Outcomes

1. Formal and informal educators will be provided with access to exemplary educational resources focused on the economic value of ocean and coastal commerce and its relationship and dependence on a healthy environment. (RCE 6.1.L)

### Consequence Outcomes

2. Marinas will adopt best management practices to meet the requirements of the Clean Marina Program in New Jersey. (RCE 6.8.C)

**Goal: Communities use comprehensive planning to make informed strategic decisions. (National Goal #7)**

### Action Outcomes

3. New Jersey's coastal communities and leaders will make efficient use of water resources to sustain coastal ecosystems, quality of life, and economic well-being. (RCE 7.4.A)

**Goal: Improvements in coastal water resources sustain human health and ecosystems services. (National Goal # 8)**

### Learning Outcomes

4. Students and lifelong learners participating in NJSGC's education programs will become aware of the impact their behaviors have on water quality and supply. (RCE 8.1.L)

**Goal: Resilient coastal communities adapt to the impacts of hazards and climate change. (National Goal #9)**

### Learning Outcomes

5. Communities, students and free choice learners are aware of the danger of rip currents and other coastal hazards and are well informed on safety measures. (RCE 9.1.L)

### Action Outcomes

6. Government agencies (local, county, state, federal) utilize the results of the latest research including Sea Grant funded research and Sea Grant's extension expertise to make informed coastal management decisions and improve coastal hazard warnings and messaging. (RCE 9.6.A)

7. New Jersey coastal communities develop and adopt coastal hazard and climate adaptation strategies suited to local needs

regarding stormwater and water quality. (RCE 9.7.A)

8. Residents and coastal communities take action to reduce the impacts of coastal hazards on property through dunes and living shorelines. (RCE 9.8.A)

### Consequence Outcomes

9. A culture of preparedness is developed throughout the state. It becomes the "in" thing. (RCE 9.10.C)

## **RCE PERFORMANCE MEASURES**

1. Number of communities, communities of practice (including marina community) or government agencies that adopt or implement sustainable best management practices that improve water resources (including reduction of non-point source pollution); or that make coastal management decisions to develop or adopt stormwater plans for coastal hazards and climate change based on sound science including Sea Grant research and extension work. (RCE 6.8.C, RCE 7.4.A, RCE 9.6.A, RCE 9.7.A) National Performance Measure #6 (Target 25)

2. Number of communities or entities (county parks, state parks, national seashores, etc) that reduce coastal hazards by incorporating hazard resilience practices into their planning, such as implementing living shorelines to reduce the impact of coastal hazards to property and actively participating in the rip current app program. (RCE 9.8.A, RCE 9.10.C) National Performance Measure #7 (Target 20)



## **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 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 convey content and build stewardship through "hands and minds-on" investigations to internships and short and long-term 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 a 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 access to 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.

## GOALS AND OUTCOMES

**Goal: An environmentally literate public supported and informed by a continuum of lifelong formal and informal engagement opportunities. (National Goal # 10)**

### Learning Outcomes

1. Environmental and ecological awareness and understanding, science literacy, and stewardship amongst schoolchildren, their teachers and lifelong learners will be advanced through a community-based oyster restoration program. (HCE 3.1.L, ELWD 10.2.L, 10.3.L, 11.1.L)
2. Environmental literacy is advanced and understanding and awareness of New Jersey's coastal and estuarine environment is increased as a result of participation in NJSGC education programs. (ELWD 10.3.L)

3. Coastal stakeholders access data and research findings relevant to New Jersey's marine and coastal environments. (ELWD 10.3.L)

### Action Outcomes

4. Formal and informal educators incorporate literacy standards developed by NJSGC and others to plan and structure education programs focused on the New York/New Jersey Harbor Estuary. (ELWD 10.4.A)
5. New Jersey's educators incorporate standards-aligned marine and coastally-based materials and activities into their classroom curricula. (ELWD 10.6.A)
6. Students, educators and life-long learners produce and use weather-related data to understand the connection between ocean, land and atmosphere and to increase their resiliency to the impacts of climate change. (ELWD 10.8.A)

**Goal: A future workforce reflecting the diversity of Sea Grant programs, skilled in science, technology, engineering, mathematics and other disciplines critical to local, regional and national needs. (National Goal #11)**

### Learning Outcomes

7. STEM-based programs that link Sea Grant educators and scientists (and other marine/coastal educators and scientists including NOAA/NMFS researchers) are utilized by New Jersey's formal and informal education community. (ELWD 11.1.L)

### Action Outcomes

8. Students supported by NJSG and NSGCP fellowships and scholarships enter careers in fisheries and aquaculture, marine science, and marine policy. (ELWD 11.2A, ELWD 11.3A)
9. Awareness of STEM careers is advanced through engagement with Sea Grant scientists and extension personnel as well as other professionals working in marine, coastal and the geosciences. (ELWD 11.2.A)



10. New Jersey's pre-service educators are prepared to include STEM education that incorporates marine and coastal topics in their future teaching. (ELWD 11.3A)

11. Undergraduate and/or graduate students conduct research in fields related to understanding and managing our coastal resources. (ELWD 11.4.A)

## ELWD PERFORMANCE MEASURES

1. Number of curriculum developed including New York/New Jersey Harbor Estuary Literacy Points curriculum guides; new or revised standards-based curricula adopted by New Jersey's formal educators; or climate related curricula developed for adoption in New Jersey's schools. (ELWD 10.4.A) (ELWD 10.6.A) (ELWD

10.8.A) National Performance Measure #8 (Target 21)

2. Number of participants in NJSJC pre-college and lifelong learning programs. (HCE 3.1.L, ELWD 10.2.L, ELWD 10.3.L, ELWD 10.4.A, ELWD 10.6.A, ELWD 10.8.A, ELWD 11.1.L, ELWD 11.2.A, RCE 6.1.L, RCE 8.1.L, RCE 9.1.L) National Performance Measure #9 (Target 120,000)

3. Number of students supported by NJSJC and NSGCP fellowships and scholarships; significantly supported by NJSJC funded research projects; or supported by pre-service internships that enter marine science, marine policy, marine education or fisheries and aquaculture fields within 2 years of degree completion. (ELWD 11.2.L, ELWD 11.3.L, ELWD 11.3.A, ELWD 11.4.A) National Performance Measure #10 (Target 12)

## Summary of NJSJC Contribution to National Performance Measures

### 2014-2018

#### Healthy Coastal Ecosystems Performance Measures

1. Number of Sea Grant tools, technologies and information services that are used by our partners/customers to improve ecosystem-based management. (Target 3)
2. Number of ecosystem-based approaches used to manage land, water and living resources in coastal areas as a result of Sea Grant activities. (Target 95)
3. Number of acres of coastal habitat protected, enhanced or restored as a result of Sea Grant activities. (Target 5)

#### Sustainable Fisheries and Aquaculture Performance Measures

4. 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. (Target 15)
5. 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. (Target 1000)

#### Resilient Communities and Economies Performance Measures

6. 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. (Target 20)
7. 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. (Target 5)

#### Environmental Literacy and Workforce Development Performance Measures

8. Number of Sea Grant facilitated curricula adopted by formal and informal educators. (Target 21)
9. Number of people engaged in Sea Grant supported informal education programs. (Target 141,870)
10. Number of Sea Grant-supported graduates who become employed in a career related to their degree within two years of graduation. (Target 12)

#### Cross-Cutting Performance Measures

11. Economic (market and non-market; jobs and businesses created or retained) benefits derived from Sea Grant activities. (Target \$400,000)
12. Number of peer-reviewed publications produced by the Sea Grant network, and number of citations for all peer-reviewed publications from the last four years. (Target 10)