Sea Grant
New York
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New York Sea Grant Strategic Plan 2018 – 2023

Technical Focus Areas for Assisting Stakeholders

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Our Vision

Coastal decision-making in New York State and the Nation will be influenced by science-based information and educated stakeholders.

Our Mission

"Bringing science to the shore" through high quality research, outreach and extension.

Our Values and Principles

Excellence, Objectivity, Integrity and Responsiveness: New York Sea Grant (NYSG) exercises excellence, objectivity, integrity and responsiveness through its funding of stakeholder-driven research, and through extension, outreach and education activities to inform and empower New York's coastal stakeholders.

Stewardship and Sustainable Development: NYSG promotes the use of science-based decision-making to support the informed stewardship and sustainable development of New York's and the Nation's coastal resources.

Collaboration and Partnership: NYSG enlists liaisons and partnerships with and among coastal stakeholders to ensure inclusion of diverse perspectives for coastal problem solving and to take maximum advantage of combined resources and energies.

Education and Continuous Learning for Positive Change: NYSG conducts formal and informal education programming for elementary, secondary, undergraduate and graduate students and the public to create an informed and engaged citizenry necessary for wise coastal resource decision-making.

Professional Competence: NYSG's highly trained and experienced staff are committed to life-long education that helps NYSG respond to high priority and emerging coastal resource needs with integrative, innovative, relevant and timely activities.

Inclusiveness and Diversity: NYSG is committed to a diverse, equitable, and inclusive workplace as well as research, education and extension programming that serves the diverse populations throughout New York State, regardless of race, citizenship, class, gender, or religion. NYSG integrates diverse perspectives and viewpoints in order to enhance programming to pursue its vision and mission effectively and efficiently. NYSG, through its host institutions, State University of New York and Cornell University, promotes inclusiveness, equity, and diversity.

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Introduction and Process

This Strategic Plan for NYSG covers the years from 2018-2023. Following guidance from the National Sea Grant Office it incorporates "Light" revisions to the 2018-2021 plan, provided by NYSG Staff, Program Advisory Council (PAC), and Board of Governors (BoG). This resulting plan is a two-year extension of the existing plan that includes a handful of refinements to strengthen select plan elements that staff, PAC, and BoG thought were needed since the development of the 2018-2021 plan. Input from staff and the PAC was gathered via virtual online working sessions. They were informed about the "Strategic Planning Light" process defined by the National Sea Grant Office for the next biennial program period. These sessions thus focused on soliciting only minor revisions to Actions and Outcomes and included a suite of Focus Area-specific breakout rooms and plenary sessions to collect and collate the input. Input from the BoG was obtained during two Board meetings, and ultimately through their final review and approval of the revised document.

The 2018-2021 plan was developed with input from the program's Board of Governors, academic researchers and their graduate students in New York, NYSG staff and, most importantly, the stakeholder groups the program serves. This plan draws upon and follows the general format of the 2018-2021 National Sea Grant Network Strategic Plan and its Focus Area priorities, identifying and targeting these priorities as they are manifest in New York's coastal region.

The content of the 2018-2021 Strategic Plan was generated using data gathered from multiple methods and multiple groups. First, our Management Team developed a questionnaire to gather information about our program and our constituents' anticipated future needs. From November 2015 to January 2016, our Extension staff canvassed their individual Program Advisory Networks using the questionnaire in order to generate data to inform the plan. Similarly, in June 2016 our Program Advisory Council and former Sea Grant Scholars (graduate students supported by NYSG-funded research) and other national fellows from New York were sent a survey soliciting similar information. During a series of sessions in August 2016, a Plan Development Team comprised of Director Bill Wise, Associate Director Kathy Bunting-Howarth, Research Coordinator Lane Smith and Seafood Safety and Technology Extension Specialist Michael Ciaramella integrated the feedback received from the several sources into the framework of the program's 2014-2017 Strategic Plan, the objectives and focus areas of which were deemed to be still relevant for the 2018-2021 planning quadrennium. During NYSG's annual state staff meeting in September 2016,

this draft plan was reviewed and discussed (focus areas, goals, objectives) along with a draft elements of the 2018-2021 National Sea Grant Network Strategic Plan to determine what edits, deletions and/or additions were needed to most effectively represent and address New York's coastal stakeholder needs. The draft plan was then shared with the NYSG Board of Governors, the group representing NYSG's host institutions, SUNY and Cornell, in terms of general program direction-setting and operational policy-making. NYSG's draft plan was twice reviewed by the NYSG Program Officer and colleagues at the National Sea Grant Office.

The 2018-2023 plan remains structured around three Program Objectives and four Focus Areas defined in the 2018-2021 planning process. The Program Goals in each Focus Area are unique to NYSG. These goals provide a clear focus and ready shorthand (economics, environment, and education) for discussing the program and its goals with policy makers and stakeholders, particularly when conducting our work and seeking funding. For the 2018-2021 planning quadrennium, a special effort was made to enunciate goals that were clear, concise, tied closely to the Focus Area and progress towards which could be readily measured and documented. Plan Focus Areas and Goals are based on stakeholder feedback. The Focus Areas in this plan also conform to the Focus Areas of the 2018-2021 National Sea Grant Network Strategic Plan, however, the Goals and Actions vary based on NY constituent needs. This consistency between State and national plans simplifies interactions with the National Sea Grant College Program and other state Sea Grant programs as well as reporting of program accomplishments and impacts to the National Sea Grant Office. Though the Focus Areas are broad, and may seem independent, in fact they are not mutually exclusive - they are tied together and do not exist in isolation.

Background

The coastal zone of New York State is perhaps more diverse than that of any other state in the United States, encompassing two Great Lakes (Erie and Ontario), two Great Rivers (Niagara and the St. Lawrence), the mighty Hudson, extensive estuarine waters with watersheds that range from the completely urban to mixed suburban and agricultural, to open ocean waters. While the State's different coastal regions share some common characteristics and pressing needs, in other ways they are each unique and present distinct challenges and opportunities for coastal stakeholders and resource managers. NYSG's program is developed with this diversity of communities, settings, and objectives in mind. (NOTE: The term coastal used throughout this document includes all the Great Lakes, estuarine, and marine coastlines mentioned here.)

NYSG is an active participant in regional programming within three different Sea Grant regions (the Northeast, the Mid-Atlantic and the Great Lakes). More than 85 percent of New York's 19 million people live within a short distance of the State's 3,400 miles of Great Lakes, estuarine and marine coastline. With so much of the State's economy and population relying upon and impacting the State's marine and Great Lakes resources, there is a compelling need for informed management of the interactions between people and the ecosystems associated with these areas. As a university-based program committed to developing and extending peer-reviewed science to its stakeholders, NYSG is well-positioned to assist all levels of government and private entities by "Bringing Science to the Shore." As a university-based Federal-State partnership, NYSG is jointly overseen by the State University of New York (SUNY) and Cornell University through a Board of Governors representing both institutions.

In a time of accelerating economic, environmental, and scientific developments and change, NYSG serves as an important partner in helping New York's diverse coastal communities to respond to rapid economic and environmental changes. NYSG's critical role supporting our coastal communities is ever more relevant and apparent in times marked by the COVID-19 pandemic, enhanced impacts of climate-related changes, and active institutional work towards social, racial, and environmental justice and equity.

NYSG supports the development of objective, peer-reviewed scientific information about New York's coastal resources that is needed for current and future decision-making. NYSG communicates the important results of these and other scientific studies in forms useful to its stakeholders and its partners in New York's coastal communities. These partners and stakeholders include coastal residents, coastal businesses and their workers, policy-making officials and the management and scientific staff of municipal, State, and Federal governments and agencies, as well as teachers and students. Through the development and dissemination of scientific research-based information, tools, and expertise, NYSG, working with these stakeholders and partners, uses an integrated approach to advance its three Program Objectives, described below.

Program Objectives

NYSG has three integrated Program Objectives, which provide the direction to drive the program forward. The Program Objectives are presented separately but they are closely connected and do not stand alone. Some of the most important outcomes of NYSG activities are those which lead to progress on more than one Program Objective simultaneously.

I. Coastal environmental sustainability NYSG will assist coastal and ocean communities in ensuring the long-term health, sustainability and resilience of their coastal *environments* by providing information on the impacts of many different human

interactions with the coastal and ocean environment, including recreational, commercial and watershed impacts.

II. Coastal economic vitality NYSG will support coastal *communities and businesses* in protecting and promoting their economic vitality in a manner consistent with coastal sustainability by providing research and extension programming that addresses tourism, recreational activities, fisheries and other sustainable waterfront businesses. This activity includes research and programs that provide information that may be used to minimize and mitigate environmental hazards, aid in job creation and retention, as well as promote cost-saving measures.

III. Coastal citizens' awareness and understanding NYSG will engage many sectors of coastal communities through education and training programs to measurably improve *coastal awareness and literacy*, as well as the understanding of sustainable coastal environments and economies. Teachers and students as well as many other coastal partners will be engaged by these efforts.

Focus Areas

To address the overarching Program Objectives, NYSG has adopted four programmatic Focus Areas. Within each Focus Area there are one or more program Goals. Outcomes are identified for each of these Goals.

NYSG's Focus Areas are informed by those of the National Sea Grant College Program. Focus Areas are intersections where Sea Grant's key capabilities, programs and resources are designed to address and respond to the nation's most urgent ocean, coastal, and Great Lakes' needs. Cross-cutting these Focus Areas is the aim to enhance community resilience by addressing variable environmental conditions due to climate change – such as shifting and/or declining natural resources and severe events like hurricanes and droughts. A national framework of Focus Areas enables the Sea Grant network to establish overarching priorities across the National Sea Grant College Program while providing the ability to report accomplishments, impacts and outcomes related to those priorities as individual State Sea Grant programs as well as collectively across the network. Individual programs may choose not to participate in all of the national-level Focus Areas and goals. State program strategies are aligned with the national network, but participation in individual focus areas, goals and performance measures to assess success in achieving goals are determined after consultation with local and regional stakeholders and advisors. This iterative and flexible planning process allows for local level input to identify and develop priorities and measures of most relevance to the state as well as address emerging issues while assuring alignment with national strategies.

In this plan, NYSG adopts and is active in the four Focus Areas contained in the National Sea Grant Network Strategic Plan for 2018-2021 (and 2018-23). Most of the Goals within the NYSG Focus Areas are derived from the goals expressed in the 2018-2021 National Sea Grant Network Strategic Plan, but are particularized by and reflect the specific issues and needs expressed by NYSG stakeholders. Annual work plans for research, extension, education and communications address the strategies for achieving the Plan's Goals, Actions, and Outcomes under each Focus Area. These specific strategies allow NYSG to respond to new and emerging issues within the four Focus Areas.

Below are the Focus Areas, Goals, Actions and Outcomes for this plan.

During the review for the 2018-2023 Strategic Planning Light process the importance of the links between ecological and habitat function and coastal protection from hazards were highlighted as appearing to be too separated in the plan (i.e. in different Focus Areas). NYSG acknowledges the integrated nature of these (and other) activities, and supports management measures and other research-based tools and methods that achieve multiple benefits that cross Focus Areas. And in fact operationally there is intersection. As such we report activities related to more fundamentally integrated topics such as natural and nature-based shoreline features under both Focus Areas. Similarly climate change impacts and adaption is cross-cutting and addressed across multiple Focus Areas.

Focus Area A. Healthy New York Coastal Ecosystems

Impairment of NY coastal and ocean ecosystems and habitats is a major concern because of the widely- recognized suite of ecosystem services they provide when healthy and functioning naturally. NYSG's work in the Healthy Coastal Ecosystems and Habitats Focus Area addresses the following key questions: 1) where, how and to what extent are coastal and ocean ecosystems and habitats impaired and what are the trends in this impairment; 2) what threats and other factors are causing these impairments or might cause future impairments; 3) what tools and approaches are available to control today's threats and what tools need development to counter anticipated future threats to coastal ecosystem integrity; and 4) what habitat and overall ecosystem restoration techniques are available or can be developed to restore impaired habitats in cases where underlying threats are controllable?

NYSG's effort in this area will be divided into the following goals that cover priority issues in Aquatic Invasive Species (AIS), water quality and Harmful Algal Blooms (HABs), and habitat protection, restoration and ecosystem services. The objectives and outcomes under each of these goals are to increase the capacity of resource managers and communities to have a positive impact in these areas and promote trends that lead to improved water quality, restored or protected habitats and ecosystem services and a reduction of HABs and impacts from AIS.

Healthy Coastal Ecosystems

NYSG GOAL A1: Coastal and ocean habitats and ecosystems, and the services they provide, are protected, enhanced or restored.

- ACTION: Develop and share scientific understanding, decision-support tools, technologies and approaches *to protect and restore ecosystems*, especially those impacted by Aquatic Invasive Species, pathogens, bacteria, plastics, altered trophic interactions, emerging contaminants, ocean acidification or other sources of habitat and ecosystem degradation.
    - OUTCOME: Greater public awareness and understanding improve community decision-making and planning through increased community participation and support.
    - OUTCOME: Ecosystem protection and restoration priorities are developed with community participation and support.
    - OUTCOME: Communities and the public use tools to protect, restore and enhance coastal habitats and ecosystems.

- ACTION: Disseminate measures and tools to *predict, control or mitigate the impacts* of Aquatic Invasive Species, pathogens, bacteria, plastics, altered trophic interactions emerging contaminants, ocean acidification or other sources on habitat and ecosystem degradation.
    - OUTCOME: Greater awareness of the approaches, methods and tools that can be used to mitigate these risks.
    - OUTCOME: Natural Resource managers, the public, resource users and businesses have access to the tools and methods needed to mitigate these risks.
    - OUTCOME: Resource managers know the potential pathways and timelines for AIS to enter NY's waters and the best methods for mitigating the risks.

NYSG GOAL A2: Coastal and ocean waters, lands and living resources are managed by applying sound science, tools and planning to sustain ecosystem function and services to sustain ecosystems.

- ACTION: Synthesize and interpret field observations, monitoring, historical data and research and modeling to provide a scientific basis to reduce, mitigate or adapt to changes especially related to climate change, water quality, AIS, and altered trophic states.
    - OUTCOME: Communities, businesses, agencies, and resource managers have access to sound science, data, tools and the training to be effective as participants in decision-making.
    - OUTCOME: Collaborations with partners and stakeholders support planning, research and technological solutions to address resource management needs.

- ACTION: Create, improve and disseminate science-based tools, products and services for informed decision-making related to managing AIS.
    - OUTCOME: Resource managers have available reliable and accessible science, information and tools to improve decision-making.
    - OUTCOME: Communities have access to sound science, data, tools, and the training to be effective in planning and decision-making processes.
    - OUTCOME: Relevant stakeholders understand the options, risks, and costs and benefits their decisions may have on ecosystems.
    - OUTCOME: Stakeholders have and are able to use the tools, information and programs needed to establish practices that reduce harm to habitats, ecosystems and their services.

- ACTION: Develop and disseminate tools, techniques and methods to manage and mitigate the impacts of, and prevent or reduce the occurrence of HABs in coastal environments.

- OUTCOME: Stakeholders understand what factors, conditions, and ecosystem characteristics influence the onset, duration and intensity of HABs.
- OUTCOME: Stakeholders have access to and are trained to use tools and methods to rapidly detect and identify HABs organism and toxin.
- OUTCOME: Stakeholders are provided with outreach, education and other communication materials intended to minimize exposure and negative impacts of HABs on humans, their pets, and wildlife.

- ACTION: Create and disseminate tools, programs, models and products that increase understanding of sources of water pollution as well as the activities that can reduce sources of pollution.
  - OUTCOME: Natural resource managers, interested stakeholders and the public understand sources of water quality impairments and have a better understanding of the value of clean water.
  - OUTCOME: Natural resource managers, interested stakeholders and the public have and can use available tools to prevent contamination of coastal waters.
  - OUTCOME: Natural resource managers and communities have and can use available tools and techniques to rapidly identify the potential types, sources and impacts of novel contaminants.
  - OUTCOME: Natural resource managers and communities have and can use available tools and techniques to reduce their inputs of nutrients into coastal waters.

- ACTION: Create and disseminate tools, programs, models and products that increase understanding of Ocean acidification and/or assess the vulnerability arising from Ocean Acidification on multi-species assemblages i.e., animals and plants.
  - OUTCOME: Managers develop a basis to ascertain barriers that prohibit restoration efforts and use adaptive measures to combat these negative effects.
  - OUTCOME: Researchers identify factors, such as nutritional status, that are compounded by Ocean Acidification and cause a severe population response

Focus Area B. Sustainable New York Fisheries, Aquaculture and Seafood Businesses

New York fisheries, aquaculture and seafood businesses are an important part of the New York State economy, worth about $7.9B per year (1999). Commercial fishing and fishing communities are centered primarily on New York's marine coast and have historically been a significant way of life on Long Island, but are currently threatened. Recreational fishing is very important in both the Great Lakes and around the New York City metropolitan area, including

Long Island. Seafood safety, including HACCP training, is essential for New York seafood businesses that handle both New York and imported seafood products, especially as the seafood business becomes increasingly international. Aquaculture is a historic but still small component of New York State's coastal economy. However, shellfish aquaculture is a growth industry in the New England region, including on eastern Long Island. Commercial aquaculture continues to offer new opportunities for economic advancement in both coastal and inland communities, including redevelopment of urban areas for aquaculture purposes and the integration of aquaculture into offshore energy production facilities. Seaweed aquaculture is also an emerging industry (that also has the potential for dual benefits in terms of water quality via bioextraction).

During the 2018-2023 plan period, NYSG's fishery and aquaculture efforts will concentrate in assistance to existing and nascent seafood and aquaculture businesses to reach their growth and profitability potential. Educate the seafood consuming public about the local seafood industry, products and the facts associated with seafood "issues" such as health benefits, environment impacts of aquaculture, status of fish stocks, microbial contamination and mercury levels. Provide marketing assistance to recreational fishing businesses and those involved in the "dock to table" trade. Educate consumers and producers about threats to wild-harvested and cultivated fish and shellfish populations from emergent diseases and other threats.

Sustainable Fisheries and Aquaculture

NYSG GOAL B1: Fisheries and aquaculture industries provide food, jobs and economic and cultural value to coastal communities and economies.

- ACTION: Develop and disseminate tools, methods and technologies for industries to use in producing safe and sustainable seafood.
    - OUTCOME: Businesses are aware of and can implement tools, methods and approaches to produce safe and sustainable seafood while being economically viable.
    - ACTION: Enhance technology transfer and develop a trained workforce in modern domestic fisheries and aquaculture methods.
    - OUTCOME: Partnerships enabling the aquaculture industry to acquire and adopt innovative production technologies increase.

- ACTION: Develop, improve and disseminate methods and tools, and provide training that ensure safe seafood preparation and handling practices for marine and freshwater resource industries.

    - OUTCOME: Marine resource industry is educated about strategies to ensure biosecurity and safe seafood.
    - OUTCOME: Marine and freshwater resource industries continues to employ technologies and reinforce strategies to ensure biosecurity and safe seafood.

- ACTION: Enhance technology transfer and develop an informed consuming public that has a better understanding of how wild-caught and cultured seafood is caught or grown and marketed and how to become a discriminating seafood purchaser.
    - OUTCOME: Consumers understand the health benefits of seafood and purchase safe & sustainable products.

- ACTION: Work with existing and emerging aquaculture businesses along with regulatory agencies and other seafood sectors to identify barriers to aquaculture expansion and create resources and opportunities to overcome barriers and increase aquaculture production in NY.

    - OUTCOME: A positive and effective atmosphere for aquaculture growth throughout the state will be created.
    - OUTCOME: An increase in aquaculture production and diversity in species and methods that are resilient to changing, political, social, and environmental conditions.

- ACTION: Develop and disseminate tools, information and methods for recreational fishery fishing businesses (e.g., "for-hire" operators, bait & tackle dealers) and commercial fishers to market their businesses and/or their catch.
    - OUTCOME: More fishing businesses adopt and benefit from marketing techniques that grow their business and profitability.

NYSG GOAL B2: Marine and freshwater fishery resources are conserved and sustained, supporting fishing communities and businesses, including commercial, aquaculture, recreational, and subsistence fisheries.

- ACTION: Identify threats to fishery resources (e.g. ocean acidification, invasive species, climate change), wild and those under cultivation, and ensure sound science, services and tools are available and accessible to help understand the threat(s), how they arise, what actions can be taken to eliminate them or ameliorate their effects.
    - OUTCOME: Fishers, culturists and coastal resource and fishery managers are knowledgeable regarding threats to fishery resources and what can be done to reduce them.

- OUTCOME: Coastal businesses e.g., shellfish hatcheries and mangers have access to information to improve decisions about scheduling seed (spat) propagation in a manner to stabilize these supplies to commercial shellfish growers.

- ACTION: Determine the causes and potential remedies for actual and predicted changes in populations, population dynamics and health of finfish and shellfish of economic importance to New York.
  - OUTCOME: Resource managers have available more tools and techniques to restore habitats and populations of economically important fisheries in NY waters.
  - OUTCOME: Resource managers and business owners have tools and data to help predict the potential impact of environmental changes and policy on economically important fish and shellfish populations and what will be the effectiveness of potential mitigation and adaptation measures.

Focus Area C. Resilient New York Communities and Economies

Eighty-five percent of New York State residents live near the coast. The communities and environments where these New Yorkers live, work and play is a focus for NYSG. The human and environment interface in the coastal area exemplifies the importance and complexities of the relationship between healthy environments and healthy economies—the synergies and the potential conflicts. As municipalities and businesses grow, human use of the landscape changes which in turn may adversely impact coastal resources. NYSG assists communities with sustainable growth that protects coastal resources, human health and the economy. NYSG helps communities understand how their activities impact coastal environments and resources and identifies actions that communities can take to protect and improve these resource and continue to benefit from the valuable ecosystem services they provide. These communities can be rural with small governments with little professional staff to urban with vulnerable neighborhood do to physical and/or socioeconomic factors.

Coastal businesses have a unique relationship with coastal resources. Many businesses depend on and benefit from healthy coastal environments but their daily operations may pose a significant threat to the coastal environment. Many of the businesses assisted by NYSG are small “mom and pop” establishments which due to their coastal nature, have more regulatory requirements. NYSG assists these stakeholders to implement sustainable practices that will benefit both their business and the environment.

The coastal environment is changing today at a rate perhaps greater than ever in human history. The most pervasive driver behind this dynamic scenario is climate change, which is further complicated by continued population increase in this area. Whether the topic is sea-level rise, shifts in the communities of key resource species, or preparing for the next major coastal storm, NYSG is focused on assisting coastal communities and businesses to deal with a changing coastal environment. In this, promoting adaptation and greater resilience are priorities.

During the 2018-2023 period, this work will have the following priorities: small coastal business development and resilience; land use planning in the coastal zone; water infrastructure improvement for resilience and coastal hazards.

Resilient Communities and Economies

NYSG GOAL C1: Vulnerable and at-risk coastal communities are aware of and can plan and prepare for changing conditions and risks and become resilient to extreme events, coastal hazards, economic disruptions, and/or other threats to community and individual well-being.

- ACTION: Develop and provide training on innovative tools to increase the public's awareness of changing environmental conditions and coastal hazards and the potential impacts individuals, their communities, economies and ecosystems may encounter. This includes activities related to offshore renewable energy development.
    - OUTCOME: Members of the community, including the underserved, are aware of and understand the implications to themselves and their communities of changing environmental conditions and coastal hazards, and are prepared to respond safely, and adapt.
    - OUTCOME: Members of the community have access to the technology and tools to plan and prepare for coastal resilience and that will improve decision-support abilities.
    - OUTCOME: Existing and innovative training programs improve community leaders' understanding of changing conditions in their communities and they implement adaptive strategies.

- ACTION: Increase the resilience of businesses to impending changes in the coastal environment and the coastal economy, by assisting them in adopting business models and business practices that emphasize diversification, flexibility, innovation and the sustainable use of natural resources through access to science-based information and tools.

    - OUTCOME: Businesses in coastal communities are aware of and understand changing coastal conditions, including coastal hazards, and the implications these have for their operations, economic performance, and their broader impacts the community of which they are a part.
    - OUTCOME: Coastal business have access to and use science-based information and tools to develop and implement business practices that reduce their environmental footprint and increase their resilience to coastal change and uncertainty.

- ACTION: Provide coastal businesses, communities, landowners and those who recreate in and along coastal waters with the knowledge, tools, and training needed to increase their resilience to the threats from coastal hazards and extreme weather.
    - OUTCOME: Those who work or play on our coastal waters understand proper procedures and techniques related to boating safety.
    - OUTCOME: Property owners and towns understand options for protecting property and reducing risk from coastal hazards and storms.
    - OUTCOME: Homeowners are aware of and understand how to use the messages, products and tools available to protect themselves from coastal hazards and extreme weather.

- ACTION: Create pathways to transfer knowledge about traditional, social, recreation, and commercial uses of natural resources that define New York's coastal heritage. (e.g. proposed Lake Ontario National Marine Sanctuary designation).
    - OUTCOME: Increased public awareness about New York's historical and traditional roles and dependency on coastal resources.
    - OUTCOME: Incremental change in minority and underrepresented groups in coastal tourism and recreation

NYSG GOAL C2: Communities utilize tools and methods to assist in comprehensive planning and implementing adaptive management strategies in order to enhance community resilience and their ability to adapt to natural hazards and changing conditions.

- ACTION: Utilize comprehensive planning and adaptive management strategies to enhance community resilience and adapt to natural hazards and changing conditions.
    - OUTCOME: Communities have access to information needed to understand and participate in adaptive management planning.
    - OUTCOME: Communities employ adaptive management strategies and apply tools to engage all members of the community and improve resilience and community sustainability.

Focus Area D. Environmental Literacy & Workforce Development in New York

In the broadest sense, the future of the coastal and ocean environment and the well-being of coastal communities will be decided by the public. It is impossible to overstate the importance of securing a public understanding of the natural functioning of coastal and ocean environments, their biotic and abiotic components and processes, and how these affect and are affected by human activities. These interactions are not matters of speculation or belief; they are matters of empirical reality that can be studied, understood and this understanding then spread widely.

Of course, even the most widespread and well-founded public understanding of these realities will not obviate the need to make decisions on how society will live, work and play on the coast. Here, human values and preferences will continue to clash and compete. However, the task of organizations like NYSG is to ensure that these debates and decisions take place on and benefit from the strongest possible scientific and technical foundation.

NYSG is committed to such a future. We will continue to promote environmental education in schools, through formal and informal education programs, including those in socioeconomically disadvantaged rural and urban coastal areas. In addition, NYSG will continue to ensure that students are exposed to ocean and coastal sciences through education, hands-on research and in-the-field training opportunities.

This focus area encompasses more than promoting awareness and understanding among the public. Workforce development is critical if the coastal economy in New York is to thrive, grow and achieve a more sustainable and resilient relationship with the coast. NYSG will continue to invest in training the next generation of coastal scientists through support of graduate research assistantships and fellowships. When the need is clear, we will engage in direct workforce training of individuals seeking to enter expanding and nascent coastal businesses and industries.

Environmental Literacy and Workforce Development

NYSG GOAL D1: An environmentally literate public that is informed by a continuum of lifelong formal and informal engagement opportunities that reflect the range of diversity of our communities.

- ACTION: Increase effective environmental literacy instruction for K-12 students by formal and informal educators.

    - OUTCOME: Teachers and students are aware of opportunities to engage in STEAM (Science, Technology, Environment, Arts, Math) programs and can employ their knowledge to support sustainable practices.

- ACTION: Increase effective environmental literacy communication, including through expanded technological approaches, to stakeholders, including how ecosystem change affects economic, social, and cultural values, as well as implications for conservation and management.
    - OUTCOME: Lifelong learners make choices and decisions based on information learned through informal science education and outreach opportunities.
    - OUTCOME: All members of a community incorporate a broad understanding of their actions on the environment into decisions as individuals and a community.

NYSG GOAL D2: A diverse and skilled workforce is engaged and enabled to address critical local, regional, and national needs.

- ACTION: Prepare a responsive and diverse workforce to participate in and benefit from the nation's marine resource sectors (e.g. industry, research, government, etc.), and to adapt and thrive in changing conditions.
    - OUTCOME: Employment in all sectors of the U.S. marine and Great Lakes resource enterprise expands and diversifies.
    - OUTCOME: Highly skilled workforce to meet demands in the markets that revolve around New York's marine, Hudson, and Great Lakes coastal industries

- ACTION: Grow awareness of marine-related occupations and aquatic science career pathways among the nation's diverse population.
    - OUTCOME: All community members and local workforce development boards are equipped with knowledge and materials for residents to pursue marine careers and for WDBs to create career training programs with local universities and businesses.
    - OUTCOME: Community members are informed about science, technology, tourism, and other related career and workforce pathways and opportunities in the coastal resources sector.

- ACTION: Support educational and professional development of diverse undergraduate and graduate students through mentoring, internship, fellowship, and Sea Grant Scholar opportunities.

- OUTCOME: Development of skilled and environmentally literate workforce supporting NY's coastal communities and contributing the conservation and management of our coastal resources (e.g. education, policy, NGOs, research).