

# New York Sea Grant Strategic Plan 2018-2021

## 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 and inclusive workplace as well as research, education and extension programming that serves ALL people of New York State. NYSG welcomes diverse perspectives and viewpoints in order to enhance cultural understanding and enable the program to pursue its vision and mission effectively and efficiently. NYSG, through its host institutions, State University of New York and Cornell University, promotes inclusiveness and diversity among its own program staff.

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## Introduction and Process

This Strategic Plan for NYSG covers the years 2018-2021. The 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 plan is structured around three Program Objectives and four Focus Areas. 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 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 target Focus Areas are broad, 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/agricultural, and 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 unique challenges for coastal stakeholders and resource managers. NYSG's program is developed with this diversity of settings and challenges in mind. 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 3400 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. (The term coastal used throughout this document includes all the Great Lakes, estuarine, and marine coastlines mentioned above.) 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.

Within these over-arching major Program Objectives, NYSG has four Programmatic Focus Areas. Aspects of each of these Focus Areas address the Program Objectives. Each Focus Area describes one or more program Goals. Outcomes are identified for each Goal.

## Focus Areas

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. By addressing focus, Sea Grant aims to make communities resilient to severe events—such as drought, hurricanes, and fisheries declines—as well as changing conditions as a result of climate change.

Annual work plans for research, extension, education and communications address the

strategies for achieving these outcomes. These specific strategies allow NYSG to respond to new and emerging issues within the four Focus Areas.

A national framework of focus areas enables the network to establish overarching priorities for the National Sea Grant College Program while providing consolidation of accomplishments, impacts and outcomes related to those priorities (i.e. “top-down” and “bottom-up” approach). Individual State Sea Grant programs may choose not to participate in all of the 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 measures to 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. Most of the goals subsumed by these Focus Area 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 in the general Focus Area expressed by NYSG stakeholders.

## 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/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 ecosystem/habitat 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, plastics, altered trophic interactions 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, plastics, altered trophic interactions 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 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 and improve 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 the tools, information and programs needed to establish practices that reduce harm to habitats, ecosystems and their services.
- ACTION: Develop tools, techniques and methods to manage and mitigate the impacts of, and prevent or reduce the occurrence of HABs in coastal environments.
  - OUTCOME: Determine what factors, conditions, and ecosystem characteristics influence the onset, duration and intensity of HABs.
  - OUTCOME: Development and refinement of tools and methods to rapidly detect and identify HABs organism and toxin.
  - OUTCOME: Develop and refine outreach, education and other communication materials intended to minimize exposure and negative impacts of HABs on humans, their pets, and wildlife.
- ACTION: Create 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 available tools to prevent contamination of coastal waters.
- **OUTCOME:** Natural resource managers and communities have available tools and techniques to rapidly identify the potential types, sources and impacts of novel contaminants.
- **OUTCOME:** Natural resource managers and communities have available tools and techniques to reduce their inputs of nutrients into coastal waters.

## **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.

During the 2018-2021 quadrennium, NYSG’s fishery and aquaculture efforts will concentrate in assistance to existing/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 wholesomeness/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/cultural value to coastal communities and economies.



- ACTION: Develop 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 and improve methods and tools 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/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: Develop tools, information and methods for marine recreational ~~fishery~~ fishing businesses (e.g., “for-hire” operators, bait & tackle dealers) and commercial fishersto 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, 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/fishery managers are knowledgeable regarding threats to fishery resources and what can be done to reduce them.

- **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 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/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 2018-2021 period, this work will have the following priorities: small coastal business development and resilience; land use planning in the coastal zone; water infrastructure improvement/resilience and coastal hazards.

## **Resilient Communities and Economies**

**NYSG GOAL C1:** Vulnerable and at-risk coastal communities are aware of 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 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.
  - **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:** 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, these businesses adopting business models and business practices that emphasize diversification, flexibility, innovation and the sustainable use of natural resources.
  - **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:** Increase the resilience of coastal businesses, communities, landowners and those who recreate in and along coastal waters 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 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.
  - **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 STEM programs and can employ their knowledge to support sustainable practices.
- **ACTION:** Increase effective environmental literacy communication 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.

**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 members of a community incorporate a broad understanding of their actions on the environment into decisions as individuals and a community.