



**PENNSYLVANIA SEA GRANT  
2024-2027 STRATEGIC PLAN  
October 26, 2022**

**Overview**

The National Oceanic and Atmospheric Administration (NOAA) established the National Sea Grant College Program in 1966 to promote stewardship of coastal resources. In 1998, Penn State University received funding from NOAA to initiate a highly focused Sea Grant outreach project in the Pennsylvania Lake Erie watershed. Penn State established the Pennsylvania Sea Grant College Program to promote the sustainability of Pennsylvania's ecological and economic coastal and watershed resources through science-based research, education, and outreach.

The following strategic plan offers Pennsylvania Sea Grant's direction and plan for 2024-2027. This is a living document and may be modified to address changing priorities.

**Background**

In March 1998, NOAA provided funding to Penn State Behrend, on behalf of the Commonwealth of Pennsylvania and The Pennsylvania State University, to initiate a highly focused Sea Grant outreach project related to the Lake Erie watershed and coastline of Pennsylvania. In response, Penn State established Pennsylvania Sea Grant to promote the sustainability of Pennsylvania's ecological and economic coastal and watershed resources through science-based research, education, and outreach.

In March 2004, based on Pennsylvania Sea Grant's performance over its initial six years as an outreach project and the University's reputation, the National Sea Grant Office (NSGO) leadership determined that:

- Penn State should lead the Sea Grant effort for Pennsylvania; and
- Pennsylvania's outreach project should be designated a Coherent Area Program, which included extension, education, and a modest applied research program.

As the program grew, Pennsylvania Sea Grant expanded its influence statewide to include three diverse regions: the Lake Erie, Delaware River, and Susquehanna River watersheds. In summer 2009, again based on performance, NSGO leadership designated Pennsylvania Sea Grant an Institutional Program, which included a broader state mandate and an expanded research program.

In February 2014, Penn State petitioned the NSGO to begin the process for designation as a Sea Grant College. To this end, a NOAA team evaluated Penn State and Pennsylvania Sea Grant in October 2014. The National Sea Grant Advisory Board approved the change in status in March 2015, and the U.S. Department of Commerce approved the change in September 2015.

In April 2016, the NSGO leadership recognized Pennsylvania Sea Grant's continuous growth and achievements as Penn State University achieved Sea Grant College status, and Pennsylvania Sea Grant was formally designated as a Sea Grant College Program.

Pennsylvania Sea Grant influences coastal watersheds across the state, including the Lake Erie, Delaware River, and Susquehanna River watersheds.

- The Lake Erie watershed consists of the northern half of Erie County and the northwest corner of Crawford County. Overall, the watershed land area is 511 square miles. The dominant topographic feature of the watershed is the 77-mile shoreline of Lake Erie that includes the Presque Isle ecosystem.
- The Delaware River is the longest un-dammed river east of the Mississippi. The Pennsylvania portion of the Delaware River watershed is home to approximately 5.25 million residents. The Pennsylvania Coastal Zone Management Area includes a 112-mile stretch of tidal Delaware River coastline within Bucks, Philadelphia, and Delaware counties. Pennsylvania Sea Grant focuses on both the coastal zone management area and the Schuylkill River watershed.
- The Susquehanna River basin is the largest watershed in the Atlantic Slope of North America. In Pennsylvania, the Susquehanna River watershed covers approximately half of the land area of the Commonwealth, touching 43 of the 67 counties. The river is only a few meters wide at its northernmost point in New York, but expands to nearly a mile wide in Harrisburg, Pa. The Susquehanna River is the largest tributary to the Chesapeake Bay, and provides half of the freshwater flow to the bay.

Pennsylvania Sea Grant provides leadership in four core program areas - outreach, education, communication, and research. Hallmark activities have included aquatic invasive species prevention and policy, terrestrial invasive species control, coastal bluff research and outreach, land conservation, Areas of Concern research and policy expertise, marine debris research and prevention, ecosystem resiliency research, nonpoint source pollution prevention, fisheries research, educator professional development related to environmental and watershed literacy, watershed and wetland restoration and monitoring, and hazard and community resiliency planning. Pennsylvania Sea Grant and many partners work together to address activities within each core program area leading to an enhanced coastal environment and economy. In addition, Pennsylvania's location affords Pennsylvania Sea Grant the opportunity to coordinate activities with the Mid-Atlantic and Great Lakes Sea Grant regions, as well as several NOAA regions.

**Vision:**

Pennsylvania Sea Grant envisions thriving and resilient coastal communities and healthy, sustainable watersheds and ecosystems in Pennsylvania that are supported by a diverse, engaged, and environmentally-literate public and informed decision-makers.

**Mission:**

Pennsylvania Sea Grant's mission is to enhance the use and conservation of Pennsylvania's coastal, marine, and Great Lakes resources to create a healthy environment, resilient and inclusive communities, and a strong and sustainable economy.

**Core Values**

Sea Grant's core values are essential and enduring tenets that influence the organization and support its mission. The core values support a culture of integrity and scientific neutrality enabling Sea Grant to serve as a trusted broker of information. Core values that will continue to guide the behavior and

actions of the National Sea Grant College Program are:

- *Vision:* Advancing creative, innovative solutions that address emerging and chronic challenges through engagement, science, and stewardship.
- *Collaboration:* Seeking and sustaining partners with whom we leverage each other's strengths, and responsively, respectfully integrating diverse expertise and perspectives to reach shared goals.
- *Sustainability:* Advancing environmental stewardship practices and communicating the value of the services that the coastal, watershed, ocean, and Great Lakes ecosystems provide to the nation.
- *Accountability:* Operating with integrity and transparency while maintaining quality and relevance in all functional areas, including program management.
- *Diversity, Equity, Inclusion, Justice, and Accessibility:* Proactively engaging with the range of identities, cultures, communities, and capacities present throughout our areas of work, with respect and sensitivity to each person's experiences, history, and systemic challenges.

In addition to the National Sea Grant College Program core values, Pennsylvania Sea Grant will also be guided by core values to:

- Serve as an unbiased provider of information and services.
- Incorporate a science-based approach to all program efforts.
- Encourage the use of best available science and management practices.
- Promote and deliver educational practices that engage participants in stewardship- and place-based learning.
- Foster collaboration with and among communities and collaborators with mutual interests.
- Build capacity to manage Pennsylvania's coastal and watershed resources in a sustainable manner.

#### **Strategic Parameters:**

- Engage an ecosystem approach to watershed management of the Commonwealth's coastal resources, focusing on the Lake Erie, Delaware, and Susquehanna watersheds.
- Capitalize on the intellectual and physical resources of Pennsylvania's colleges and universities to further Pennsylvania Sea Grant research and collaborative efforts.
- Utilize a broad base of public and private funding sources that are consistent with the program's mission.
- Collaborate with partner organizations and seek new partnerships that build on Pennsylvania Sea Grant's strengths.
- Serve as a local resource to support and disseminate findings and resources of NOAA and other partner organizations.

#### **Cross-Cutting Principles**

The National Sea Grant College Program has identified two cross-cutting principles in its 2024-2027 Strategic Plan that will help enhance the College Program's capabilities to meet future needs. These concepts provide a common foundation for all the Focus Areas and the work Sea Grant conducts. While implementing the 2024-2027 National Strategic Plan, Sea Grant will:

- Cultivate and sustain partnerships by integrating the expertise and capabilities of partners from international, federal, tribal, state, and local communities as well as from academia, nongovernmental organizations, and industry.

- Enhance diversity, equity, inclusion, justice, and accessibility by seeking and integrating diverse perspectives to advance cultural understanding and enable the network to pursue its vision and mission with, and for, all audiences. We will actively create mechanisms to allow all people to participate in network activities. Bringing a range of perspectives, values, and tools together to find solutions that are more innovative, creative, inclusive, and responsive will help us be successful in tackling problems facing coastal and Great Lakes communities.

Pennsylvania Sea Grant will work to adopt and adapt these principles in Pennsylvania to ensure the sustainability of the Commonwealth's coastal resources.

### **Outline of the Planning Process**

Pennsylvania Sea Grant works proactively to stay current on local, state, and regional issues and concerns. Information is gathered through involvement in numerous boards, committees and organizations, review and consideration of plans and tools developed by collaborators, and by gathering input through surveys and discussions with partners and Pennsylvania Sea Grant advisory committee members. These efforts keep Pennsylvania Sea Grant informed of local and regional concerns and issues in Lake Erie, and the Delaware and Susquehanna River basins, and are utilized when Pennsylvania Sea Grant conducts strategic planning efforts.

Pennsylvania Sea Grant staff serve on and participate in a variety of boards, committees, and organizations to improve Pennsylvania's coastal community resiliency and environmental literacy, and protect and restore its coastal, marine, and Great Lakes resources. These efforts include:

- Chesapeake Bay Invasive Catfish Workgroup
- Chesapeake Bay Regional Communications Committee
- Community Resilience Action Network of Erie
- Delaware County Coastal Zone Management Task Force
- Erie County Coastal Zone Management Task Force
- Great Lakes Panel on Aquatic Invasive Species
- Governor's Invasive Species Council
- Lake Erie Region Conservancy
- Lake Erie Watershed Cooperative Weed Management Area
- Mid-Atlantic Aquatic Invasive Species Panel
- Pennsylvania Advisory Committee for Environmental Education
- Pennsylvania Association of Natural Resource Extension Professionals
- Pennsylvania Department of Environmental Protection Statewide Coastal Advisory Committee
- Pennsylvania Department of Environmental Protection Water Resources Advisory Committee
- Pennsylvania Environmental Literacy Steering Committee
- Pennsylvania Green and Healthy Schools Partnership Advisory Committee
- Pennsylvania Lake Erie Harmful Algal Bloom Taskforce
- Pennsylvania Lake Erie Watershed Association
- Pennsylvania Master Watershed Stewards Statewide Advisory Committee
- Pennsylvania Meaningful Environmental and Watershed Educational Experience Task Force
- Penn State Water Team
- Pennsylvania Water Resources Research Center External Advisory Committee
- Philadelphia Higher Education Network for Neighborhood Development
- Regional Outdoor Learning Network

- Regional Science Consortium Executive Board
- Schuylkill Action Network – Stormwater Subgroup
- School District of Philadelphia Green Futures Education for Sustainability Committee
- Sea Grant communities of practices, such as:
  - Diversity, Equity, Inclusion, and Justice
  - Green Infrastructure
  - Hazardous Material Transport Outreach Network
  - Marine Debris

Pennsylvania Sea Grant’s strategic plan fully aligns with the NOAA National Sea Grant College Program’s strategic goals. Additionally, Pennsylvania Sea Grant reviews other regional and state plans to identify shared priorities and collaborative opportunities. These plans include:

- Chesapeake Bay Total Maximum Daily Load
- Chesapeake Bay Watershed Agreement
- Delaware Estuary Program Comprehensive Conservation Management Plan
- Erie County Hazard Mitigation Plan 2022
- Pennsylvania Aquatic Invasive Species Management Plan
- Pennsylvania Climate Action Plan 2021
- Pennsylvania’s Final Phase 3 Watershed Implementation Plan
- Pennsylvania Invasive Species Management Plan
- Pennsylvania Lake Erie Watershed Integrated Water Resources Management Plan
- The Pennsylvania State University Strategic Plan 2016-2025

Finally, Pennsylvania Sea Grant also gathers input from local, regional, and statewide collaborators and the Pennsylvania Sea Grant advisory committee members to provide input about focus areas and topics where Pennsylvania Sea Grant should focus its activities in 2024-2027. Survey findings from 2022 are reflected in this strategic plan. Pennsylvania Sea Grant’s key partner groups include state and local agencies, businesses, non-profit organizations, academia, PreK-12 educators, and the public.

Since feedback is gathered on an ongoing basis, Pennsylvania Sea Grant considers its strategic plan a working document, maintaining flexibility to incorporate emerging issues and changing directions of NOAA, NSGO, Pennsylvania, and other collaborators.

### **Pennsylvania Sea Grant Focus Areas**

This strategic plan follows the outline set forth by the National Sea Grant Strategic Plan for 2024-2027. The National Sea Grant Strategic Plan identifies four critical focus areas: Environmental Literacy and Workforce Development, Healthy Coastal Ecosystems, Resilient Communities and Economies, and Sustainable Fisheries and Aquaculture. The National Sea Grant Strategic Plan recognizes that focus areas are interrelated and overlapping, and a single activity may advance the goals of multiple focus areas.

This strategic plan is designed to take advantage of Pennsylvania Sea Grant’s strengths in integrated communication, education, outreach, and research, and is a working document subject to change. The goals are broad and speak to long-term national priorities to which Pennsylvania Sea Grant will contribute.

The 2024-2027 Pennsylvania Sea Grant Strategic Plan will work to address the following focus areas:

- Environmental Literacy and Workforce Development

- Healthy Coastal Ecosystems
- Resilient Communities and Economies
- Sustainable Fisheries and Aquaculture

### **Goals and Outcomes**

Pennsylvania Sea Grant’s goals and outcomes address local, regional, and national priorities and issues, and align closely with the goals and evaluation measures of the 2024-2027 NOAA National Sea Grant College Program Strategic Plan. Focus area goals and outcomes are adapted from the 2024-2027 National Sea Grant Strategic Plan. Below are the goals and outcomes that Pennsylvania Sea Grant’s plan will help to fulfill:

#### **Focus Area: Environmental Literacy and Workforce Development (ELWD)**

It will take a workforce literate in science, technology, engineering, history, communications, and mathematics to protect and sustain Pennsylvania’s natural resources. To develop environmentally literate community members, educational programs are needed to improve the understanding of how personal actions contribute to pollution, climate change, invasive species, habitat destruction, and other problems. Educated and involved youth and adults, and coordinated management is what is required to preserve, protect, develop, enhance, and restore limited resources to sustain current and future generations.

Pennsylvania Sea Grant strives to promote stewardship of limited resources in all formal, nonformal, and informal learning opportunities as is key to sustaining Pennsylvania coastal and watershed resources. By partnering with federal, state, and local organizations, informal educators, PreK-12 schools, colleges, and nonformal educators, Pennsylvania Sea Grant can reach critical audiences and maximize limited educational resources. Pennsylvania Sea Grant utilizes a variety of delivery methods that are obtainable to diverse communities including in person and virtual workshops and forums, online and print publications, factsheets, maps, posters, booklets, websites, and social media.

Meaningful environmental and watershed educational experiences are the hallmark of Pennsylvania Sea Grant PreK-12 program success and include lessons, activities, and stewardship project guidance to address Ocean and Great Lakes Literacy Principles. Our offerings support a variety of educator professional learning opportunities focused on participatory science learning and place-based education such as via workshops that offer first-hand explorations of watershed topics including ecology, geology, history, biology, economics, geography, traditional ecological knowledge, maritime heritage and culture, and with particular emphasis on human impacts and environmental literacy. Educators and students will continue to benefit from local and place-based science to meet Pennsylvania’s curriculum standards, including the Integrated Standards for Science, Environment, Ecology, Technology, and Engineering (Grades K-5) and the Integrated Standards for Science, Environment and Ecology (Grades 6-12) that were legislatively approved in April 2022 and must be fully integrated into classroom instruction for the 2025-2026 school year.

Through Pennsylvania Sea Grant programs, participants learn to take action and change behaviors. Examples include creating rain gardens to help control stormwater and soil erosion, recycling instead of sending materials to a landfill, choosing to purchase safer and greener products, and by properly disposing of unused medicines. An environmentally literate public are the stewards who will conserve and restore precious coastal resources.

## **Environmental Literacy and Workforce Development Goals, Actions and Outcomes:**

### **Goal 1: A diverse, environmentally literate public that participates in lifelong formal and nonformal learning opportunities.**

*ACTION 1.1: Create and implement educational resources and opportunities that are diverse, equitable, inclusive, just, and accessible for formal and nonformal learners to explore multiple ways of learning and knowing and to develop their curiosity and learning abilities throughout their lives.*

#### **DESIRED OUTCOME:**

1.1.1 Individuals consider themselves environmentally literate lifelong learners who utilize knowledge to support, build, and restore healthy natural and human communities.

*ACTION 1.2: Develop, provide, and assess research, curricula, tools, and other resources for educators, students, and lifelong learners to support personal choice, participatory decision-making, and community planning processes.*

#### **DESIRED OUTCOMES:**

- 1.2.1: Educators, students, and lifelong learners have current information and innovative tools that meet or exceed relevant standards and practices.
- 1.2.2: People know and can act on issues that impact their lives, communities, and environments.
- 1.2.3: Community members use their knowledge to remove barriers and act for personal and social resilience and adaptation to changing economic, environmental, and social conditions.

*ACTION 1.3: Strengthen the ability of individuals, organizations, and communities so that they have the knowledge, dispositions, skills, and abilities to make informed and responsible decisions regarding coastal and Great Lakes environmental issues.*

#### **DESIRED OUTCOMES:**

- 1.3.1: Individuals, organizations, and communities create innovative opportunities, businesses, and communities that respect diverse ways of knowing and learning, address systemic problems in equitable and just ways, and integrate traditional and novel cultures.
- 1.3.2: Coastal and Great Lakes communities are sustainable, healthy, diverse centers of tradition, innovation, and prosperity.

### **Goal 2: A diverse, skilled, and environmentally literate workforce that is engaged and able to build prosperous lives and livelihoods in a changing world through traditional and innovative careers.**

*ACTION 2.1: Identify and remove barriers to accessing training and learning opportunities so that the nation's diverse population is connected to and prepared for the range of career paths that support the needs of coastal and Great Lakes communities.*

DESIRED OUTCOME:

- 2.1.1: All members of a community are enabled to explore and pursue the variety of occupations that are essential to sustain coastal and Great Lakes communities, economies, and ecosystems.

*ACTION 2.2: Increase opportunities for students at all levels (P-12, undergraduate, graduate, post-graduate, and career and technical education) to gain knowledge and experience addressing issues that are important to the ocean, coasts, and Great Lakes, and their respective watersheds.*

DESIRED OUTCOMES:

- 2.2.1: Sea Grant student opportunities provide for increased literacy, experience, and preparedness in critical disciplines, skills, and issues.
- 2.2.2: Students from all backgrounds and with diverse needs are thoughtfully and intentionally supported in and have access to formal, nonformal, and experiential learning, training, and research experiences.

*ACTION 2.3: Develop and carry out programs that help people discover, create, and grow within careers that support the current and future needs of coastal communities and ecosystems and to adapt and thrive in changing conditions.*

DESIRED OUTCOME:

- 2.3.1: Employment in coastal, Great Lakes, and watershed communities expands and diversifies.
- 2.3.2: The existing and future workforce is able to adapt and thrive in changing environmental, social, and economic conditions.

**Focus Area: Healthy Coastal Ecosystems (HCE)**

Pennsylvania's aquatic habitats play a critical role in three of the world's great water resources – the Lake Erie, Delaware, and Susquehanna watershed ecosystems. Pennsylvania shares many ecological and economic challenges with neighboring states and provinces. These challenges include the rapid pace of coastal development, greater demands on fisheries resources, water quality degradation, increased demands on water supplies, changes to fisheries stocks, wetlands loss, proliferation of invasive species, and a host of other ecological and ecosystem impacts. It is essential for decision-makers and community members to understand the interconnectedness and interactions of these systems to maintain vital habitats and inform restoration efforts within ecosystems and watersheds.

Keeping ecosystems healthy is a challenge because of the diversity of stressors each system faces. This stewardship is further complicated because Pennsylvania ecosystems cross many political boundaries. Responsible management of these systems requires new ways of thinking and actions, often termed ecosystem-based management. New approaches require unprecedented levels of coordination and collaboration among federal, state, and local jurisdiction and the active engagement of the people who live, work, and play along Pennsylvania's coasts and rivers. They also require understanding of the characteristics of species, landscapes, and their interactions within each ecosystem. Pennsylvania Sea Grant leads regional approaches to understanding and maintaining healthy coastal ecosystems, including employing planning efforts across the Commonwealth to identify information gaps,



implementing research priorities, and coordinating information and technology transfer to the people who need it.

### **Healthy Coastal Ecosystems Goals, Actions, and Outcomes**

#### **Goal 3: Coastal and Great Lakes habitats, ecosystems, and the services they provide are protected, enhanced, and/or restored.**

*ACTION 3.1: Co-develop, improve, and share knowledge, decision-support tools, technologies, and approaches to protect, enhance, and restore ecosystems.*

##### **DESIRED OUTCOMES:**

- 3.1.1: Communities have greater awareness and understanding of ecosystem functions and the services they provide.
- 3.1.2: Coastal and Great Lakes ecosystem science and conservation needs are identified and prioritized through diverse participation by interested parties.
- 3.1.3: Evidence-based science, traditional and local knowledge, and innovative solutions inform and improve the management and conservation of coastal habitats.
- 3.1.4: Coastal and Great Lakes biodiversity, habitats, and ecosystem functions and services are restored and sustained.
- 3.1.5: Collaborative and inclusive planning and decision-making leads to enhanced stewardship and community benefits, especially for the most vulnerable.

#### **Goal 4: Land, water, and living resources are managed by applying science, tools, and services to sustain resilient coastal and Great Lakes ecosystems.**

*ACTION 4.1: Support a science- and management-driven framework that integrates research, observations, monitoring, and modeling and that includes community engagement and traditional and local knowledge to provide a scientific basis for informed decision-making.*

##### **DESIRED OUTCOMES:**

- 4.1.1: Inclusive collaborations with diverse partners and other interested parties support planning, research, and innovative solutions to address coastal and Great Lakes resource management needs, especially for vulnerable communities.
- 4.1.2: Community science initiatives are utilized and contribute to improving knowledge with respect to stewardship of ecosystems and their contributions to coastal and Great Lakes communities and economies.
- 4.1.3: Coastal and Great Lakes communities and resource managers have access to and use science, data, tools, and training to be effective in planning and decision-making processes.
- 4.1.4: Resource managers understand the risks, options, tradeoffs, and impacts of their decisions.

*ACTION 4.2: Identify and advance successful strategies that enhance resilient ecosystems and watersheds in the context of changing conditions, including environmental variability and climate change.*

DESIRED OUTCOMES:

- 4.2.1: Communities share, access, understand, and use information regarding projected changes and related impacts within ecosystems.
- 4.2.1: Communities can apply knowledge from case studies, training, and tools to improve their ability to plan, prepare, and adapt to environmental variability and climate change.

**Focus Area: Sustainable Fisheries and Aquaculture**

Pennsylvania's fisheries are complex webs of fish populations, their aquatic environment, and the people who use and enjoy them. These fisheries are under stress and innovative approaches are needed to manage and sustain them. The Lake Erie, Delaware River, and Susquehanna River fisheries have been important fisheries for centuries. As the climate and ecosystems change, fish populations will also change, which may result in impacts to the economies that rely on fisheries. Pennsylvania Sea Grant will work with fishing operators and businesses, anglers, scientists, and managers to address key fisheries issues including fish biology and population dynamics, fish health, habitat and ecosystem health, the potential impacts of climate change, and socioeconomic impacts.

**Sustainable Fisheries and Aquaculture Goals, Actions, and Outcomes**

*Note: The National Sea Grant College Program 2024-2027 Strategic Plan includes Goal 5 (and associated actions and outcomes) related to commercial aquaculture and harvesting, which Pennsylvania Sea Grant will not focus on during this strategic planning cycle.*

**Goal 6: Natural resources are sustainably managed to support coastal communities and working waterfronts, including commercial, recreational, subsistence fisheries, and aquaculture.**

*ACTION 6.1: Ensure the best available science, services, and tools are available to and trusted by resource managers, fishing and aquaculture communities, and consumers.*

DESIRED OUTCOMES:

- 6.1.1: Commercial and recreational fishers and aquaculturists are knowledgeable about efficient, sustainable, and responsible tools, techniques, and uses of coastal and freshwater resources.
- 6.1.2: Resource managers and fishing and aquaculture communities have access to and share diverse knowledge and tools to increase their capability to adapt to changing resource management needs, including those driven by climate change.
- 6.1.3: Consumers understand the health and sustainability benefits of domestically produced seafood and use that knowledge to inform their seafood purchasing decisions.

**Focus Area: Resilient Communities and Economies (RCE)**

Pennsylvania's communities in the Lake Erie, Susquehanna River, and Delaware Estuary watersheds provide vital economic, social, and recreational opportunities for millions of residents and visitors alike. These watersheds are experiencing development pressures, even in those locations experiencing no population growth. This development transforms natural habitats into urban or suburban landscapes and intensifies the use of finite coastal resources.

Population increases and urbanization result in greater vulnerability of communities and environments to hazards. Natural hazards include hurricanes, tornados, extreme rain and flooding events, blizzards, droughts, and heat waves. Technological hazards include chemical and oil spills, and even nuclear reactor accidents.

Accommodating growing populations or land use development while also stabilizing demands on coastal resources and community resilience requires the development and implementation of innovative management policies and technologies. Pennsylvania Sea Grant will continue to support innovative education, research, and outreach efforts in the areas of marine-related energy sources, climate change, coastal processes, energy efficiency, hazards, stormwater management, and tourism. Pennsylvania Sea Grant will engage Pennsylvanians in applying the best-available scientific knowledge in order to address increased demands on vulnerable coastal resources.

Pennsylvania Sea Grant will continue to support the development of resilient coastal communities that sustain vibrant economies, effectively respond to and mitigate natural and technological hazards, and function within the limits of their ecosystems.

#### **Resilient Communities and Economies Goals, Actions and Outcomes:**

**Goal 7: Coastal and Great Lakes communities have the capability and resources to prepare for and adapt to extreme and chronic weather and coastal hazards, climate change, economic disruptions, and other threats to community health and well-being.**

*Action 7.1: Improve and expand exchanges of knowledge to better identify the diverse needs of communities and to increase the public's understanding of changing conditions and related impacts.*

##### **DESIRED OUTCOMES:**

- 7.1.1: Scientific understanding, including traditional and local knowledge, provides foundational information, and all community members understand the impacts of changing conditions and coastal hazards and have the capability to prepare, respond, and adapt.
- 7.1.2: Community leaders improve their understanding of changing conditions and coastal hazards and their capability to implement mitigation and adaptive strategies.

*ACTION 7.2: Work with communities to advance collaborative comprehensive planning, actionable science, and adaptive management strategies.*

##### **DESIRED OUTCOME:**

- 7.2.1: Inclusive collaborations with diverse stakeholders and partners support mitigation and adaptation efforts built on knowledge from and responsive to the needs of all, especially the most vulnerable.

*ACTION 7.3: Work with communities to explore and support diversification, strengthening, sustainability, and social equity within coastal economic sectors and the blue economy.*

##### **DESIRED OUTCOMES:**

- 7.3.1: Coastal and Great Lakes communities have access to and share knowledge, tools, services, and technologies to adapt and grow resilient economies.
- 7.3.2: Leaders in coastal and Great Lakes economic sectors understand how they can become

more resilient through diversification including expanded renewable, regenerative, and clean practices.

**Goal 8: Water resources are enhanced, sustained, and protected to meet existing and emerging needs of the communities and economies that depend on them.**

*ACTION 8.1: Use engagement and information exchange to advance the understanding of how actions impact water quality, quantity, and availability.*

DESIRED OUTCOME:

- 8.1.1: Community members understand watershed and coastal functions and the ecosystem services they provide, understand how their actions will impact water resources, and are able to make informed decisions.

*ACTION 8.2: Collaborate with diverse partners and interested parties, especially the most vulnerable, to advance plans and management practices for protecting and managing water resources.*

DESIRED OUTCOMES:

- 8.2.1: Communities work with knowledge networks to share and access science, data, tools, and services to anticipate changes in water resources, to protect and sustain water resources, and to make informed decisions.
- 8.2.2: Communities have diverse, sustainable economies and industries that support existing and emerging water resource needs.

**Appendix A: Pennsylvania Sea Grant Performance Measures and Metrics**

<b>Focus Area</b>	<b>Performance Measures</b>
HCE	Number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities.
HCE	Number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities
SFA	Number of fishers, seafood processors, aquaculture industry personnel, or seafood consumers who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities
RCE	Number of communities that adopt/ implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities
RCE	Annual number of communities that adopt/implement hazard resilience practices to prepare for and respond to/minimize coastal hazardous events.
ELWD	Number of Sea Grant products that are used to advance environmental literacy and workforce development.
ELWD	Number of people (youth and adults) engaged in Sea Grant-supported nonformal education programs
ELWD	Number of Sea Grant supported graduates who become employed in a job related to their degree within two years of graduation.
Cross Cutting	Number of Sea Grant tools, technologies, and information services that are used by our partners/customers to improve ecosystem-based management.
Cross Cutting	Economic and societal impacts and benefits derived from Sea Grant activities (market and non-market; jobs and businesses created or sustained; patents/licenses)
<b>Focus Area</b>	<b>Performance Metrics</b>
Cross Cutting	Sea Grant Staffing: Number of individuals and full-time equivalents (FTEs) devoted to Sea Grant
Cross Cutting	Core Funding Proposals: Number and origination of core funding pre- and full-proposals.
Cross Cutting	Number of volunteer hours.
Cross Cutting	Number of postsecondary students and degrees financially-supported by Sea Grant in higher education programs (Undergraduate, Graduate)
Cross Cutting	Number of P-12 Students who participated in Sea Grant-supported formal education programs
Cross Cutting	Number of P-12 students reached through Sea Grant-trained educators
Cross Cutting	Number of P-12 educators who participated in Sea Grant-supported professional development programs
Cross Cutting	Number of individuals certified or recertified in Hazard Analysis Critical Control Point (HACCP) as a result of Sea Grant activities
Cross Cutting	Number of peer-reviewed publications produced by Sea Grant

Cross Cutting	Number of individuals and full-time equivalents (FTEs) by Sea Grant
Cross Cutting	Number of Sea Grant- sponsored/ organized events
Cross Cutting	Number of attendees at Sea Grant- sponsored/ organized events
Cross Cutting	Number of public or professional presentations
Cross Cutting	Number of attendees at public or professional presentations
Cross Cutting	Number of peer-reviewed publications produced by Sea Grant
Cross Cutting	Visitor Attendance: Number of people that visit museums, aquariums, and other informal education institutions hosting NOAA-supported exhibits or programs.
Cross Cutting	Environmental Actions: Number of people participating in environmental actions through NOAA education programs