



PENNSYLVANIA SEA GRANT 2018-2021 STRATEGIC PLAN

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 Erie the Behrend College received funding from NOAA to initiate a highly focused Sea Grant outreach project related to coastal Pennsylvania in the Lake Erie watershed. Penn State established the Pennsylvania Sea Grant program (PASG) 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 PASG's direction and plan for 2018-2021. 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 PASG to promote the sustainability of Pennsylvania's ecological and economic coastal and watershed resources through science-based research, education, and outreach.

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

- Penn State should lead the Sea Grant effort for Pennsylvania;
- 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, PASG expanded its influence statewide to include three diverse coastal regions: the Lake Erie, Delaware River, and Susquehanna River watersheds. In summer 2009, again based on performance, NSGO leadership designated PASG an Institutional Program, which included a broader state mandate and an expanded research program.

In February 2014, PASG petitioned the NSGO to begin the process for designation as a Sea Grant College. To this end, a NOAA team evaluated PASG 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 PASG's continuous growth and achievements and formally designated PASG a Sea Grant College.

PASG 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. PASG 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.

PASG, with input from local and statewide advisors, provides leadership in four core program areas - outreach, education, communication, and research. Hallmark activities include aquatic invasive species prevention and policy; terrestrial invasive species control; coastal bluff research and outreach, land conservation, pharmaceuticals and personal care product pollution prevention; Areas of Concern research and policy expertise, especially related to fish tumors and contaminated sediment; marine debris research and prevention, ecosystem resiliency research, nonpoint source pollution prevention, watershed and wetland restoration and monitoring; and hazard 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:

National Sea Grant College Program Vision: Sea Grant envisions thriving coastal ecosystems and communities that are supported by an engaged public and informed decision-makers.

Pennsylvania Sea Grant Program Vision: Pennsylvania Sea Grant envisions coasts and watersheds, and the communities that surround them, that are healthy, sustainable, and

resilient. Pennsylvania Sea Grant envisions community residents and decisions-makers that are informed and engaged to improve Pennsylvania's coastal and watershed resources.

Mission:

To promote the sustainability of Pennsylvania's ecological and economic coastal and watershed resources through science-based research, education, and outreach.

Core Values

Core values that will continue to guide the behavior and actions of the National Sea Grant College Program are:

- *Visionary* - Advance innovative solutions that address emerging challenges (science and stewardship) and encourage creativity, initiative and innovation.
- *Collaborative* – Seek partnerships that leverage our strengths. Be responsive and accessible, respect partners, maintain scientific neutrality, integrate diverse expertise and provide the science and knowledge needed to inform stakeholders.
- *Dedicated to Sustainability* - Communicate the importance of good stewardship and the value of the services that the coastal, ocean, and Great Lakes' ecosystems provide to the Nation.
- *Accountable* - operate with integrity and transparency; maintain quality and relevance in administration, management and oversight.

In addition to the National Sea Grant College Program core values, PASG 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 activity-based learning.
- Foster collaboration with and among stakeholders 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 PASG research and collaborative efforts.
- Utilize a broad base of funding sources including public and private sources that are consistent with the program's mission.
- Collaborate with partner organizations, and seek new partnerships that build on PASG'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 2018-2021 Strategic Plan that will help enhance the College Program's capabilities to meet future needs.

- Cultivate Partnerships - Sea Grant will integrate the expertise and capabilities of our partners from the international, federal, tribal, and state communities and from academia and nongovernmental organizations.
- Enhance Diversity & Inclusion – Sea Grant will seek and welcome diverse perspectives and viewpoints in order to enhance cultural understanding and enable the network to pursue its vision and mission effectively and efficiently.

PASG 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

Program priorities for this strategic plan were developed with input from the Statewide Advisory Council and local advisory boards. These advisors represent many of PASG's key stakeholder groups including agencies, businesses, non-profits, academia, and the public. In June 2016, the statewide and local councils, as well as various stakeholders, were surveyed to provide input about focus areas and topics where PASG should focus its activities in 2018-2021, and survey findings are reflected in this strategic plan. PASG also considered regional and state plans such as the Delaware Estuary Program Comprehensive Conservation Management Plan and the Pennsylvania Lake Erie Watershed Integrated Water Resources Management Plan to identify shared priorities and collaborative opportunities. PASG staff and advisors will review drafts to help further refine the 2018-2021 PASG Strategic Plan. In addition, PASG's plan articulated below fully aligns with the NOAA National Sea Grant College Program's strategic goals.

Since stakeholder, advisor, and staff feedback are gathered on an ongoing basis, PASG considers its strategic plan a working document, maintaining flexibility to incorporate emerging coastal issues and changing directions of NOAA, NSGO, Pennsylvania, and other collaborators.

PASG Focus Areas

This strategic plan follows the outline set forth by the National Sea Grant Strategic Plan for 2018-2021. It does, however, diverge from the National Plan in that PASG will focus on three critical focus areas rather than four as outlined in the national plan.

The National Sea Grant Strategic Plan identifies these four critical focus areas: Healthy Coastal Ecosystems, Resilient Communities and Economies, Sustainable Fisheries and Aquaculture, and Environmental Literacy and Workforce Development. After much consideration PASG staff, stakeholders and advisors determined that "Sustainable Fisheries

and Aquaculture” is not currently a high-priority issue in Pennsylvania, and as such has decided not to include it in the strategic plan at this time.

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

The 2018-2021 PASG Strategic Plan will work to address the following focus areas:

- Healthy Coastal Ecosystems
- Resilient Communities and Economies
- Environmental Literacy and Workforce Development

Goals and Outcomes

PASG’s strategic plan reflects the input of its stakeholders and advisors, and aligns closely with the goals and evaluation measures of the 2018-2021 NOAA National Sea Grant College Program Strategic Plan. Below are the National Outcomes and Performance Measures this Pennsylvania Sea Grant plan will help to fulfill:

(Focus area goals and outcomes from National SG Strategic Plan, Dec. 16 draft)

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. These ecosystems include 77 miles of Lake Erie coastline, 57 miles of tidal Delaware River coast, and the Susquehanna River, the largest tributary to the Chesapeake Bay. 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, climate change and other human activities leading to water quality degradation, increased demands on water supplies, changes to fisheries stocks, wetlands loss, proliferation of invasive species, and a host of other ecological impacts. It is essential for decision-makers to understand the interconnectedness and interactions of these systems in order to maintain vital habitats and inform restoration efforts within ecosystems and watersheds.

Keeping coastal 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 kinds 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. They also require understanding of the characteristics of species, landscapes, and their interactions within each ecosystem. Pennsylvania Sea Grant is a leader in regional approaches to understanding and maintaining healthy coastal ecosystems, 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

HCE GOAL 1: Habitat, ecosystems, and the services they provide are protected, enhanced, and/or restored.

HCE ACTION 1.1: Develop and share scientific understanding, decision-support tools, technologies, and approaches to protect and restore ecosystems.

- HCE DESIRED OUTCOME 1.1.1: Scientific understanding and technological solutions inform and improve conservation and the management of natural resources.
- HCE DESIRED OUTCOME 1.1.2: Ecosystem science and conservation priorities developed through stakeholder participation are addressed.
- HCE DESIRED OUTCOME 1.1.3: Greater awareness and understanding of ecosystem functions and services they provide improves stewardship efforts.

HCE ACTION 1.2: Sustain the habitat, the biodiversity, and the abundance of coastal ecosystems, fish, wildlife, and plants.

- HCE DESIRED OUTCOME 1.2.1: Declining biodiversity, habitats, and ecosystem functions and services are restored and sustained.
- HCE DESIRED OUTCOME 1.2.2: Improved collaborative planning and decision-making leads to enhanced stewardship.

HCE GOAL 2: Land, water, and living resources are managed by applying sound science, tools, and services to sustain ecosystems.

HCE ACTION 2.1: Support a sound science- and management-driven framework that integrates observations, monitoring, research, and modeling to provide a scientific basis for informed decision-making.

- HCE DESIRED OUTCOME 2.1.1: Collaborations with partners and stakeholders support planning, research and technological solutions to address resource management needs.
- HCE DESIRED OUTCOME 2.1.2: Citizen science initiatives are engaged and contribute to improving our knowledge with respect to coastal communities and ecosystems.
- HCE DESIRED OUTCOME 2.1.3: Communities have access to sound science, data, tools, and the training to be effective in planning and decision-making processes.
- HCE 2.1.4 DESIRED OUTCOME: Resource managers understand the risks, the options, tradeoffs, and impacts of their decisions.

HCE ACTION 2.2: Identify and promote case studies and strategies that enhance resilient ecosystems and watersheds in the context of changing conditions.

- HCE DESIRED OUTCOME 2.2.1: Communities have access to information and understand projected changes within coastal ecosystems and how changes will impact coastal ecosystems.
- HCE DESIRED OUTCOME 2.2.2: Communities can access case studies, training and tools to improve their ability to plan, prepare and adapt to future ecosystem conditions.

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 local residents and visitors alike. These watersheds are experiencing development pressures, even in those locations experiencing no population growth. This development transforms natural coastal habitats into urban or suburban landscapes and intensifies the use of finite coastal resources.

Population increases and urbanization of rural areas result in greater vulnerability of coastal 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 urbanizing land use development while also stabilizing demands on coastal resources and community resilience requires the development and implementation of innovative management policies and technologies. PASG 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. PASG will engage Pennsylvanians in applying the best-available scientific knowledge in order to address increased demands on vulnerable coastal resources.

PASG will continue to support the development of resilient coastal communities that 1) sustain vibrant economies, 2) effectively respond to and mitigate natural and technological hazards, and 3) function within the limits of their ecosystems.

Resilient Communities and Economies Goals, Actions and Outcomes:

RCE GOAL 1: Coastal communities use their knowledge of changing conditions and risks to become resilient to extreme events, economic disruptions, and other threats to community well-being.

RCE ACTION 1.1: Use innovative tools to increase the public's awareness of changing conditions and the potential impacts their communities, economies and ecosystems may encounter.

- RCE DESIRED OUTCOME 1.1.1: Members of the community, including the underserved, are aware of and understand changing conditions and hazards and the implications to their communities, and are prepared to respond, and adapt.

- RCE DESIRED OUTCOME 1.1.2: Existing and innovative training programs improve community leaders' understanding of changing conditions in their communities and implement adaptive strategies.

RCE ACTION 1.2: Utilize comprehensive planning and adaptive management strategies to enhance community resilience and adapt to hazards and changing environmental and socioeconomic conditions.

- RCE DESIRED OUTCOME 1.2.1: Communities have access to information needed to understand the factors impacting ecosystems and participate in adaptive management planning.
- RCE DESIRED OUTCOME 1.2.2: Communities employ adaptive management strategies and apply tools to engage diverse members of the community to improve resilience and community sustainability.

RCE ACTION 1.3: Increase the resilience of coastal communities through diversification, growth, and strengthening of coastal economic sectors.

- RCE DESIRED OUTCOME 1.3.1: Members of the community, including the underserved, have access to information needed to understand how coastal economic activities and trends will impact environmental and community well-being.
- RCE DESIRED OUTCOME 1.3.2: Communities have access to tools, services, and technologies to adapt and grow resilient economies.
- RCE DESIRED OUTCOME 1.3.3: Leaders in coastal economic sectors understand how they can become more resilient through diversification and through conservation of ecosystem resources and the services they provide.

RCE GOAL 2: Water resources are sustained and protected to meet existing and emerging needs of the communities, economies, and ecosystems that depend on them.

RCE ACTION 2.1: Inform community members about how actions impact water quality and availability.

- RCE DESIRED OUTCOME 2.1.1: Community members understand watershed functions and the services they provide that support communities and economies.
- RCE DESIRED OUTCOME 2.1.2: Community members understand how actions will impact water quality and quantity and are able to make informed decisions.

RCE ACTION 2.2: Collaborate with stakeholders to develop and share best management practices and measures to protect and manage water resources.

- RCE DESIRED OUTCOME 2.2.1: Communities have access to sound science, data, tools, and services to understand and anticipate changes in water quality and quantity.
- RCE DESIRED OUTCOME 2.2.2: Communities have diverse, sustainable economies and industries that support the existing and emerging water resource needs.
- RCE DESIRED OUTCOME 2.2.3: Communities have access to science, tools, and technologies to protect and sustain water resources and make informed decisions.

Focus Area: Environmental Literacy and Workforce Development (ELWD)

It will take a workforce literate in science, technology, engineering, and mathematics to protect and sustain Pennsylvania's coastal resources. To develop an environmentally literate citizenry, educational programs are needed to improve the understanding of how personal actions contribute to pollution, climate change, invasive species, habitat destruction, and other problems. It will take educated, involved citizens and coordinated management to preserve, protect, develop, enhance, and restore limited resources to sustain current and future generations.

PASG strives to promote stewardship of limited coastal resources in all formal and informal learning opportunities – a key to sustaining Pennsylvania coastal resources. By partnering with federal, state, and local organizations, informal educators, schools, and colleges, PASG is able to reach critical audiences and maximize limited educational resources. PASG utilizes a variety of delivery methods including shipboard programs, workshops, online forums, distance learning, and online and print publications, such as social media, website, factsheets, maps, posters, booklets, and others. PASG also provides news outlets and readers with the best available coastal and environmental science such as the “News In Education (NIE)” page presented weekly in the Erie Times-News print and online newspaper.

Kinesthetic learning opportunities are the hallmark of PASG K-12 program success, including activities such as shipboard education, drift buoy projects, fish habitat restoration, summer field studies, underwater robotics, online forums, watershed investigations, and fishing programs. Educators and student will continue to benefit from place-based science to meet Pennsylvania's Environment and Ecology curriculum standards.

Through PASG programs, participants learn by changing behavior and taking actions like creating rain gardens to help control stormwater and soil erosion, recycling instead of tossing, choosing to purchase safer and greener products, and properly disposing of unused medicines. Environmentally literate citizens will become stewards who protect and restore precious coastal resources.

Environmental Literacy and Workforce Development Goals, Actions and Outcomes:

ELWD GOAL 1: An environmentally literate public that is informed by lifelong formal and informal opportunities that reflect the range of diversity of the Nation's coastal communities.

ELWD ACTION 1.1: Enable the public to engage in community planning processes with respect to adaptive management to changing conditions by providing the best available information.

- ELWD DESIRED OUTCOME 1.1.1: Communities are knowledgeable and equipped with the best available science and technology in order to contribute to adaptive management planning processes and stewardship.

ELWD ACTION 1.2: Increase effective environmental literacy instruction for K-12 students by formal and informal educators.

- ELWD DESIRED OUTCOME 1.2.1: Teachers and students are better informed in science, technology, engineering, and mathematics fields and can employ their knowledge to support sustainable practices within their communities.

ELWD ACTION 1.3: 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.

- ELWD DESIRED OUTCOME 1.3.1: Stakeholders develop a sense of awareness, understanding and stewardship in order to sustain watershed, coastal, and marine ecosystems and resources.
- ELWD DESIRED OUTCOME 1.3.2: Communities implement sustainable strategies when managing natural resources and make decisions based on information acquired through informal science education.

ELWD GOAL 2: A diverse and skilled workforce is engaged and enabled to address critical local, regional, and national needs.

ELWD ACTION 2.1: Grow awareness among the nation's diverse population of career paths that support the needs of the nation's coastal communities.

- ELWD 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 the nation's coastal communities, economies, and ecosystems.

ELWD ACTION 2.2: Increase opportunities for undergraduate and graduate students to gain knowledge and experience in the science and management of watershed, coastal, and marine resources.

- ELWD DESIRED OUTCOME 2.2.1: College level courses and internships provide increased literacy, experience, and preparedness in areas of watershed, coastal, and marine ecosystems for all students including those from underrepresented groups.
- ELWD DESIRED OUTCOME 2.2.2: Undergraduate and graduate students including those from underrepresented groups, are supported and have access to formal and experiential learning, training, and research experiences.