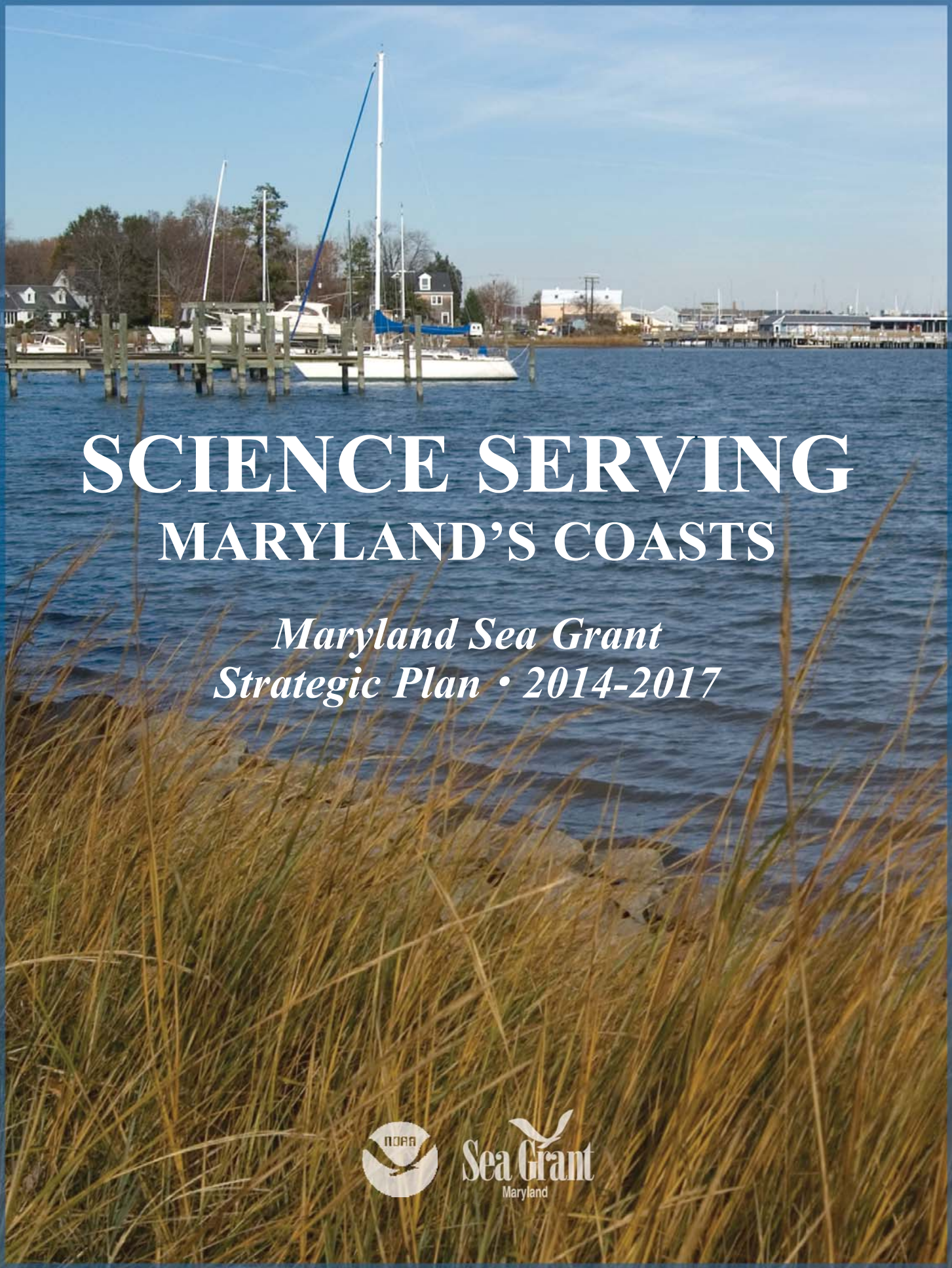

SCIENCE SERVING
MARYLAND'S COASTS

Maryland Sea Grant
Strategic Plan • 2014-2017

NOAA

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Introduction

For Marylanders, the health of the Chesapeake Bay is a "quality of life" issue. The Chesapeake watershed reaches into all of Maryland's counties, drains 93 percent of our land, and dominates our history, ecology and economy. No other state is so closely tied to the fate and future of the Chesapeake Bay.

It should be no surprise that the multi-state drive to restore the Bay ecosystem began in Maryland. Over 25 years, that effort has created a complicated coalition of federal and state agencies, non-governmental organizations, local municipalities and universities drawn from six states and the District of Columbia. That alliance not only faces long-standing challenges like the increasing urbanization of the watershed but it now confronts a gathering public perception that those agencies charged with caring for the Bay have made insufficient progress during the past two decades. In this complex environment, Maryland Sea Grant occupies a unique niche and plays an important role in addressing critical watershed, coastal, and marine science-based issues concerning environmental conservation, restoration, and sustainability in the region.

Mission, Vision, and Values

The Maryland Sea Grant College is a partnership between the National Oceanic and Atmospheric Administration (NOAA) and the University System of Maryland, a partnership that serves the state of Maryland and is administered by the University of Maryland Center for Environmental Science.

Our Mission

Maryland Sea Grant's mission is to conduct a locally responsive and nationally eminent program that advances the sustainable use and conservation of coastal, marine, and watershed resources in Maryland, in the Mid-Atlantic region, and in the nation. Our approach is threefold: we develop research that addresses key questions in environmental management, we support and enrich marine education from elementary through graduate school, and we organize outreach efforts that clarify for key audiences the applications of research findings to science-based management of our estuarine and coastal ecosystems.

Our Vision for 2014-2017

Our work will focus on the environmental and economic health of the Chesapeake Bay, its watershed, and Maryland's coastal waters. We will engage the talent and resources of the academic and research communities in Maryland, creating a strong program that addresses current issues and anticipates future directions. By integrating their research findings with outreach and education projects, we will support the conservation and restoration of coastal resources, advance sustainable economic opportunities, and serve as a highly credible source of information for multiple audiences. In our roles as "honest brokers," we will provide a neutral forum for the lively discussion of problems, solutions, and creative ideas. By connecting the research and policy communities, we help to integrate policy needs into research projects and to insert research findings into policy, advancing science-based decision-making.

Our Values

Maryland Sea Grant is committed to serving the needs of diverse constituencies. We strive to:

- Engage those groups dedicated to restoring and sustaining Chesapeake Bay, its watershed, and Maryland's coastal waters.
- Catalyze translational science to address human-nature interactions.
- Transfer scientific knowledge through outreach to inform decision-making, to develop new products, and to foster new economic opportunities.
- Deliver innovative education for Maryland's citizens of all ages to foster scientific understanding of coastal, marine, and scientific processes and to build a knowledgeable workforce.
- Expand our efforts to engage at regional and national scales.
- Develop the professionalism of our colleagues, maintain the responsible management of our program, and achieve organizational excellence for serving our stakeholders.

Strategic Planning for 2014-2017

Since it began in 1977, Maryland Sea Grant has focused its research, education, and outreach work on the Chesapeake Bay, its watershed, and on our coastal bays. Our research over these decades has addressed gaps in the knowledge needed for science-based management that could restore water quality and achieve sustainable commercial and recreational fisheries for species such as blue crabs, oysters, and finfish. Our outreach work has engaged multiple audiences to help inform and advance this important regional effort in ecosystem restoration.

Science and Policy Needs

As we move forward with our planning for 2014-2017, our program is now responding to several recent federal and state initiatives designed to speed up the restoration of ecological health for the Chesapeake Bay and for the coastal waters of the Mid-Atlantic region. Those efforts include:

- *The Chesapeake Action Plan (CAP).* In response to concerns about the slow progress in restoring the Chesapeake Bay, at the request of Congress the EPA's Chesapeake Bay Program, working with its state agencies and non-governmental partners, developed the Chesapeake Action Plan (CAP) for the remaining years of the *Chesapeake 2000* agreement. The CAP outlined strategies for Bay restoration and provided targets for restoration, conservation, and sustainability goals that embrace an adaptive management process. http://cap.chesapeakebay.net/index.htm.

- *Chesapeake Bay Executive Order.* In 2009, President Obama issued this Executive Order that called on federal agencies to develop a strategy to restore the Chesapeake Bay and its watershed. This new strategy includes "using rigorous regulations to restore clean water, implementing new conservation practices on 4 million acres of farms, conserving 2 million acres of undeveloped land, and rebuilding oysters in 20 tributaries of the bay." http://executiveorder.chesapeakebay.net.

- *Chesapeake Bay TMDL.* The Chesapeake Bay Total Maximum Daily Load (TMDL) was established in December 2010. As required under the Clean Water Act, the TMDL set specific limits on nutrient and sediment inputs to the Bay. Additionally, Watershed Implementation Plans (WIPs) detail how and when states must meet their TMDL allocations. Further, meeting the TMDL requirements is a keystone commitment of the federal agencies' strategy in response to the Executive Order. http://www.epa.gov/chesapeakebaytmdl.

- *BayStat.* In Maryland, Governor Martin O'Malley instituted BayStat, an interagency program that assesses, coordinates, and targets Maryland's Chesapeake restoration programs; improves transparency and accountability in state agencies; and sets targets and measures performance in meeting Bay restoration goals. By cutting across multiple state agencies, BayStat is designed to track the current status of the Bay, the effectiveness of state actions, and help set strategies for future actions. http://www.baystat.maryland.gov.

- *National Ocean Policy*. Established by Presidential Executive Order in 2010, this action set a national course for developing a comprehensive, integrated National Ocean Policy for the stewardship of the ocean, our coasts, and the Great Lakes.

- *Maryland Climate Action Plan*. Developed by the Maryland Climate Change Commission, this action plan calls for Maryland state agencies to pursue 42 mitigation strategies and 19 adaptation strategies.

- *Maryland Greenhouse Gas Emissions Reduction Act.* Maryland's stringent climate legislation requires a 25-percent cut from 2006 levels of greenhouse gas emissions by 2020.

- *Marine and Coastal Ecosystem-Based Management (EBM)*. The ongoing evolution and adoption of an integrated whole-system approach will help ensure sustainable coastal resources, especially when coupled with an "adaptive management" that quickly translates new scientific findings about ecosystem function into new management strategies.

- *Mid-Atlantic Ocean Research Plan.* Released in October 2012, the plan emerged out of four years of consultation with numerous stakeholders and comprehensive analysis of existing data. It identifies priority research needs associated with ocean and coastal issues in the mid-Atlantic region such as climate change impacts, offshore energy development, water quality concerns, ecosystem structure and function, and the human dimensions of ocean and coastal management. http://www.midatlanticoceanresearchplan.org.

Aligning with Our Partners

Our 2014-2017 strategic plan shares key themes and values with the strategic plans of those organizations that fund, oversee, and collaborate with our program. Maryland Sea Grant is defined by its position as a Congressionally mandated program, overseen by a federal government entity, the National Sea Grant Office (NSGO) of the National Oceanic and Atmospheric Administration (NOAA), and administered through the University of Maryland Center for Environmental Science (UMCES). Our ultimate effectiveness as a program depends on understanding the priorities and strengths articulated in these other plans as a way to help us clearly define our niche and articulate our priorities.

Strategic Plans of our Partners. Our essential federal-state partnership forms the foundation of Maryland Sea Grant's work, requiring us to align our strategic plan with the NSGO, the University System of Maryland, UMCES, and the Cooperative Extension Program administered by the University of Maryland College Park. With our goals, as noted below, clearly aligned with those of our key partners, we are in a strong position to collaborate closely.

- ***The NOAA National Sea Grant Office.*** Starting with our 2010-2013 strategic plan, the National Sea Grant Office has encouraged us to align our strategic plan with the

NSGO strategic plan. For our 2014-2017 strategic plan, Maryland Sea Grant is encouraged to organize our work in four focus areas that advance eleven goals. This framework outlines the Sea Grant network contribution to issues of national importance and is consistent with the NSGO 2014-2017 plan. As organized in our strategic plan, those national goals, in fact, align closely with our projects, strategies, and expected outcomes.

- ***University System of Maryland.*** The 2010-2020 strategic plan for the University System of Maryland places priority on creating and applying knowledge "to advance the state's economy and to improve the quality of life for Maryland's residents." Maryland Sea Grant reflects the USM plan through our work on preparing and retaining teachers for Science, Technology, Engineering, and Mathematics (STEM) courses in K-12 education and through our support for research and outreach on state environmental issues.

- ***University of Maryland Extension (UME).*** The University of Maryland College Park (UMCP) and the University of Maryland Eastern Shore (UMES) are the two land-grant campuses within the University System that have historically housed key components of the state's Cooperative Extension Service. Administered through the College of Agriculture and Natural Resources at UMCP, the extension service has for more than 120 years embraced a strategy and vision highlighting engagement, partnerships, collaboration, and multidisciplinary efforts to reach and impact the greater community. Since 1977 Maryland Sea Grant has partnered with UME to provide marine extension agents and specialists who advance environmental stewardship of the Chesapeake and coastal bays watersheds, always with the common mission of "helping people help themselves." The 2009 UME strategic plan highlights the synergies with Maryland Sea Grant through its initiatives in natural resource conservation and sustainability, resilient communities, and STEM education — directly linking their agents with the goals, outcomes and strategies in the Maryland Sea Grant strategic plan.

- ***The University of Maryland Center for Environmental Science (UMCES).*** Maryland Sea Grant is administered by UMCES and shares many of its priorities and purposes. According to the UMCES strategic plan, "Focus on the Future," the center's mission is to "lead, coordinate, and catalyze environmental research and education within the University System of Maryland." The priorities in the strategic plan for Maryland Sea Grant focus on three of the strategic areas listed in the UMCES plan: (1) science to support ecosystem-based management, (2) multi-scale ecosystem restoration, and (3) regional consequences of climate change and variability. In addition, both MDSG and UMCES share an overriding focus on supporting the conservation, restoration, and sustainability of Maryland waters from the mountains to the sea.

- ***Other Research Partners.*** Maryland Sea Grant also recognizes the strategic plans of our other institutional partners within the University System of Maryland and in the broader academic and research community, including institutions such as Johns Hopkins University, Smithsonian Environmental Research Center, St. Mary's

College, and Morgan State University. In general terms, their plans also share a strong connection to issues of importance in the Chesapeake and coastal bays and their watersheds.

Aligning with Policy Partners. Working with partners outside of academe is critical to Maryland Sea Grant's mission of improving the health of the Chesapeake and coastal bays. One of our primary partners is the Chesapeake Bay Program, a program administered by the Environmental Protection Agency that leads the multi-state effort to restore the Bay and defines many of the key steps to be taken in that quest. Other important partners and collaborators include the NOAA Chesapeake Bay Office and numerous Maryland state agencies, including the Departments of Natural Resources, Environment, Planning, and Agriculture. In addition, we are open to opportunities to work with non-governmental organizations who serve as critical advocates for conservation and restoration of the Bay and its watershed.

Aligning with Regional Partners. Maryland Sea Grant has a history of collaborating closely with Sea Grant programs in Virginia and Delaware to draw on the expertise of their scientists and to leverage joint funding for regional research projects. Past examples of regional research and outreach efforts include a better understanding of blue crab recruitment patterns, a project to reduce the spread of aquatic invasive species through live bait transport, and a research investigation of the physics of rip currents coupled with outreach education among lifeguards and beach goers — all of which demonstrate our long-standing commitment to extend our influence beyond our state borders. Regional partnerships strengthen the quality of the research we support and extend our outreach to many more audiences.

Strategic Management

The role of program management is to engage the diverse talent of Maryland's academic and scientific communities and to link this expertise to diverse constituencies.

Our management approach works through an organizational structure that allows us to clarify for a variety of key audiences the implications and applications of research findings. Our extension program includes agents and specialists trained in translating science to audiences in seafood industries, marine trades, county and city planning, science education, and resource management. And our communications program focuses on interpreting, synthesizing, and translating science to broader publics through print, the web, and broadcast television. The result: from industry, to management, to schoolchildren, Maryland Sea Grant is able to reach and inform multiple audiences engaged in issues critical to the future of the Chesapeake Bay region.

We work through a "portfolio" approach, where we connect our core support activities — research, outreach, education — in a concerted fashion to push for effective resolution of important issues. In addressing targeted issues, we stress the importance of active, productive partnerships, open lines of communication, and willingness to leverage input and resources from

many quarters. For this approach to work, Sea Grant leadership must carefully consider which issues we can address within our resources and capacity.

Setting Priorities. For identifying appropriate issues and ranking their importance, the first step is answering the following questions:

- Does the issue fall within Maryland Sea Grant's mission and would it be an appropriate university-based activity?
- Is the issue important to the region and to the program's stakeholders?
- Can innovative science make a contribution and is there reasonable probability of achieving significant progress within the typical funding limitations of Maryland Sea Grant?
- Will Maryland Sea Grant support make a meaningful contribution toward addressing the issue with a demonstrable application and impact?
- Will the issue remain "unaddressed" without our involvement?
- Are the talent and expertise available in Maryland or in the region to address the issue?
- Would support from Sea Grant enhance, directly or indirectly, the talent base for marine and coastal issues?

Serving the Region. Once we've identified our targets, we are able to play a leadership role in advancing science-based decision-making for environmental issues that affect the region. Our well-established academic base enables us to investigate controversial marine issues by convening teams of scientists, managers, and stakeholders to review the literature and debate policy options. Through these synthesis and facilitation projects, we act as an ***integrator***, connecting research with policy analysis and creating ***neutral and objective forums*** for use by the larger stakeholder community. Because Sea Grant has neither regulatory nor rule-making responsibility, we serve as an honest broker to help resolve emerging environmental conflicts.

Our commitment to advancing science-based environmental management extends beyond the state, leading to collaborative alliances and projects with neighboring Sea Grant Programs and with communities in the Mid-Atlantic. Stronger communities, new economic opportunities, and expanded educational resources are all critical for conserving and restoring the Chesapeake and coastal bay watersheds. Through innovative extension and education programming, we help develop sustainable communities that are effective stewards of our coastal resources.

Strategic Planning Process

Maryland Sea Grant operates in a complex programmatic and institutional environment that includes numerous efforts to pursue conservation and restoration of the Chesapeake Bay and Maryland's coastal waters. Our expertise in the support and interpretation of scientific inquiry enables us to make strong contributions in both research and outreach. At the same time, our size

and scope demand that we be selective in choosing issues and targeting resources. This new strategic plan provides a roadmap that enables us to be both selective and productive.

Working with the NSGO Planning Process. We carried out our strategic planning cycle as the National Sea Grant Office was developing its 2014-2017 strategic plan. The two plans, as a result, are closely aligned in their focus areas and goals, but our Maryland plan outlines strategies and outcomes that strongly reflect our important niche in our state and region.

Listening to Constituents. Our planning process for the 2014-2017 cycle included meetings and discussions with, and surveys of, our constituents to assess our progress and recommend future directions. Working with our staff and extension agents we examined our past efforts in order to set priorities for this next funding cycle. In these discussions, it became clear that our constituents were strongly supportive of our approach, encouraging us to "do more" rather than suggesting areas where Maryland Sea Grant could reduce its efforts. What emerged was a strong consensus supporting the following propositions: Maryland Sea Grant should continue to lead in its efforts to connect human-nature interactions in its research and policy efforts — a connection recently emphasized by federal research funding agencies, such as NSF and NIH. We should double down on our long-standing efforts to engage social scientists. And we should continue our leadership role as a synthesizer of scientific information and as a reliable facilitator in the work for applying research to policy and management issues.

Our past work has raised expectations on the part of policymakers, managers, and the general public that we will make substantive contributions to Chesapeake and coastal bays issues. We expect to continue our leadership role in bridging local, regional, and national priorities, in reaching beyond our state boundaries, and in fulfilling our federal mandate.

Our planning process highlighted the important challenge our program now faces: we need to make wise investments that yield useful outcomes, but we have to do so while working with limited resources. Our advisory boards encouraged us to balance our broad strategic plan with a set of carefully selected priorities. To that end they recommended we frame more specific goals in our request for research proposals.

Strategic Plan 2014-2017

Our plan defines four focus areas and 11 state goals that align with those of the National Sea Grant Program, but it also includes outcomes and strategies that are more specific and more narrowly focused, an approach that will enable us to more accurately measure progress and outcomes over the next four years.

Focus Area 1. Resilient Ecosystem Processes and Responses

Scientists have documented how the Chesapeake Bay has experienced a profound functional shift from an ecosystem dominated by benthic processes to one driven by planktonic production in the water column. Urbanization, intensive agriculture, and large-scale changes within the watershed are primary contributors to an ecosystem functionally impaired by excess nutrients and sediments — impairments evident in the water quality, habitat structure, and biodiversity of Maryland coastal and freshwater systems. These anthropogenic loads also interact with changes

in broad hydrological cycles, posing fundamental challenges to those seeking to manage the estuary and watershed.

Achieving sustainable Chesapeake and coastal bays requires science-based decisions about how and when conservation and restoration efforts can be most effective. Restoration will not result in an idealized vision of a past Chesapeake Bay, but will lead instead to a dynamic Bay that reflects the reality of what can be accomplished in reducing nutrient and sediment inputs, adapting to climate change, and managing our fisheries in a sustainable manner. What will a "new ecosystem" look like? How will it function? How will it evolve as management actions take hold? Are there ecosystem thresholds? What role does society play in the environmental decisions for the bays? These are fundamental questions we need to answer.

To address these issues of conservation and restoration, Maryland Sea Grant will investigate key coastal and ecosystem processes in marine, estuarine, and freshwater reaches of our watersheds and how they respond as nutrient and sediment reduction goals are achieved and maintained over time. The program will provide critical information for describing the temporal and spatial scales over which actions may be effective and for predicting the trajectories that the ecosystem may follow once reductions are achieved. We will also seek to understand the societal constraints that influence policy directions. These efforts will improve ecosystem-based decision-making in the Bay watershed by providing decision-makers and constituents with the understanding needed for addressing complex socio-environmental issues.

Goal 1.1 An improved scientific understanding of estuarine and coastal processes and functions

Goal 1.2 A stronger scientific foundation for environmental management focused on ecosystem preservation and restoration

Goal 1.3 A stronger scientific foundation for ecosystem-based approaches to management

Focus Area 2. Sustainable Fisheries and Aquaculture

An in-depth research foundation is critical for supporting ecosystem-based management, an approach we believe is essential for restoring and conserving sustainable fisheries and achieving profitable aquaculture in Maryland. Success will require investigations of fishery population trends and targets and their effects on ecosystems, a better understanding of the needs of and engagement strategies for multiple audiences with different priorities, and an adaptive approach to ecosystem-based management that embraces sound policies for sustainable use. Aquaculture, along with a suite of novel applications for engineering and biotechnology, may broaden seafood options and

catalyze new uses leading to economic development and jobs. Technologies to improve seafood products and enhance the industry's ability to deliver a safe and satisfying product are all important to the health and sustainability of Maryland's natural resources.

Maryland Sea Grant will address these themes by supporting natural and social science, synthesizing and translating research results, and engaging stakeholders in the movement to ecosystem-based fisheries management.

Goal 2.1 Fisheries and aquaculture are healthy and sustainable

Goal 2.2 Seafood industries use safe practices

Focus Area 3. Resilient Communities and Economies

Restoration and sustainability mean different things to different interest groups or stakeholders. As traditional drivers such as commercial fishing and agricultural patterns are changing, recent policy decisions and management actions are creating new and different economic opportunities in traditional tidewater communities. The emerging need to adapt to climate change and meet new TMDL requirements to limit nutrient and sediment pollution will present new challenges for communities and local governments. Even the term "coastal community" finds a much broader meaning now as we recognize the influence communities in the upper watershed reaches of the region have on estuarine and coastal environmental conditions. Increased precipitation and changing rates of sea-level rise, both anticipated consequences of climate change, require well-informed communities who understand these issues and are engaged in strategic decision-making to strengthen their communities.

Maryland Sea Grant will address these issues by engaging with communities that preserve working waterfronts, adapt to climate change, and respond to water quality regulations.

Goal 3.1 Local communities are supplied with the information necessary for economic resilience

Goal 3.2 Communities are informed and engaged on water quality and quantity issues

Goal 3.3 Communities are informed and engaged about coastal hazards and the impacts of climate change

Goal 3.4 Comprehensive planning efforts help communities make informed strategic decisions

Focus Area 4. Effective Environmental Science Education

Education, both formal and informal, is the foundation for building communities that understand environmental issues and engage in decision-making about sustaining the Chesapeake Bay, its watershed and our coastal areas. A greater awareness of the issues and their complexities empowers individuals to make sound decisions and take ownership of their surroundings. Formal education also trains future scientists who can investigate environmental complexities, translate their results, and help improve the management of our environmental resources.

Maryland Sea Grant will pursue strategies that deepen the knowledge and broaden the skill sets of students, educators, science practitioners, decision-makers, and citizen scientists. Our efforts will include partnerships with other programs, research experiences for undergraduate students, research and policy fellowships for graduate students, and communication and outreach projects directed to a variety of audiences.

Goal 4.1 A public educated about watershed, coastal and marine issues

Goal 4.2 A diverse workforce educated in environmental science

A Cross-Cutting Approach

All four focus areas interconnect in a number of ways, reflecting the interdisciplinary nature of Maryland's coastal issues and the overarching commitments that guide all of Maryland Sea Grant's work. Those commitments include:

- **Science To Environmental Policy (STEP).** With a clear mandate to provide strong educational programming, we work to create opportunities and products that empower scientists, policymakers, managers, teachers, students and committed citizens as they collectively work to understand issues and their responsibility as stewards of the Bay and its watershed.

- **Adaptive Management.** A process of systematically improving environmental management of complex, highly uncertain ecological systems, adaptive management integrates multiple techniques and disciplines — from natural to social sciences — in planning, implementing, and evaluating environmental policy. By learning from stakeholders and examining outcomes, it proceeds in an iterative manner seeking more effective conservation and restoration of resources over time. Maryland Sea Grant embraces this approach as one way of advancing the cause of ecosystem-based management of the state's coastal areas.

- **Building Diversity.** Maryland Sea Grant is committed to expanding the diversity of our thinking and of our workforce. Both are needed for addressing the complex problems facing the Chesapeake Bay and for restoring both environmental and economic health in the region. Building diversity in our workforce brings the greatest breadth of ideas, cultures, experiences, and backgrounds into play in the quest to build a sustainable ecology and stable economy.

Improving the resilience of the region's bays and watersheds requires applying the best scientific information to adaptive policymaking. To support this effort our strategic plan for 2014-2017 builds on our strengths in program management, outreach, education, facilitation, and synthesis. Applied across all our focus areas and program commitments, those strengths provide program cohesion as we move forward with this new plan.

Maryland Sea Grant Strategic Plan 2014-2017. National focus areas and goals align with state focus areas and goals. Each state plan goal has a series of associated outcomes and strategies.

State Strategic Plan Alignment with National Goals and Focus Areas			
National Plan Goals	**State Plan Goals (End State)**	**State Plan Outcomes (Result/What is achieved)**	**State Plan Strategies (Actions/What we will do)**
Healthy Coastal Ecosystems (HCE) = MDSG FOCUS AREA 1. Resilient Ecosystem Processes and Responses			
Ecosystem services are improved by enhanced health, diversity and abundance of fish, wildlife and plants (1)	An improved scientific understanding of estuarine and coastal pro-cesses and functions	Scientific understanding of ecosystem processes and responses is improved	Support research to understand species responses (e.g. keystone, invasive, harmful algae) to environmental conditions
			Support research to understand how coastal and estuarine conditions (e.g., anthropogenic inputs of nutrients, sediments and contaminant loadings) interact to affect ecosystem function and food web dynamics on multiple spatial and temporal scales
			Support social and natural science research to understand ecosystem responses to energy development, climate change, sea-level rise, etc.
Ecosystems and their habitats are protected, enhanced or restored (3)	A stronger scientific foundation for environmental management focused on ecosystem preservation and restoration	Scientific understanding of ecosystem restoration and conservation is improved	Determine how ecosystems are affected by and respond to conservation, management and restoration actions
			Determine how restoration efforts affect or are affected by changes in coastal and estuarine conditions (e.g., temperature, salinity, wind, waves, nutrients, sediments, contaminants and climate change)
		Coastal and watershed restoration practices are informed by science	Support research into restoration technologies and their effectiveness to prevent and/or reduce nutrient and sediment loading within the watershed
Ecosystem-based approaches are used to manage land, water and living resources (2)	A stronger scientific foundation for ecosystem-based approaches to management	Constituents are engaged and informed about the science necessary for ecosystem-based management	Support social, economic and environ-mental research and synthesis to advance ecosystem-based management

Sustainable Fisheries and Aquaculture (SFA) = MDSG FOCUS AREA 2. Sustainable Fisheries and Aquaculture			
A safe, secure and sustainable supply of seafood to meet public demand (4)	Fisheries and aquaculture are healthy and sustainable	Scientific foundations for sustaining fisheries and aquaculture are improved	Support research to further the understanding of recreational and commercial fisheries sustainability and their effects on ecosystem function
			Support natural and social science research on sustainable fisheries targets and the strategies for effective communication on such fisheries issues
		Safety and sustainability of the fisheries and aquaculture industries are improved	Support technology innovation and sustainable practices in fisheries and aquaculture
			Support the development and appropriate use of aquaculture for restoration and/or commercial enterprise
		Research and synthesis informs ecosystem-based fisheries management	Support research and synthesis to inform EBFM
Informed consumers who understand the health benefits of seafood consump-tion and how to evaluate the safety and sustainability of the seafood they buy (5)	Seafood industries use safe practices	Fisheries and aquculture industries adopt seafood safety practices and technologies	Support research and develop technologies, strategies and training in support of safe aquaculture and seafood production

Resilient Communities and Economies (RCE) = MDSG FOCUS AREA 3. Resilient Communities and Economies			
Development of vibrant and resilient coastal economies (6)	Local commu-nities are supplied with the information necessary for economic resilience	Communities are informed and understand issues important to community resilience	Support research on and development of technologies and strategies for sustainable communities (e.g. stable shorelines, tourism, working waterfronts)
			Support socio-economic research to understand and help resolve multiple use issues in coastal communities
			Support environmental research and outreach in communities where resources and understanding of environmental issues may be limited
Improvements in coastal water resources sustain human health and ecosystem services (8)	Communities are informed and engaged on water quality and quantity issues	Community understanding of sustainable water quality and quantity issues is improved	Develop tools and support research to understand the socioeconomic value and ecological consequences of water resources management options
			Engage communities and decision makers on water quality and quantity issues (e.g. TMDLs, BMPs)
Resilient coastal communities adapt to the impacts of hazards and climate change (9)	Communities are informed and engaged about costal hazards and the impacts of climate change	Scientific understanding of climate change and hazards is improved and translated for decision-makers and the public	Support social and natural science research to improve understanding and communication climate change and hazards (e.g. flooding, sea-level rise) on community resilience
			Develop tools and strategies to engage and communicate with communities and decision makers regarding the risks of climate change and hazards
Communities use comprehensive planning to make informed strategic decisions (7)	Comprehensive planning efforts help communities make informed strategic decisions	Coastal management and community planning are informed by research, tools and activities	Support natural and social science research, including modeling, to understand the effects of land use on ecosystems and communities
			Develop mechanisms to translate relevant science to planners and community leaders
			Support and provide facilitation for comprehensive planning in communities

Environmental Literacy and Workforce Development (EWD) = MDSG Focus Area 4. Effective Environmental Science Education			
An environmentally literate public supported and informed by a continuum of lifelong formal and informal engagement opportunities (10)	A public educated about watershed, coastal and marine issues	Knowledge and stewardship capacity in the public is enhanced	Develop partnerships and programs and associated materials to educate diverse audiences
			Support best practices to understand and implement effective education pedagogy for diverse audiences
			Expand use of new communications technologies (e.g. website, online multimedia presentations, social media, e-books) to educate and meet the information needs of diverse audiences
A future workforce reflecting the diversity of Sea Grant programs, skilled in science, technology, engineering, mathematics and other disciplines critical to local, regional and national needs (11)	A diverse workforce educated in environmental science	Future and current workforce is enhanced through education in environmental science and other STEM fields	Develop STEM content, lessons, curriculum enhancements, and research experiences for K-12 teachers/administrators and informal education professionals focused on coastal and watershed issues
			Develop, improve and market graduate and undergraduate research fellowship funding opportunities and extend their reach to under-represented groups in coastal and marine sciences

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