Virginia Sea Grant Strategic Plan 2010-2014

Letter from the Director

Dear Virginia Sea Grant Community and Friends,

It is my pleasure to submit to you Virginia Sea Grant's (VASG) 2010-14 Strategic Plan!

This Plan is the result of an extensive, 16-month, stakeholder-driven process, managed by VASG staff and many of our external advisors. The process employed multi-stakeholder workgroups for each of our four focus areas, a dedicated blog, extensive electronic tools for obtaining feedback, and face-to-face listening sessions with stakeholders across the Commonwealth.

VASG has friends in Virginia, and we were delighted to see how enthusiastic, interested, thoughtful, and committed those stakeholders were to our planning. The response we received speaks to how effective VASG's research, extension, education, and communication has been in meeting the needs of Virginia in the past. More importantly, these interactions helped us to better see how our capacities can help Virginia, the region, and the nation address a rapidly changing coastal and marine world.

The outcome of strategic planning preserved VASG's commitment to alignment with national and regional priorities, while addressing the Commonwealth's specific coastal and ocean challenges in four focus areas:

- Safe and Sustainable Seafood
- Healthy Coastal and Ocean Ecosystems
- Sustainable and Resilient Coastal Communities
- Coastal and Ocean Literacy

VASG views the strategic plan as a living document. We will maintain the lines of communication with stakeholders well beyond the production of this strategic plan in order to be a reflective, adaptive organization. I look forward to future opportunities to meet with you and discuss Virginia's coastal and marine issues, so that VASG can bring the best, most relevant science to the table to serve our coastal and marine communities.

Sincerely,

Troy W. Hartley

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Virginia's Coastal and Marine Ecosystem Services

In December 1606, three ships departed England for a new land of opportunity. They landed in Jamestown, Virginia, in May 1607, beginning a journey into history that literally changed the world. The cradle of American democracy, the "mother of Presidents," and a leader in the birth of the Internet, Virginia has a rich, truly American history that is tightly bound to its natural environment.

Ecosystem services are direct and indirect benefits that people derive from ecosystem structure, function, and processes. These benefits range from moderating weather and its impacts, supporting life stages of fish and shellfish, cycling nutrients, and protecting shorelines from erosion, to purifying air and water, regulating disease, and supplying seafood.

When English settlers first arrived in Virginia, they encountered well-established populations of Native Americans who had been benefitting from the area's coastal and marine environments for thousands of years. These unique ecosystems also provided the Jamestown settlers with valuable products and services. In fact, the 104 Englishmen who first landed on the banks of the James River were sponsored by the Virginia Company of London, which hoped to make a profit from the natural resources of the New World. They selected the Jamestown site for its deep-water anchorage and geographically defensible position. While these natural characteristics were beneficial, others presented challenges. The unfamiliar climate, brackish water supply, and scarcity of food, which may have been aggravated by prolonged drought, led to disease and death.

Today, Virginia's aquatic ecosystems provide valuable goods and services for about 5 million people in our coastal zone. As one of the nation's largest seafood producers, Virginia's seafood industry lands 562 million pounds of finfish and shellfish that contributes to 123 million meals annually. A portion of this comes from the Chesapeake Bay, the nation's largest, most biologically diverse estuary. Estuaries and coastal waters are an important part of our nation's economy. Nationwide, it is estimated that 75% of commercially harvested fish and shellfish depend on estuaries and nearby coastal waters for some part of their life cycle. Coastal watershed counties in the U.S. contribute approximately 50% of the nation's gross domestic product (GDP).

Coastal development, a substantial national security and defense presence, offshore energy resources, and the prospect of expanded maritime trade in Virginia's deep-water ports have all contributed to growing local economies. The port in southeastern Virginia supports nearly 200,000 jobs, almost $700 million in local taxes, and about $5 billion in payroll revenues. Virginia's Eastern Shore, containing a stretch of natural barrier islands and the last pristine section of the Delmar Peninsula, is home to watermen tilling the tides, family farms, and a multi-million dollar clam aquaculture industry. Coupled with the beauty of the Chesapeake and Mid-Atlantic, these economic strengths give Virginia a highly desirable quality of life.

However, like the original Jamestown Settlement, Virginia today faces serious challenges. Some of our fisheries are in decline. Persistent and emerging threats to our coastal and marine ecosystem are undermining its health and resilience. Virginia is experiencing coastal land-use transformation, which has implications for natural systems and is leading to a socioeconomic transition that is altering the heritage and character of coastal communities.

Changing climate compounds these emerging issues. In Virginia, climate change is a powerful force that is altering sea level, storm surges, and nutrient and water cycles while enabling new invasive species to gain a foothold. Climate change could dramatically affect ecosystem structure and function and the goods and services those ecosystems produce. For example, blue crabs, eelgrass, and oysters could decline or disappear as salinity and temperature increase and precipitation patterns fluctuate. Coastal wetlands will be lost due to sea-level rise, while freshwater coastal wetlands will be threatened by saltwater intrusion; both types of wetlands provide critical habitat for many species. Oxygen levels in the Bay are expected to decrease, harming striped bass, blue crabs, and oysters. Climate change will likely exacerbate the threats from invasive species, pathogens, and pollution. As the water absorbs more carbon dioxide, acidification in the Bay and Mid-Atlantic Ocean will affect fish, shellfish, marine plankton, and other aquatic life. These are complicated and dynamic phenomena, and our citizens, businesses, policy makers, and resource managers are demanding the best available science to help them solve the resulting problems.

We are confident that Virginia will rise to the occasion, address the challenges we face, and achieve balance and sustainability in ecosystem and human well-being. Virginia has unmatched coastal and marine infrastructure, expertise, and human resources. Virginia's academic and research community is one of the nation's largest and most productive, with nationally ranked institutions and cutting-edge research and technology development. Sitting at the mouth of the Chesapeake Bay, Virginia is uniquely positioned where this critical watershed and estuary meet the sea.

Virginia Sea Grant (VASG) will be here to help the Commonwealth fully benefit from these strengths—by funding research, conducting extension and education activities, and producing communication materials that advance safe and sustainable seafood, promote healthy coastal and ocean ecosystems, enhance sustainable coastal development, and ensure that the population is literate about coastal and ocean issues.

Our Approach

Strategic Imperatives

Partnerships. VASG operates in partnership with other organizations to achieve synergistic benefits that are effective and efficient.

Relevance and impacts. VASG strives for demonstrable, real-world impacts on critically important problems and challenges.

Integration. VASG advances the integration of extension, education, communication, and research functions to achieve science-to-management impacts, the broad adoption of technological innovation, and the utilization of science by decision makers.

Science-based information. VASG applies only science-based information in support of decision makers.

Responsive national and regional network. VASG is part of a national network and is closely aligned with national Sea Grant priorities; we are responsive to the Commonwealth's needs and opportunities; and we pursue regional approaches for multi-state issues.

Core Collaborators

Virginia Institute of Marine Science (VIMS), College of William & Mary. VIMS hosts the headquarters of VASG in the VASG Research and Administration Office and extension and education staff in the Marine Extension Program (MEP).

Virginia Tech. The Virginia Seafood Agricultural Research and Extension Center (VSAREC) in the Commercial Fish and Shellfish Technologies (CFAST) program, Department of Food Science and Technology, College of Agriculture and Life Sciences.

Old Dominion University. The Department of Ocean, Earth and Atmospheric Sciences, College of Sciences.

University of Virginia. The Department of Environmental Sciences, College of Arts and Sciences, and the Landscape Architecture program, School of Architecture.

"[A] **broker** of policy alternatives … expands (or at least clarifies) the scope of choices (i.e., alternatives, policy options, forks in the road, etc.) for decision-making. The honest broker enables the freedom of choice by decision-makers."

—Roger A. Pielke, 2007, The Honest Broker: Making Sense of Science in Policy and Politics. Cambridge University Press.

Vision

Virginia Sea Grant is a scientific broker, supplying science-based information to citizens, businesses, educators, resource managers, and policy makers to address resilience and sustainability in coastal and marine ecosystems and the communities that depend upon them.

Core Assets

Experienced, talented extension and education staff. VASG's staff has over 540 years of experience as research, extension, and outreach professionals, marine educators, and communicators. Staff members have direct links and long-term professional relationships with stakeholders throughout the Commonwealth, region, and nation.

World-class researchers. The Commonwealth of Virginia has an extensive university and college system with outstanding research capacity—consistently ranking in the top one third in National Science Foundation dollars secured in each of the last five fiscal years.

Research funding and capacity. VASG administers competitive, peer-reviewed research funding programs and maintains organizational capacity to administer and monitor the implementation of research funding.

Advanced communication capabilities. VASG maintains a communication center where staff use the latest technologies and strategies to promote science-to-management impacts, the transfer and adoption of technologies, and increased awareness of coastal and marine issues to all of VASG's audiences.

Graduate student training. Sea Grant administers and funds prestigious graduate fellowships, both through research funding and through fellowship programs, such as Knauss Marine Policy Fellowship. Virginia has been one of the largest presences in the Knauss program. Only the state of Washington has had more students hold Knauss Fellowships than has Virginia.

VASG Focus Areas

Safe and Sustainable Seafood

Healthy Coastal and Ocean Ecosystems

Sustainable and Resilient Coastal Communities

Coastal and Ocean Literacy

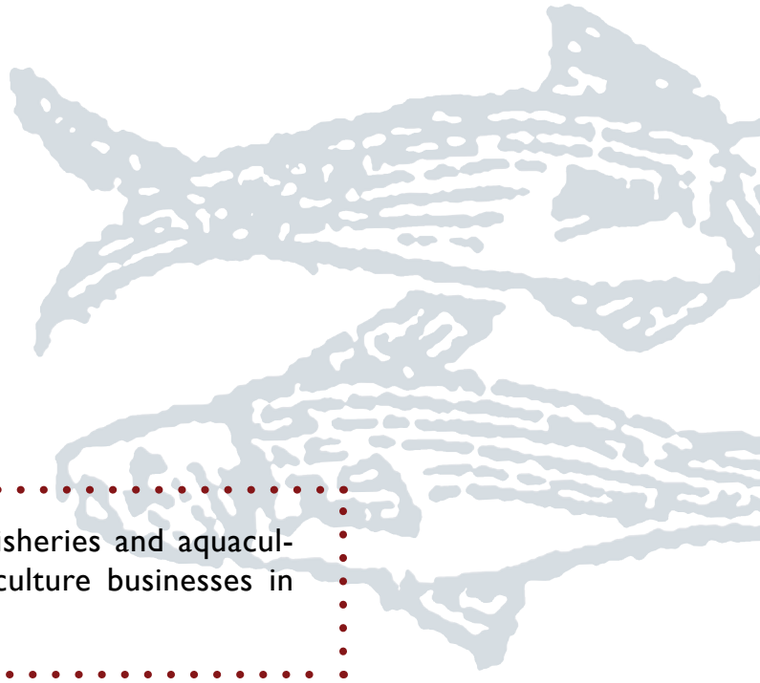
Mission

To enhance the ecological, economic, and social sustainability of coastal and ocean communities and the ecosystem services they depend upon through university-based research, extension, education, and communication that provide science-based information to decision makers. VASG serves the Commonwealth of Virginia, the region, and the nation.

1. Safe and Sustainable Seafood

The combined economic impact of Virginia's commercial and recreational fisheries exceeds $1 billion annually. Unfortunately, most historically exploited stocks are experiencing declines in abundance from a combination of environmental factors, habitat changes, water quality deterioration, and over-harvesting. The consequences of these declines could include changing fishery practices, techniques, or locations; increased regulatory oversight; more frequent conflicts between resource users; and labor force reductions. Aquaculture has emerged as a major contributor to Virginia seafood industries and is considered to be the fastest growing segment of U.S. agriculture. This increase in aquaculture has resulted in rapidly changing production technologies, new target species, and expanding markets. The landscape is also changing rapidly for Virginia's seafood processors, from workforce training and safety compliance issues to marketing of new products and consumer education.

VASG aims to maintain sustainable and thriving fisheries (commercial and recreational), aquaculture production, and seafood processing capacity in Virginia.



Goal 1

Advance scientific understanding of sustainable fisheries and aquaculture and support sustainable fisheries and aquaculture businesses in coastal Virginia.

Highest Priority Objectives

• Advance the development of bycatch-reduction devices, conservation engineering, and sustainable fishing practices in commercial and recreational fishing and the use of collaborative research to promote sustainable fishing practices.

• Help individuals enter and remain competitive in a sustainable aquaculture industry, including the development and use of collaborative research to promote sustainable aquaculture practices.

Priority Objectives

• Advance the development and use of innovative, adaptable, and viable business models for working watermen.
• Advance the development and use of science for optimization of culture conditions and disease management in shellfish and finfish aquaculture, including identification and use of environmentally responsible controls.
• Advance scientific understanding and stakeholder awareness of potential new species for sustainable aquaculture development.
• Support and advance the sustainable use of bycatch, regulatory discards, and underutilized species by watermen.
• Develop harvest, handling, and transport methods for live-fish production from wild-harvest fisheries.
• Advance scientific understanding of and expand extension services for minority and subsistence fishing communities.
• Promote improved energy efficiency and utilization in all areas of aquaculture, commercial fishing, and recreational fishing.

Goal 2

Provide stakeholders with the best available science, facilitate stakeholder engagement in decision making, and advance science-to-management and technology adoption.

Highest Priority Objective

• Provide resource managers with the best available science and decision-support tools to promote effective regulatory actions, resource allocations between user groups, and resource sustainability.

Priority Objectives

• Facilitate education, collaboration, and networking among all sectors of the fishing industry.

• Increase awareness among fishing and aquaculture businesses as well as local and state officials about jurisdictions of regulatory authorities for all aspects of fisheries and aquaculture.

Goal 3

Increase understanding and application of best practices in seafood safety, product and market development, and seafood-processing efficiencies.

Highest Priority Objectives

- Encourage participation of seafood scientists and industry in VASG research.
- Promote efficiencies and byproduct utilization and improve waste-treatment systems in the seafood-processing industry.
- Advance emerging markets for seafood products in local farmer markets, community-supported fisheries, or other buy-local or high-value product strategies.

Priority Objectives

- Develop an innovative, integrated model for new value-added products along with business and marketing support to identify and facilitate access to commercial markets.
- Promote seafood-processing efficiencies through the use of sustainable energy practices in seafood processing.

Goal 4

Provide technical support and guidance to industry to increase food safety and product quality.

Highest Priority Objectives

- Promote the implementation of up-to-date post-harvest safety technologies and methods and best management practices.
- Improve industry understanding of food-safety hazards and increase compliance with regulatory requirements by providing training and technical assistance in the development of HACCP plans.

Priority Objective

- Evaluate the microbial shelf-life and microbial safety of new value-added products and traditional products.

II. Healthy Coastal and Ocean Ecosystems

A healthy ecosystem is critical for the delivery of ecosystem products and services, including wild-caught fish and shellfish, aquaculture products, recreation, and tourism. Virginia's coastal and ocean ecosystems supply valuable products and services despite being threatened by persistent, long-standing challenges from reduced water quality; declines in critical species and habitats; loading of nutrients, sediments, toxics and pathogens; and invasive species. New threats to ecosystem health and resilience are emerging and are expected to intensify in the future—for example, the cumulative impacts of coastal land-use transformation and new offshore and coastal development, more frequent harmful algal blooms, larger low-oxygen dead zones, and climate change.

VASG aims to enhance ecosystem health, resilience, and sustainability across scales and sectors, transcending the watershed-estuary-ocean transition, and including near- and offshore interactions.

Goal 1

Develop and provide sound scientific information to support ecosystem-based approaches to managing the coastal and marine environment and enhancing ecosystem health, services, and resilience.

Highest Priority Objectives

• Fund research and conduct extension and education activities on the interactions between fisheries and aquaculture activities and ecosystem health, services, and resilience.

• Increase socioeconomic, policy and management understanding of current fisheries regulations and emerging ecosystem-based fisheries management systems, including impacts on fishing practices, stocks, human communities, governance, and ecosystem health, services, and resilience.

• Fund research and conduct extension and education on the relationship between human use patterns and ecosystem health, services, and resilience.

Priority Objective

• Advance scientific understanding and stakeholder awareness of the response of ecosystem health, services, and resilience to the impacts of climate change.

Goal 2

Support use of integrated, ecosystem-based approaches to managing coastal and marine resources and enhancing ecosystem resilience.

Highest Priority Objectives

• Advance the development and use of decision-support tools and monitoring protocols that provide real-time feedback at a high spatial and temporal resolution for integrated, adaptive management.

• Advance the development and use of indices of ecosystem health and resilience, community resilience, and management effectiveness.

Priority Objectives

• Synthesize the scientific knowledge that resource managers need in order to pursue ecosystem-based approaches to management.
• Assist partners in undertaking integrated, ecosystem-based approaches.
• Advance the use of indices, maps, and other observational systems, monitoring data, and decision-support tools for public deliberation on the societal trade-offs inherent in ecosystem-based approaches to management.

III. Sustainable and Resilient Coastal Communities

The Commonwealth's emerging coastal economy will represent a mixture of both traditional and new activities. Rural coastal communities are working to implement programs that enable residents to remain competitive contributors to future economic activities in their communities. Suburban communities are confronting myriad issues related to growth and sprawl within an overall changing economic climate. Urban waterfront communities face the challenge of redeveloping declining water-dependent industries to accommodate a new economic base that is primarily information and service based. Among all coastal communities, public access to coastal waters for both recreational and commercial uses is a future challenge. Development in rural, suburban, and urban areas needs to be planned and carried out in such a way as to maintain ecosystem health, services, and resilience in order for coastal communities to endure and thrive. All of these challenges are magnified as the inevitable changes to coastal communities proceed at a time of declining coastal environmental quality and climate change. Southeastern Virginia is considered one of the most vulnerable areas in the U.S. to the impacts of sea-level rise because of low elevation and geologically subsiding land.

VASG aims to enhance the sustainability and viability of coastal communities, from Virginia's rural Eastern Shore and Chesapeake Bay communities, to our suburban coastal communities in the Northern Virginia–Richmond–Norfolk corridor, to the urban centers in the Hampton Roads areas.

Goal 1

Advance healthy and sustainable coastal economies with working waterfronts, recreation, tourism, coastal access, and vibrant green coastal and marine technology jobs.

Highest Priority Objectives

- Inform decision making by advancing scientific understanding of the human dimensions of coastal and ocean land- and water-use, including infrastructure, public financing, and other socioeconomic, policy and management, and legal studies.
- Increase scientific understanding of the link between sustainability and working waterfronts, recreation, tourism, coastal access, and green coastal and marine jobs.

Priority Objective

- Support market analysis and development of green coastal and marine technology jobs and industries.

Goal 2

Promote sustainable and efficient use and protection of land, energy, and water resources by coastal communities.

Highest Priority Objective

- Develop decision-support tools to assist community planners, city and local officials, planning commissions, and voting citizens and to complement existing regional capacity.

Priority Objectives

- Increase awareness in the university-based scientific community about how local governments function and are structured, in order to advance effective science-to-management transfer at the local level.
- Increase understanding of science and policy relating to marine energy development and other green coastal and marine technology industries.

Goal 3

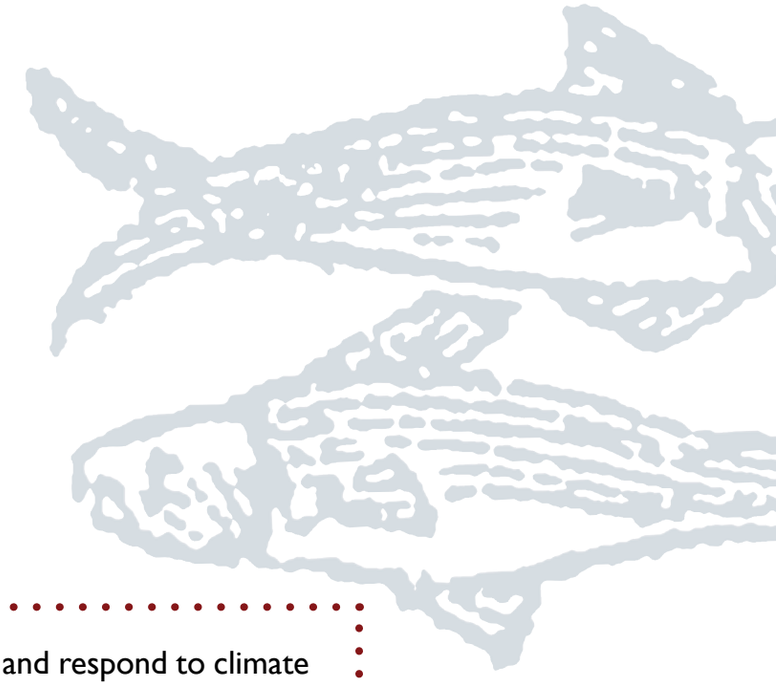
Encourage coastal citizenry, leaders, and industry to recognize the complex societal trade-offs inherent in sustainability and work together for sustainability and balance.

Highest Priority Objective

• Advance the development and use of decision-support tools and procedures that foster management and resolution of complex multi-use conflicts.

Priority Objective

• Design and deliver professional development programming to citizen-members of planning bodies and commissions, in coordination with and complementary to existing programs.



Goal 4

Build coastal community capacity to prepare, adapt, and respond to climate change impacts and other natural and human hazards.

Highest Priority Objectives

• Advance scientific understanding of the socioeconomic, infrastructural, and policy and management impacts from climate change.

• Advance scientific understanding of the effectiveness of climate adaptation measures.

• Develop and expand use of best management practices and advanced design and planning for climate change adaptation in targeted coastal industries and communities.

Priority Objectives

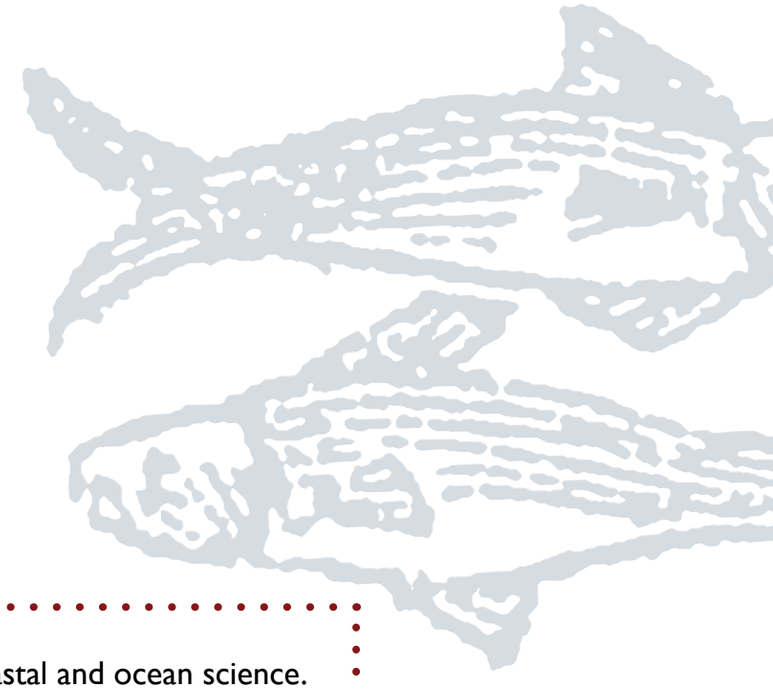
• Synthesize and translate research data on storm events, tides, waves, and sea-level rise into a local context for city and local officials, planners, marine-trade groups, and the general public.

• Advance the effectiveness of prediction and impact-visualization tools for storm events, tides and wave action, and sea-level rise at the local level.

IV. Coastal and Ocean Literacy

The challenges facing Virginia and the nation—from climate change to community development issues to globalization—make it critical for all Virginians, and indeed all Americans, to understand the importance of the marine environment and why we literally cannot live without it. Unfortunately, most students in the United States receive little if any in-depth classroom instruction in ocean sciences during their K-12 classroom years. The economic slowdown has exacerbated the trend toward reduced federal, state, and local funding or educational efforts. Other challenges for teachers include the need for subject-area professional development in coastal and ocean science and the growing gap in technical knowledge between scientists and non-scientists. Teachers are faced with an exponentially increasing amount of subject-related information available online, but they often lack the technical expertise to filter that information for reliability, accuracy, and good scientific grounding. Well-informed and well-trained teachers can foster awareness of coastal and ocean issues among the general public. However, it is also essential to target outreach efforts at other groups, including regulators, government officials, and industry representatives, who may be especially influential in decisions that affect the health of coastal and ocean ecosystems.

VASG seeks to increase the coastal and ocean literacy of citizens, students, teachers, culinary industry members, consumers, and local resource managers.



Goal 1

Improve the ability of educators to teach about coastal and ocean science.

Highest Priority Objectives

• Translate science-based information about the coast and ocean to make it accessible and usable for classroom teachers, informal educators, and outreach staff at non-governmental organizations and government agencies.

• Provide easy access to online resources for use in teaching coastal and ocean science, including expanding VASG distance-learning capacity for teachers and other audiences.

Priority Objectives

• Design and implement teacher professional development based on educational best practices.

• Provide service to education organizations in order to promote coastal and ocean science education regionally and nationally.

• Develop and implement a comprehensive program evaluation and monitoring protocol to assess effectiveness, provide real-time feedback, and identify impacts of educational programs.

Goal 2

Enhance the ability of scientists and extension staff to communicate their work to coastal and ocean stakeholders.

Highest Priority Objectives

• Enhance understanding among graduates students, post-doctoral staff, and early career scientists of effective techniques and strategies for communication to non-scientists.

• Increase collaboration with scientists to design effective "broader impacts" outreach activities.

Priority Objectives

• Expand collaboration with staff in other focus areas to enhance their impact through integration of educational tools, skills, and strategies into their programming.
• Expand graduate training in communicating ocean sciences in informal settings.
• Foster collaborations between researchers and the education community through distance-learning technology and online communities.

Goal 3

Elevate awareness and understanding of coastal and ocean science among targeted audiences so they can become more informed decision makers.

Highest Priority Objective

• Foster collaboration with educators in state agencies, local organizations, and other stakeholder groups to enhance the effectiveness of Meaningful Watershed Educational Experiences (MWEEs) as defined by the Virginia Department of Education.

Priority Objectives

• Engage K-12 students, early learners (pre-K), families, and the public-at-large in exciting and motivating interdisciplinary activities aimed at fostering life-long interest in and awareness of watershed, coastal, and ocean sciences.
• Increase awareness of coastal and ocean science issues among non-coastal teachers, community members, and leaders through targeted websites, distance-learning technologies and other online resources.

Goal 4

Increase awareness and understanding of health, safety, and sustainability issues among the culinary community and consumers to enable them to make informed seafood choices.

Highest Priority Objectives

• Provide fisheries information and resources to chefs and culinary students to foster their interest in and application of sustainable practices.

• Expand innovative strategies for delivering coastal and ocean literacy through culinary studies and programming.

Priority Objectives

• Develop region-specific, science-based information for Virginia and Chesapeake Bay seafood consumers.
• Promote dialogue among fisheries scientists and suppliers of seafood consumer-choice information.

Virginia Sea Grant Integration

VASG aims to foster integration of extension, education, communication, and research functions to achieve science-to-management impacts, technology transfer, and the use of science by decision-makers, citizens, and students. We will use, develop, test, refine, and apply rigorous and feasible evaluation methodology in extension, education, and communication programming to obtain real-time feedback on what works, what doesn't, and why—thus enhancing VASG's ability to practice adaptive program management.

The strategic planning process has identified overlapping content areas that provide further opportunity for integration across functional areas and across our institutional partners. In particular, critical cross-cutting themes include:

The interdependence of ecosystem and human well-being. People impact the ecosystem and ecosystems impact people. Any activity in one part of the interconnected system produces a response in other parts—some responses are understood, while many are unintended and surprising. Rapid changes are now occurring in all areas of human and natural systems (biological, physical, socioeconomic, cultural).

Watershed-estuarine-ocean connections. Virginia sits in the mixing bowl of many ecosystem and human systems, bridging natural, physical, and social conditions. We are located where the Chesapeake watershed meets the sea. Our ocean witnesses the mixing of northern and southern Atlantic species and our shores experience converging human uses of terrestrial, coastal, and marine resources. Virginia's ports link America with the global market.

Impacts & Conclusion

VASG will develop indices of performance that will be used in an on-going discussion with external advisors and in an annual project participants meeting to enable VASG to function as a reflective practitioner. We aim to build a culture as a learning organization.

Strategic planning is a tool, and while it produces an output, its greatest value is in establishing a culture of openness, transparency, and commitment to on-going dialogue with stakeholders. VASG will listen to stakeholders in Virginia, the Mid-Atlantic and Chesapeake region, the nation, and beyond—not only during strategic planning, but daily. We will listen to and engage not only those stakeholders that VASG has worked with for years, but those with whom we have never worked. The past two years have been an exciting time of renewal at VASG. We have re-organized, relocated our headquarters to VIMS, and re-committed ourselves to the coastal and ocean issues of Virginia, the region, and the nation. We are starting a new chapter in the VASG story.

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