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Virginia Sea Grant Strategic Planning Foundation Document

Introduction

A Time of Challenge

This is a time of major challenges and new possibilities for coastal Virginia. Coastal communities are experiencing socio-economic transformations as people flock to live in the coastal zone and bring with them major changes in coastal economies and ways of life. Given its unique seafloor geology, Virginia's port at Hampton Roads has become a premier deep-water port on the east coast, a major gateway to international trade in the rapidly growing global economy. At the same time, the state is increasingly vulnerable to sea level rise and other impacts of global climate change.

Virginia sits at the coastal-marine junction of the Chesapeake Bay, the focus of America's most comprehensive experiment in integrated ecosystem-based management. The state is on the northern edge of a giant ocean mixing bowl where North Atlantic species and systems interact with southern, warmer water species. This confluence of complex natural and socio-economic features provides Virginia Sea Grant (VASG) with its own particular set of problems and opportunities. Many of these challenges and possibilities reach well beyond Virginia's boundaries and call for integrated research, outreach and education initiatives between Sea Grant programs, and with other states and regions. The VASG program is poised to respond proactively and creatively to the challenges of the times and the needs of the Commonwealth.

A Time of Change

This is also a time of major transition for VASG. In 2007, NOAA designated the Virginia Institute of Marine Science (VIMS) at the College of William and Mary as the institutional base for Virginia's Sea Grant program. VIMS is one of the nation's largest and best recognized marine science centers. It is focused on coastal and estuarine research with a state mandate to advance research, outreach and education on coastal- and ocean-science activities in Virginia. Consolidation of VASG activities at VIMS brings administrative and programmatic responsibilities together at one institution and co-locates them with a premier marine research, science and education center that shares, reinforces and strengthens VASG's role and mission. It does this while maintaining VASG's long-standing partnerships with the other primary research institutions in the state: Old Dominion University (ODU), the University of Virginia (UVA), and Virginia Polytechnic Institute & State University (VA Tech) as well as a wide array of other national, state and local partners.

In addition to its new base, VASG is making a transition to new leadership. A new director joins the program in September 2008, and a number of existing staff members have assumed or will assume new leadership responsibilities as part of this transition. Long-standing partnerships are being re-affirmed and new partnerships are being forged.

Changes are occurring at the national level as well. The National Sea Grant College Program has just adopted a new five-year strategic plan that establishes priority focus areas and goals for the entire Sea Grant network. The new national plan requires state Sea Grant programs to bring their strategic plans into alignment with the national agenda by developing priorities, goals and measurable objectives that will contribute to achieving national goals. In the future, state Sea Grant programs will be evaluated on the extent to which they contribute to meeting national and regional goals and objectives as well as addressing their own critical state needs.

The Virginia Sea Grant Response

This time of challenge and change is an ideal time for VASG to launch a strategic planning process. The process will create an agenda for the future that builds on the program's strengths, while responding to the national call for collaboration among Sea Grant colleges and institutions to address regional and national priorities and give greater attention to social, economic and policy research.

Developing this foundation document is the first step in an 18-month planning process that will bring the VASG into alignment with the goals and priorities of the national program. When completed, this process will result in five-year strategic and implementation plans. These plans will guide VASG and be used to evaluate its effectiveness.

To develop this document, VASG convened its External Advisory Committee for a workshop in May 2008 that included participants from the National Sea Grant Office, NOAA, VIMS, and other national, state, regional and local coastal and fisheries agencies, businesses and organizations. Workshop participants were asked to identify major trends in coastal Virginia and potential program priorities and partnerships for VASG. The outcomes of this workshop were combined with input from two staff workshops in May and June 2008 to create this document. The process included the participation of both the interim director of the program and the incoming director to build a bridge from past successes to future needs, issues and possibilities.

This document is the culmination of the first phase of strategic planning and it represents Virginia's initial response to guidance provided by the national Sea Grant College Program's 2008 strategic plan. It uses the input from external stakeholders and staff to highlight areas of excellence that will continue to be priorities for VASG. It also identifies new areas of opportunity the program will consider incorporating into its five-year strategic plan to help achieve national goals and meet high-priority needs in the Commonwealth of Virginia. This document, along with the newly released national strategic plan, is being used to guide one-year research, extension and education priorities for VASG and it will be used as a starting point for developing the full five-year strategic and implementation plans in 2009.

The Planning Context

Virginia Trends and Issues

Virginia Sea Grant must take a number of trends into account in planning for the future. Most of these are being experienced far beyond state borders, but they take on particular importance in Virginia, given the state's unique geographic location and coastal features.

Climate change. Virginia is among the states most vulnerable to climate change impacts, including sea level rise and increased number and intensity of coastal storms. This lends greater urgency to hazard-related research, emergency management planning, and building community resiliency at the state and local levels.

Coastal land-use transformation. Large numbers of people continue to move to Virginia's coasts. This is leading to rising concerns about water supply, waste disposal and the future health of the Chesapeake Bay, and to increasing conflicts among coastal uses.

Changing coastal economies. New residents and activities are putting pressure on traditional marine and coastal businesses. At the same time, coastal recreation and tourism activities are thriving and economic globalization is dramatically increasing port development in the state.

Declining fisheries. Virginia's commercial seafood industry as a whole is in decline as a result of over-fishing, changing demographic and land-use patterns, and regulatory and other issues. There is increased competition between commercial and recreational fishermen, the seafood trade deficit is rising, and there is renewed pressure to develop environmentally responsible aquaculture alternatives to meet growing seafood demand.

Energy development. Intense national focus on energy needs and development is increasing interest in off-shore energy development and expanding export and import of energy-related materials. These trends will have major implications for Virginia's coastline and ports.

Seafood safety concerns. Commercial fisheries and aquaculture industries are critical to human and economic health in the Commonwealth, but seafood consumption is a major source of food borne illness. Bacteria, viruses, parasites, chemical toxins, and decline in quality control resulting from increases in seafood imports are among the factors contributing to this problem.

Focus on national security. Virginia houses a number of major military facilities, which along with its ports, will receive additional attention in efforts to improve homeland security. This will need to be balanced with other coastal uses and activities.

Ecosystem health threats. Critical coastal lands are under stress, invasive species are on the rise, and negative atmospheric effects from outside the watershed are increasing, posing threats to long-term ecosystem health.

In addition to these major trends, there are other important issues facing the Commonwealth with implications for the future of its coastal and marine resources.

- Most citizens and elected officials have limited scientific literacy, and younger generations who will be the state's future leaders have increasingly little contact with or understanding of the natural world.
- Current development practices need to be replaced with more sustainable models.
- New methods are needed to protect critical habitats and ecosystems in the face of intense coastal development and better tools are needed to evaluate costs, benefits and social, economic and environmental trade-offs in coastal decision-making.

These major trends and issues need to be considered, alongside national Sea Grant priorities, in setting priorities for VASG for the next five years.

Regional Challenges and Opportunities

Many challenges and opportunities facing VASG are regional in scope and must be addressed at a regional level. VASG is actively involved in a variety of regional research and outreach activities with many partners. It is an active partner in the Sea Grant Mid-Atlantic Advisory Program, a group that meets annually and has collaborated on such things as Hazard Analysis Critical Control Point (HACCP) training, aquaculture development and recreational fishing initiatives. VASG advises several key committees charged with managing the Mid-Atlantic and New England sea scallop resource, a fishery worth nearly \$300 million to the nation. Other recent regional activities include participation in Chesapeake Bay management issues, fishery

restoration in the Bay, work with the National Marine Fisheries Service, establishment of the Mid-Atlantic Coastal Ocean Observing Regional Association, and development of the Chesapeake Bay Observing system. A number of regional educational initiatives have been developed in partnership with the NOAA Office of Education, the Centers for Ocean Science Education Excellence, and chapters of the National Marine Education Association.

The new national Sea Grant strategic plan recognizes the importance of advancing regional approaches to problems that do not conform to traditional political boundaries. VASG will continue to collaborate with others to design and carry out regional activities addressing such high priority issues as fisheries management, habitat protection, off-shore energy development, hazard resiliency, coastal and ocean literacy, and ocean observing systems.

Institutional Context

In addition to the issues that are in the forefront for the nation, the region and the Commonwealth, some unique features of VASG and its location at VIMS will affect the activities it undertakes and its relationships with key partners.

VIMS gives VASG access to an extraordinary range of partners who are engaged in activities related to Virginia's coastal and ocean environments. VIMS itself shares Sea Grant's three part mission of conducting research in coastal, ocean and estuarine science; educating students and citizens; and providing advisory services to policy-makers, industry, and the public. NOAA's Chesapeake Bay National Estuarine Research Reserve (NERRS) program and NOAA's Virginia Office of the Chesapeake Bay Program are also housed at VIMS. VASG's strategic planning process will involve continuing to develop VASG's relationships with other entities within VIMS and to focus Sea Grant energies where they can make the greatest contributions and complement the efforts of other parts of VIMS and other state coastal programs.

A Partnership Approach

The National Sea Grant College Program is a partnership program and VASG's work is partnership based. The partnership approach begins with relationships within VIMS and strong partnerships with Virginia's other higher education institutions with marine science interests including: ODU, UVA, and VA Tech, and two historically black universities: Virginia State University, which has a cooperative extension program, and Hampton University, which has a marine science program. The partnership approach extends beyond university communities to strong partnerships with key coastal interests and industries, other state Sea Grant programs and NOAA partners, and a host of federal, state, and local agencies and organizations, as well as regional partners who share VASG's goals and concerns.

Part of the task throughout the planning process is to gain additional understanding of the needs and priorities of these clients and partners and to assess how they fit with Sea Grant's national goals and priorities, the Commonwealth's particular needs and priorities, and the strengths of the VASG program. The priorities and potential partnership opportunities outlined in this foundation document represent a first step in beginning to identify where VASG can make the greatest contributions to shared national and state goals and where partnership opportunities exist to combine resources and efforts to make these shared goals a reality.

Beginning to Build the Agenda

Core Principles

Some core principles emerged from these initial planning discussions to guide the selection of five-year strategic priorities for VASG.

- VASG priorities will be closely aligned with national Sea Grant priorities as well as responsive to particular needs and opportunities within the Commonwealth.
- VASG will sustain and build upon current areas of excellence, but will also explore moving in new directions to address emerging challenges and opportunities.
- VASG will continue to emphasize the integration of research, outreach, and education activities--the foundation of the Sea Grant approach to solving problems.
- VASG will focus its energies on programs with demonstrable impacts that make a real difference in the future health and vitality of coastal resources and economies.
- VASG will collaborate with VIMS and NOAA partners and work closely with these and other partners to make sure the goals and objectives in the plan respond to identified needs and complement rather than duplicate work being done by others.
- VASG will pursue regional and national approaches to addressing problems and opportunities that reach beyond state borders.
- VASG will increase collaboration with minority serving institutions and programs, extending research and outreach opportunities, and meeting needs of culturally diverse coastal communities.
- VASG will look for ways to increase the funding available to the program so that it can continue important ongoing work, while moving into new areas of demonstrated need and opportunity.

Initial Focus Areas

In keeping with these principles, the following five major focus areas are suggested for VASG for the next five years:

- safe and sustainable seafood supply
- sustainable coastal development
- healthy coastal ecosystems
- hazard resilience in coastal communities
- coastal and ocean literacy

The first four areas are the focus areas in the national Sea Grant strategic plan. They include some current areas of program excellence for VASG as well areas of emerging importance. The fifth focus area, coastal and ocean literacy, is a high priority in the Commonwealth and an area of strength for the VASG program that contributes to long-term success in the other four focus areas.

In identifying potential priority activities within each focus area, this initial planning effort identified both strong existing programs that should continue and new activities to pursue if an appropriate role for Sea Grant is found and funding can be secured. Some of the potential new areas of activity that received the greatest attention during these initial discussions were:

- New port and marine transportation developments in the state.
- Ways to balance economic and environmental competition for water uses.
- Impacts of alternative energy development on the coast.
- Education of public officials.

These appear in one or more focus areas in this document, along with the many other ideas that emerged.

It is not anticipated that all of the priorities identified for consideration in this document will be included in the final plan. It is also likely that other ideas will emerge during the planning process. For each of the possible new activities, additional work must be done to determine areas of greatest need, where interested clients and partners exist, what Sea Grant's role and impact might be, and where additional funding might be found.

Potential Focus Area #1: Safe and Sustainable Seafood Supply

Safe and Sustainable Seafood Supply is a national focus area and an area of excellence for VASG. VASG, through its VIMS-based personnel, VA Tech's Virginia Seafood Agricultural Research and Extension Center in Hampton, and the Department of Food Science and Technology in Blacksburg, is actively involved with commercial and recreational ocean fishermen and a wide array of clients involved in aquaculture and seafood production, preparation and safety. The program has strong partnerships in place and expects to make ongoing contributions to this high national and state priority. Potential activities are organized under headings that track the national goals in this focus area.

A Sustainable Supply of Safe Seafood

VASG supports a wide range of research, outreach and education activities to maintain and develop sustainable wild fisheries and aquaculture in the ocean and the Chesapeake Bay. The program has supported research on fish habitat and migration patterns, gear and harvesting improvements, best management practices for shellfish aquaculture, and ways to optimize marine finfish aquaculture. VASG has partnered with the Virginia Marine Resource Commission on the Virginia Game Fish Tagging Program to track movement of finfish and to inform fisheries-management activities. Work is also being done on Atlantic Sturgeon restoration in the Chesapeake Bay and on ways to reduce discard mortality in Black Sea Bass. VASG personnel serve on state, regional, national, and private advisory bodies related to seafood safety and sustainability and administer the Virginia Fishery Resource Grants Program. Aquaculture outreach activities include continuing support of a biannual International Conference on Recirculating Aquaculture, a video project on the potential of aquaculture to meet demand for safe, healthy seafood, and assistance in the development of a variety of commercial aquaculture facilities.

Potential priority areas for the future include:

- Conduct research, outreach, and technology transfer activities to reduce unnecessary by-catch—in both commercial and recreational fisheries.
- Conduct research and outreach on the interactions between wild fisheries and protected species and ways to mitigate impacts of commercial fisheries on threatened and endangered species, including special management areas, marine protected areas, and adaptive resource management.
- Develop science-based information on the economic, social and environmental impacts of aquaculture development for local governments and others to help define what is meant by “sustainable aquaculture.”
- Work with local governments to promote understanding and management of aquaculture development, including identification of appropriate legal and regulatory frameworks and conflict resolution mechanisms.
- Conduct social, economic, and policy research and compile case studies that address the costs, benefits, and socio-economic impacts of aquaculture production activities in the state.
- Work on site-specific guidelines for aquaculture activities that take different local conditions into account and enhance local decision-making.
- Conduct research to provide a better understanding of the energy and water inputs required for commercial fishing and aquaculture activities.
- Work with stakeholders and partners on the development of improved fisheries-management practices and regulations.
- Support research on stocking programs.
- Work with the Virginia Marine Resources Commission and the Recreational Fishery Advisory Board to identify research and outreach initiatives to address recreational fishing issues and opportunities.
- Engage in aquaculture-related outreach and education to the public at large, watermen and others to provide quality, science-based information.
- Work with commercial and recreational fishermen to resolve conflicts on specific issues that emerge.

A Healthy Domestic Seafood Industry

VASG activities focus on generating and sharing knowledge about the effective production, marketing, and distribution of safe fish and shellfish products and on fostering the growth and development of related industries. Recent research activities include studies of the effects of high pressure processing on the quality, safety and shelf-life of seafood; alternative post-harvest production procedures to control pathogens and extend shelf-life of seafood; and aquaculture and human health.

A wide array of outreach and education activities related to seafood production, safety, quality, processing, and marketing are also taking place. These include HACCP workshops for seafood processing industry personnel, assistance in developing new-value added seafood products, and microbiological laboratory support to ensure safe, high-quality seafood products. VASG is also helping fish dealers comply with accepted good manufacturing practices and food safety regulations, and identifying innovative ways to work with non-English speaking members of the seafood harvesting and production labor force on a range of safety and production issues.

Potential priority areas for the future include:

- Conduct research and outreach on safe seafood handling, processing and storage from harvest through distribution.
- Conduct research on emerging pathogens and their control measures.
- Conduct research and outreach on market and valued added product development.
- Conduct workforce training related to safe seafood production.
- Conduct research and outreach on post harvest processes and emerging seafood production technologies to ensure safety and quality of seafood products.
- Provide education and outreach services to address labor supply and language issues in the seafood industry.
- Carry out social, economic and policy research on various parts of the seafood industry.

Informed Seafood Providers and Consumers

VASG has a number of educational programs designed to educate consumers and promote safe seafood practices. It produces fact sheets on seafood safety; aquaculture and fish disease; and proper seafood handling, storage and cooking. The annual Chefs' Seafood Symposium educates culinary professionals and seafood industry representatives about current research and trends in aquaculture and wild commercial fisheries. A 20-year partnership with the American Culinary Federation's Virginia Chefs' Association, and a variety of shellfish aquaculture education and outreach activities provide ways of disseminating science-based seafood information.

Potential priority areas for the future include:

- Provide science-based information on seafood safety and sustainability to a wide range of audiences.
- Integrate safe and sustainable seafood education activities more closely with other VASG outreach activities.
- Engage in outreach to low-income consumers and "subsistence fisheries" on seafood quality, safety, and preparation.

Potential Focus Area #2: Sustainable Coastal Development

VASG has been active in many areas related to sustainable coastal development, a second national focus area. The program has conducted applied research for local governments, facilitated access to financial capital for coastal industries, and conducted economic impact studies to inform decision-making by local governments and a wide range of coastal industries such as commercial fishing, recreational fishing and boating, tourism, and aquaculture development. The program has been a state and national leader on ways to create and maintain waterfront access. A number of areas of need and opportunity have been identified in the area of sustainable coastal development, but many Sea Grant partners are already actively involved in initiatives in this area. It will be important for VA Sea Grant to work with partners to determine where and how Sea Grant contributions can make the greatest impact in achieving shared goals, while responding to the call in the Sea Grant national strategic plan for greater attention to social, economic and policy research to address sustainable coastal development concerns. Possible Sea Grant priorities are organized around the national goals in this focus area.

Healthy Coastal Economies

VASG has worked with local communities to enhance waterfront economic activities including tourism and commercial and recreational fishing. It has conducted research on finfish aquaculture to reduce dependence on depleted wild stocks and on best management practices for many kinds of aquaculture activities to minimize negative environmental impacts. The program has been active in the Working Waterways & Waterfronts Initiative and the Virginia Marine Trades Training Program and has taken a lead role at both the national and state levels on coastal access issues by holding conferences and conducting economic studies to inform state and local public access planning.

Potential priority areas for the future include:

- Engage in research, outreach and education activities related to the sustainability of coastal economies and communities (eg. commercial and recreational fishing, marine transportation and trades, boating, tourism, socio-economic resilience, and other factors contributing to community sustainability.)
- Work with the VA Port Authority, maritime industry representatives, the U. S. Army Corps of Engineers and others to plan for and manage port expansion and development in the state, including dredging, development-environment interactions, impacts on localities, and conflict resolution.
- Continue to play a state and national leadership role in maintaining and expanding public access for coastal industries, by working with state and local governments, Virginia's regional Planning District Commissions (PDCs), commercial and recreational fishermen, and others.
- Provide a range of socio-economic tools and outreach services to assist coastal businesses and communities in their activities and decision-making, working with VA Tech and Virginia State Cooperative Extension Programs and other partners.
- Engage in outreach and education on sustainable economic development opportunities, including seafood related tourism development.

Sustainable Use of Coastal Land, Water and Energy Resources

One of Virginia Sea Grant's most significant initiatives in this area has been the highly successful Clean Marina Program promoting best management practices that protect water quality while promoting economic vitality. Much of VASG's research and outreach on aquaculture development relates to the sustainable use of land and water resources. Many of VASG's major partners, including the Virginia Coastal Zone Management Program (CZM) and the state's PDCs are actively involved in activities related to sustainable land, water and energy use, and this presents collaborative opportunities.

Potential priority areas for the future include:

- Continue to develop the Virginia Clean Marina Program, expanding participation and program components.
- Conduct social, economic and policy research to help understand and evaluate costs, benefits, and impacts of coastal land and water use and the ways in which trade-offs are made through public decision-making processes.
- Work with the Virginia Coastal Energy Research Consortium at ODU and others to build understanding of the costs and benefits of alternative energy development in coastal environments, including interactions with fisheries.

- Work with the Virginia Department of Environmental Quality, PDCs, VA Department of Game and Inland Fisheries and local jurisdictions on ways to turn coastal brownfields into usable property for things like boating access by identifying sites and developing guidelines and best management practices for waterfront redevelopment.
- Identify partnership opportunities to work on sustainable land, water and energy use with institutions such as VA Tech's Coastal Community Development Program and other VA Tech Cooperative Extension programs, UVA's sustainable development initiatives on the Eastern Shore, and Virginia State's Cooperative Extension program.
- Identify specific partnership opportunities to work with Virginia CZM and other appropriate federal, state, and local partners on blue-green infrastructure development and responsible waste disposal.
- Convene science-based and stakeholder-led conflict resolution activities to help competing coastal interests work together and foster collaboration on special geographic areas of interest to multiple stakeholders.
- Partner in developing education initiatives on green building and design standards and other emerging planning and sustainable development guidelines.

Sound Decision-making in Coastal Communities

VASG engages in an array of activities designed to provide science-based information to Virginia citizens and decision-makers. These activities include offering educational workshops and developing white papers and popular articles that translate applied research findings into useful information. VASG conducts economic impact analyses to inform the decisions of private clients and public decision-makers.

Potential priority areas for the future:

- Explore opportunities to address the need for coastal and ocean literacy among local public officials, building on the strengths of the current coastal and ocean literacy program and working with NERRS, Virginia CZM, VA Tech, PDCs, and others engaged in education and outreach with local officials. One notable potential partner identified in initial discussions is the Network for Educating Municipal Officials (NEMO) program in Virginia, which is part of a national network of education programs for local land-use officials that addresses the relationships of land use to natural-resource protection.
- Convene forums on specific topics in coastal decision-making to foster exchange of views and lead to more informed choices.
- Fund research on the social, economic, policy, and other human dimensions of public decision-making processes related to coastal and ocean resources.

Potential Focus Area #3: Healthy Coastal Ecosystems

Healthy coastal ecosystems are essential to the economic and environmental health of Virginia's coastal and ocean resources and communities. VASG supports a wide array of research activities to improve understanding and management of ecosystems along the Mid-Atlantic coast, including research on fish and oyster disease, algal blooms, and habitat health in the Chesapeake Bay. It provides maps, scientific information and education and outreach activities aimed at building understanding about ecosystem functioning and responsible resource management. This will continue to be an important area of activity for VASG as it identifies specific ways to contribute to the following national goals in this focus area.

Sound Scientific Data to Inform Management Decisions

VASG has supported scientific research in a number of areas designed to inform resource-management decisions. Recent activities include the Virginia Game Fish Tagging program-- which tracks target fish species important to VA's recreational fisheries and contributes to aquatic ecosystem baseline data as well as research on fish disease, menhaden population, harmful algal blooms, and Chesapeake Bay blue crab nursery and habitat use.

Potential priority areas for the future:

- Explore state and regional alliances to pursue an ecosystem-based management initiative focusing on the relationships between farmland, water quality and fisheries emphasizing Virginia's unique location at the mouth of the Chesapeake Bay.
- Continue to support development of baseline fisheries data and research on coastal habitat health and threats to coastal fisheries and environments.
- Conduct research on harmful algal blooms in the Bay and their impact on public health, fish health and aquaculture.
- Increase involvement with UVA's Virginia Coastal Reserve Long Term Ecological Research Program on Virginia's Eastern Shore.
- Explore the potential to partner on ecosystem health research with the Hampton University Center for Marine and Coastal Environmental Science and the Rice Riverine Research Center at Virginia Commonwealth University.
- Support research on social, economic, policy and environmental impacts of port expansion and development, including effects on coastal wetlands.
- Support invasive-species research that relates to other VASG programs (eg. ballast water problems at marinas and ports.)
- Support collaborative ecosystem health research with other VIMS centers, other universities in the state and region, and other Sea Grant programs in the region.
- Translate research findings into useful information for resource managers.
- Collaborate with others in the region on the development of a Chesapeake Bay Observation system to compliment other national and regional ocean observation systems.

Responsible Ecosystem Management

Ecosystem-based resource management is a complex conceptual approach that is in its infancy. Much of VASG's work contributes to building the foundation necessary to move to this type of management approach, but much more work is needed to advance understanding of the importance of integrated management and to build the institutional frameworks that will be required to make them a reality.

Potential priority areas for the future:

- Continue the Virginia Game Fish Tagging Program, which engages citizens in fisheries stewardship, demonstrating benefits of proper fish handling and release techniques, fishes' habitat needs, and the importance of the Chesapeake Bay as a unique environmental resource.
- Work with state agencies responsible for over-seeing state mandates on coastal resource management to identify opportunities to collaborate on advancing more ecosystem based decision-making at the regional, state and local levels.
- Work with the Virginia Coastal Energy Research consortium at ODU and others on providing the research, outreach and education needed for informed decision-making about energy infrastructure development along the coast.

- Work with NERRS, Virginia CZM and other partners to expand protection of special management areas and living shorelines and explore the utility of innovative concepts like ocean zoning.
- Continue education and outreach programs and events that focus on coastal ecology topics such as ecosystem stewardship and invasive species.
- Work with partners to advance incorporation of ecosystem based management approaches and decision-making structures.
- Fund research on the social, economic, policy, and other human dimensions of ecosystem-based management strategies and tools.

Restored Ecosystem Function and Productivity

Given its emphasis on addressing clients' needs, much of VASG's work in this area has focused on restoration of habitat for fisheries. The program's research on marine habitat in the Upper James River, on restoring Atlantic sturgeon in the Chesapeake Bay, and on blue crab nursery habitat in the Bay are all designed to increase understanding of these ecosystems in order to protect and restore them and maximize productivity.

Potential priority areas for the future:

- Continue to work with all partners inside and outside NOAA on research, programs and projects to support habitat restoration in the Bay and its tributaries.
- Continue education, outreach, and communication activities that demonstrate the ways in which the Bay is a critical nursery and grow-out area for recreational and commercial fisheries from New England to southeast US coastal waters.
- Continue to work with the Tidewater Oyster Gardeners Association on non-commercial aquaculture activities to improve water quality

Potential Focus Area #4: Hazard Resilience in Coastal Communities

Threats to Virginia's and the nation's coastal environments and communities are on the rise. Changes in the natural environment related to global climate change pose significant challenges. Increases in global trade are leading to port expansion, energy development and the potential for more marine transportation hazards such as oil spills. This has not been an area of focus for VASG in the past, but given the growing importance at the national level of fostering greater hazard resilience, VASG will explore opportunities to contribute to making Virginia's coastal communities more resilient in the face of these growing threats. As in all areas, the approach will be to work with partners to identify needs, build on existing strengths, and seek additional resources to support new initiatives.

Potential priority areas for the future:

- Work with the NOAA Office of Climate Change and others to expand public understanding about global climate change and its potential impacts on Virginia's coastal resources, businesses, and communities.
- Engage in education and outreach initiatives that get data from VIMS research on tides, waves, and sea level rise, as well as information from national and regional coastal ocean observation systems, into the hands of the public and private planners and managers who need it.

- Expand coastal economic impact studies for coastal industries to include hazard risk assessment.
- Build hazard assessment, planning and mitigation into the Virginia Clean Marina Program.
- Continue outreach activities related to responsible shoreline stabilization.
- Work with the Virginia Port Authority and others in the state and region on identifying and managing port-related risks and vulnerabilities to hazardous events and on understanding the potential impacts of such events on port economies and coastal ecosystems.
- Work with Virginia Department of Emergency Management to identify research, outreach and education needs in the areas of coastal hazard risk, management and mitigation.
- Conduct research, extension, education and communication activities on coastal community resilience and change management.

Potential Focus Area #5: Coastal and Ocean Literacy

VASG has a strong coastal and ocean literacy program that provides leadership in this area at both the state and national levels. It has a number of educational initiatives that contribute to achieving goals in the previous four focus areas, but it also offers marine education programs specifically designed for teachers, students and the general public. VASG works with a number of VIMS programs, NOAA partners and others to develop and carry out these initiatives. VASG has collaborated with several of the national Centers for Ocean Sciences Education Excellence (COSEE). It partners with the National Marine Educators Association (NMEA) in building and maintaining *The Bridge*, an online ocean-science education resource center that offers teacher-reviewed content on the web for teachers around the world. VASG plays a major leadership role in the Sea Grant Marine Education Network and is involved in a special project with NOAA's Office of Education to organize and maintain NOAA educational resources for teachers on-line. VASG is part of the National Ocean Sciences Bowl project, a collaboration linking ocean researchers and teachers nationwide. VASG carries out communication activities to compliment these education programs, including publishing the Virginia Marine Resource Bulletin and placing stories about Sea Grant's approach to coastal and ocean issues in the popular press. It is anticipated that coastal and ocean literacy will continue to be an area of focus and excellence for VASG.

Potential priority areas for the future:

- Continue to work with a wide range of national, state and local partners on the development and delivery of programs and materials for teachers and to promote the incorporation of coastal and ocean literacy programs throughout the entire educational curriculum.
- Continue to partner with NMEA and the National Sea Grant Office on *The Bridge* and other activities that organize and increase access to on-line coastal and ocean literacy resources.
- Continue to use ocean observation data being collected at the regional and national levels to develop educational projects and materials.
- Develop projects directed toward scientists to help them translate their work for non-scientific audiences and assist them in responding appropriately to the needs of user groups with content that specific audiences find meaningful and useful.
- Continue to translate VASG research, extension and education projects into stories for the Virginia Marine Resource Bulletin and popular newspapers and magazines.
- Increase the online profile and presence of VASG through the redesign of its website and explore new online communication tools such as e-newsletters and blogs.
- Explore opportunities to develop coastal and ocean literacy projects for a broader array of audiences to develop more informed constituencies.

- Explore opportunities to increase coastal and ocean literacy among public officials, working in partnership with the Center for Coastal Resource Management at VIMS, VA Tech and Virginia State Cooperative Extension Programs, NEMO, Virginia CZM, Virginia PDCs, and others already involved in programs to educate local officials.

The final item in the list above: education outreach to public officials was a topic discussed at some length during these initial conversations. The goal is to increase scientific literacy among local officials in order to support more informed decision-making. Ideas for specific activities included taking research findings and amplifying them through education; facilitating information delivery; convening forums on controversial issues; working with scientists to help them better understand the informational needs of public officials; and looking for ways to adapt existing educational materials and programs for this new audience. This reinforces the educational priorities identified in the Sustainable Coastal Development and Healthy Coastal Ecosystem focus areas and is an activity that would involve people throughout the VASG organization as well as a wide range of partners, reinforcing the national themes of partnership and integration across Sea Grant's research, extension, outreach and communication activities.

Next Steps

This foundation document provides a starting point for the next phase of strategic planning for VASG. Over the coming months, VASG will clarify which of its current activities and programs can make the greatest contributions to addressing the national, regional and state needs that have been identified. It will reach out to current and potential partners and funding sources to explore the value and potential of some of the new initiatives identified during this first stage in the process. Potential for synergistic benefits and impacts, complementary strengths, and consistency between Virginia and national Sea Grant missions and goals are factors that will guide future partnership activities.

In the second phase of planning to begin in the fall of 2008 and culminate with the completion of strategic and implementation plans in 2009, VASG will work with its External Advisory Committee and other major partners to select its final focus areas and identify the specific goals, activities, and measurable objectives that will be contained in those plans.