

Policy Portfolio

BUILDING A BRIDGE FROM SCIENCE TO POLICY

For nearly thirty years Maryland Sea Grant has supported marine-related science focused on important resource issues. At the same time, we have built a bridge between science and policy issues that now confront the region, from fisheries to watershed protection.

In 2005, when a Congressional committee considering whether to list the Eastern oyster as “endangered” called for an expert on oyster genetics, Maryland Sea Grant put them in touch with researcher Matthew Hare. Hare, who has worked with Sea Grant funds to identify possible subpopulations of oysters in the Chesapeake using genetic characteristics, testified in July before the U.S. House of Representatives Committee on Resources. Similarly, when the National Academy of Sciences sought an anthropologist to serve on a panel analyzing the potential for introducing the Chinese oyster, *Crassostrea ariakensis*, to the Chesapeake Bay, they chose Maryland Sea Grant-funded scholar Michael Paolisso, who has partnered with Sea Grant both to study and to collaborate with the Bay’s watermen.

From its position within the university, Sea Grant plays a unique role, working closely with the scientific community, but also remaining neutral and open to a range of stakeholders and viewpoints. Maryland Sea Grant has developed recognized skills in the area of synthesis and facilitation — summarizing and clarifying complex topics to help diverse groups come to consensus on agreed courses of action.

In the past five years, Maryland Sea Grant has engaged closely with others to address complex and often highly charged issues facing the Chesapeake Bay and its watershed. We have provided our expertise to:

- develop scenarios for the future of the Chesapeake Bay
- finance the cleanup of the Bay and its tributaries
- determine the best course for oyster restoration
- design a foundation for regional management plans for invasive species
- manage the Baywide blue crab fishery¹

The Mathias Medal

Since 1989, Maryland Sea Grant has joined with Virginia Sea Grant and the Chesapeake Research Consortium to recognize researchers who have made a significant contribution to policy through science. The vehicle for the recognition is the Mathias Medal, named for former Senator Charles “Mac” Mathias of Maryland, who led the call for a federally funded study that became the Chesapeake Bay Program. The Mathias Medal has honored only five researchers since its inception, and in 2004 Grace Brush of the Johns Hopkins University joined their ranks. Through her work on sediment cores and paleobotany, Brush has helped to paint a concrete picture of the Bay’s past, showing, for example, precisely when pollen grains shifted from trees to crops planted by early settlers. That shift was accompanied by a rapid influx of sediments and the beginning of the Bay’s transition from a bottom-dwelling ecosystem to one dominated by pelagic species, especially floating algae. For more on the Mathias Medal, see www.mdsg.umd.edu/Mathias.

¹ Maryland Sea Grant’s role in shaping fisheries policy for the blue crab is described in the Blue Crab portfolio.

Blueprint for the Bay

Chesapeake Futures. As the 21st century approached and the regional *Chesapeake 2000* agreement began to take shape, experts and the broad public alike started to ask very tough questions. How much progress were we really making in cleaning up the Chesapeake Bay? What was the future of the Bay likely to be? And what paths would lead us to an improved Bay rather than a degraded one?

The Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) took on the challenge of answering these questions. Comprised of scientists and engineers with a deep knowledge of the Bay, and with strong connections to the research community through the region's universities, laboratories and agencies, STAC was well positioned to tackle this task. They called their initiative *Chesapeake Futures*.

An ambitious effort followed, led by STAC and the multi-institutional Chesapeake Research Consortium. A number of meetings and the work of four workgroups generated important information about the current state of the Bay and what the future might look like, depending on what choices citizens and their businesses and governments made at the dawn of the 21st century. The group of experts determined that rather than attempting a set of predictions — always a tricky proposition — they would define three possible scenarios, each one tied to a set of behaviors and decisions:

- Scenario I — if recent trends (in housing, land use, nutrient inputs, sedimentation, air deposition) continue over the coming decades.
- Scenario II — if current commitments, such as the nutrient reduction goals set forth in the historic Bay agreement of 1987, are largely met.
- Scenario III — if a range of feasible but aggressive programs and technologies are put in place, for agriculture, land use, and other Bay-related issues, including transportation and sewage treatment.

Combining and shaping this wide range of information into a coherent articulation of the three scenarios posed a daunting challenge. STAC, led by University of Maryland Center for Environmental Science president Donald F. Boesch, chair of the *Futures* effort, tapped Maryland Sea Grant to help the team synthesize, organize and refine its final report.

Sea Grant's Assistant Director for Public Affairs, Jack Greer, became, with D. F. Boesch, a co-editor of the report, and helped to write context-setting chapters for the document as well as

Maryland Sea Grant and the Ocean Commission

When Congress established the U.S. Commission on Ocean Policy it was clear that this landmark effort would have a significant impact on the nation's ocean programs and strategies over the next several decades. And when, in the fall of 2002, the Ocean Commission invited Maryland Sea Grant's Assistant Director for Research Fredrika Moser to join the Commission's staff, we recognized the valuable role she could play in providing assistance to this historic initiative.

In her role as a consultant, Moser, who is an environmental geochemist by training, worked with Commission staff to provide input and specifically to help research, write and edit two chapters for the Commission's report: "Managing Sediment and Shorelines," and "Preventing the Spread of Invasive Species." As one of a few consultants with first-hand knowledge of Sea Grant and of the challenges and rewards of coordinating across local, regional and national boundaries, Moser, when asked, also provided insights from her experiences with Sea Grant.

On September 20, 2004, the U.S. Commission on Ocean Policy fulfilled its mandate to submit recommendations for a coordinated and comprehensive national ocean policy to the President and Congress. The Commission's final report, "*An Ocean Blueprint for the 21st Century*," contains 212 recommendations addressing all aspects of ocean and coastal policy.

shape technical presentations provided by members of the workgroups. The result, a 160-page report, *Chesapeake Futures: Choices for the 21st Century*, has been well received and touted as a model for other regions attempting to chart a course for their own environmental futures.

As the report made clear, only the third scenario, of aggressive and creative programs aided by new or better-employed technologies, will lead to a Bay that begins to resemble the Chesapeake of the 1950s.

Ecosystem Resilience and Adaptive Management. To envision a forward trajectory for restoration of the Bay that shifts it to a state more closely resembling the 1950s draws upon the concept of ecological resilience, a framework that has helped to guide Maryland Sea Grant's thinking. Resilience is a measure of the ability of an ecosystem to withstand perturbation without a fundamental change in state. Resilience is what allows an ecosystem to recover from a storm, but it is also what makes it difficult for management efforts to "flip" that system out of an undesirable state and into a more desirable one. As ecosystems shift and change, so management must adjust and adapt to results of policies and responses from natural systems.

In order to explore resilience and adaptive management and to inject these concepts into the public discussion, in February 2005 Maryland Sea Grant director Jonathan Kramer along with Drs. Donald Boesch (UMCES) and Margaret Palmer (UMCP) organized and facilitated a panel at the annual AAAS meeting held in Washington, D.C. entitled "Transcending Boundaries: Challenges for Holistic Restoration in the Chesapeake Watershed." This session brought together eminent scientists in the region along with national experts in ecosystem processes, including Lance Gunderson, vice-chair of the Resilience Alliance — scientists and practitioners from many disciplines who explore the dynamics of social-ecological systems. Maryland Sea Grant wrote and issued a press release (using the online *Eurekalert*) and worked with SeaWeb, a national communications-based ocean conservation nonprofit organization, to prepare speakers for a press briefing attended by more than 20 journalists.

Informing the policy process with complex concepts such as ecosystem resilience, adaptive management and watershedwide restoration will remain a central challenge for Maryland Sea Grant as we continue to provide a science-to-policy link in the public arena.²

Innovative Solutions to Watershedwide Problems

Chesapeake Bay Watershed Blue Ribbon Finance Panel. In 2003 the regionwide Chesapeake Bay Program marked twenty years since the historic Bay agreement of 1983. At the same time, it faced the difficult reality that it had not met goals set for the year 2000 — especially for reducing nitrogen flowing into the Bay. The governors of the Bay states and the other members of the Chesapeake Executive Council realized that a major barrier to progress was a lack of adequate funds. At their December 2003 meeting they called for the establishment of a Blue Ribbon Panel to explore the financing challenge facing the Chesapeake clean-up effort.

As the Chesapeake Bay Watershed Blue Ribbon Finance Panel took shape, the Bay Program needed assistance in gathering and synthesizing information and in facilitating the fast-paced process. They turned to Maryland Sea Grant.

Beginning in 1992, Maryland Sea Grant had, with additional support from the U.S. EPA, worked to establish an Environmental Finance Center. The Finance Center pulled together experts from the public and private sectors, including fund managers, insurance experts, public utility experts and others, to recommend ways of paying for environmental projects. In the mid-1990s the Governor of Maryland asked the EFC and Sea Grant to help facilitate a panel on financing Maryland's Tributary Strategies. The result was a 120-page compendium of creative funding tools entitled *Financing Alternatives for Maryland's Tributary Strategies*. When the

² At Sea Grant Week 2005 in Rockport, Maine, Maryland Sea Grant received an award for its efforts in "Communicating Ecosystem Restoration."

Chesapeake Bay Program needed assistance in facilitating the Blue Ribbon Finance Panel they too turned to Maryland Sea Grant and the Environmental Finance Center.

The Panel, comprised of governmental leaders like Bruce Babbitt, business leaders like Jim Perdue and environmental leaders like Will Baker of the Chesapeake Bay Foundation, deliberated for almost nine months. In October 2004, under the capable guidance of chair and former Virginia governor Gerald L. Baliles, they released *Saving a National Treasure: Financing the Cleanup of the Chesapeake Bay*. This 40-page report details the challenges facing the Bay clean-up effort, and bold approaches for generating and securing finances necessary to meet those challenges.

Maryland Sea Grant's Assistant Director for Communications and Public Affairs helped to facilitate several panel meetings, helped to coordinate interactions among planning committees and support staff, and played a central role in providing background documentation and syntheses. He was responsible for the editing, design and production of the final report. Partly for his role in this effort, Jack Greer was awarded the 2005 University of Maryland Center for Environmental Science President's Award for Excellence.

Environmental Finance Center

The Environmental Finance Center itself represents a Sea Grant success story. Hosted by Maryland Sea Grant since 1992 and directed by the Assistant Director for Public Affairs (who in 1992 was also serving as the Director of the University's Coastal and Environmental Policy Program), the EFC has reached maturity and in January 2005 was passed to the University's Institute for Governmental Service, an effective long-term home for the Center. At the same time, the Coastal Communities program spearheaded by Sea Grant Extension has continued to build strong links with the EFC, the Institute for Governmental Service, and other assistance providers, including the University's Center for Smart Growth, and the Center for Agro-Ecology. Environmental finance has become one cornerstone of a broader outreach effort to assist coastal communities. This incubation and launching of a special initiative is very much in keeping with the Sea Grant model.

Upon receipt of the Blue Ribbon Panel report, the governors of the Bay states and the other members of the Chesapeake Executive Council called for the formation of a committee to explore potential models for a Chesapeake Bay Financing Authority. Again the Bay Program requested the assistance of Maryland Sea Grant and the EFC, and during the spring and early summer of 2005 Sea Grant's Assistant Director for Public Affairs facilitated all meetings of the Committee. The committee's report was submitted on July 1, per the request of the Executive Council, and before the end of 2005 the Council is expected to respond to the recommendations of this report.

Stewardship of the Bay's Living Resources

Oysters in the Chesapeake. Much more than a popular appetizer, oysters represent both economic livelihood and ecological promise for the state of Maryland. They reflect a time when coastal communities were built on a thriving oyster industry, and the Bay itself had clear waters and abundant aquatic vegetation, partly maintained by the filtering power of billions of bottom-dwelling mollusks. For years Maryland Sea Grant has played a key role in supporting oyster research and oyster aquaculture. Maryland Sea Grant Extension Specialist Donald Meritt has, in the UMCES Horn Point hatchery, raised over ninety percent of the spat-on-shell used in Maryland's oyster restoration effort. In addition, Sea Grant has supported research into oyster biology and the oyster's role in the Bay's ecosystem.

During the past two years a critical need to bridge science and policy led Maryland Sea Grant to co-sponsor two important meetings focused on oyster restoration, both held in Annapolis, Maryland:

- *Oyster Research and Restoration in US Coastal Waters: Strategies for the Future*, September 8-9, 2003. Co-sponsored with the NOAA National Sea Grant Program and the Virginia Sea Grant Program, this conference:
 - Summarized the status of oyster fisheries in the U.S.
 - Shared recent developments at the leading edge of oyster disease research.
 - Synthesized developments for management and restoration of oyster populations.
 - Provided the foundation for subsequent NOAA Oyster Disease Research Program RFPs.
- *Identifying and Prioritizing Research Required to Evaluate Ecological Risks and Benefits of Introducing Diploid Crassostrea ariakensis to Restore Oysters to Chesapeake Bay*, December 2-3, 2003. Sponsored by the Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) and co-chaired by Maryland Sea Grant director Jonathan Kramer, this workshop articulated four critical research questions:
 - Can self-sustaining populations of *C. ariakensis* be established in the Bay, and is there a greater likelihood of successful restoration using other strains of *C. ariakensis* than using wild or disease-tolerant strains of *virginica*?
 - What risks does *C. ariakensis* pose to *C. virginica* and other bivalves within the Chesapeake Bay and in regions outside the Chesapeake?
 - What ecosystem services (e.g., water quality improvement through provision of vital habitat) might be provided by *C. ariakensis* relative to those already demonstrated for *C. virginica*?
 - Will *C. ariakensis* accumulate human pathogens to a greater degree than *C. virginica*, thereby impacting the economic viability of the fishery?

By organizing and shaping such scientific gatherings, Maryland Sea Grant has collaborated with others to clarify and sharpen the status of current science and the nature of the difficult questions that still confront us. Maryland Sea Grant is continuing to hone our knowledge of how an exotic oyster such as *C. ariakensis* compares with the growth and parasite-tolerance of the native oyster, *C. virginica*, by funding research targeted at precisely these questions. We will continue to provide objective information and scientific syntheses as decision makers wrestle with such issues as introductions of non-native species or disease-resistant strains.

Exotics in the Chesapeake. The issue of non-native species goes far beyond the current controversy over the potential introduction of the Chinese oyster to the Chesapeake Bay. A number of species — some introduced intentionally, like the beautiful but destructive mute swan, and others by accident — have become invasive and damaged local ecosystems.

To help address this issue, and playing the role of objective integrator and neutral forum, Maryland Sea Grant Assistant Director for Research, Fredrika Moser organized and facilitated a meeting designed to develop initial management plans for six targeted aquatic non-native species in the Chesapeake region. Entitled *Invasive Species in the Chesapeake Watershed* and held in Baltimore on May 7-8, 2002, the workshop focused on mute swan, nutria, phragmites, purple loosestrife, water chestnut, and zebra mussels.

The comprehensive report from the workshop formed the framework for finalizing regional management plans for each of these six targeted species.³ This report and workshop helped lead to the formation of a Mid-Atlantic Regional Panel on exotic species, as part of the national Aquatic Nuisance Species Task Force. Maryland Sea Grant is an active participant and supporter of this Regional Panel whose goal is to help build local, state and federal partnerships to effectively prevent and control the spread of invasive species.

Poised for Future Policy Challenges

Maryland Sea Grant has played a singular role as an honest broker in the policy arena over the past 20 years, building lasting credibility. Over the course of the past five years, Maryland Sea Grant has made key contributions to the policy landscape of the Chesapeake watershed. One of the most important aspects of doing this policy work is our rapid response capability for future challenges. We will plan for continued involvement in critical policy projects, such as the ongoing meetings of the Chesapeake Bay Commission's Bi-State Blue Crab Technical Advisory Committee. We will also be ready for important and exciting challenges that we may not yet envision. Our dependable role as unbiased information providers with known skills in facilitation and synthesis will continue to place us at the crossroads of critical policy issues in the Chesapeake Bay region.

IMPACTS: CONTRIBUTIONS TO POLICY

Sea Grant has participated in policy efforts that have led to:

- A set of recommendations for the governors of the Bay watershed and the other members of the Chesapeake Executive Council detailing potential models for a Chesapeake Bay Financing Authority.
- Widespread press coverage for both the Blue Ribbon Panel and the *Chesapeake Futures* report.
- The involvement of the Bay Program's Citizen's Advisory Committee, whose student representative took on the project of creating a PowerPoint lecture to describe to other groups the intent and conclusions of *Chesapeake Futures*.
- The assertion into public dialogue of complex ecological concepts, such as ecosystem resilience and adaptive management. The Sea Grant-sponsored symposium on holistic watershed management at the 2005 AAAS meeting garnered 737 hits by reporters and others on the Eurekalert website.
- A bill that imposes restrictions on the state's plans to introduce nonnative oysters into the Chesapeake Bay was passed by the Maryland legislature, a result of the scientific and environmental communities calling for caution and adequate study.

³ See the workshop report included on the ancillary CD under Policy Portfolio.