



MARYLAND SEA GRANT

2015 Annual Report



*Science Serving
Maryland's Coasts*

MESSAGE FROM THE DIRECTOR



MICHAEL W. FINCHAM

It is with much pleasure that we provide to you our 2015 annual report highlighting some of the successes we achieved last year through partnerships we created with university researchers, outreach professionals, resource managers, decision makers, and a variety of environmental and community organizations. These partners, along with our exceptional advisory committees and our excellent staff, help drive our program's strong contributions to current efforts to achieve healthy and resilient coastal watersheds in Maryland and the Mid-Atlantic region. Our key partner, the University System of Maryland (USM), has provided unwavering support since Maryland Sea Grant began work nearly 40 years ago. As a result of that strong

base and those long-standing partnerships, we have been able to respond to some remarkable opportunities to engage with Maryland citizens and communities. In January 2015, the strength of these collaborations was commended during a four-year review by a site review team and panel appointed by the National Sea Grant office. That review ranked Maryland Sea Grant as one of the top Sea Grant programs in the country.

This sampling of our 2015 projects highlights the work of our partners and staff in the areas of research, education, communications, and Extension. Maryland Sea Grant supported scientists whose research helped clarify how the Conowingo Dam affects downstream estuarine processes, how to respond to invasive species, and how to improve the replanting of riparian forests and the stabilizing of eroding shorelines. Much of our research and outreach focused on achieving sustainable fishery harvests and ensuring the delivery of safe seafood products from Maryland waters. In addition, many of our outreach efforts assisted communities interested in implementing stormwater management practices. Our funding supported eight faculty-led research projects, 15 graduate students, and over 35 undergraduates. Our magazine *Chesapeake Quarterly* and our two blogs created accessible, in-depth explanations of current research and examined its applications to environmental issues and public policy discussions. In addition, our Extension agents, working closely with our community and industry partners, developed innovative outreach and training projects to help grow jobs, strengthen our regional economy, and improve the health and productivity of the estuary.

We hope you enjoy this report and welcome you to join with Maryland Sea Grant as we work to preserve and restore Maryland's beautiful coastal waters and the stunning landscapes that surround them. We value your thoughts and comments, so please don't hesitate to contact any of our team.



Fredrika C. Moser, Ph.D.
Maryland Sea Grant



SKIP BROWN

PROGRAM PRIORITIES

Our activities in 2015 reflected priorities described in the four focus areas of our 2014–2017 strategic plan. These are the focus areas and examples of our work in each.

Resilient Ecosystem Processes and Responses: Support scientific research and synthesis to help inform management of the Chesapeake and coastal bays and their watersheds

Resilient Communities and Economies: Grow jobs and businesses in Maryland's aquaculture industry; assist local partners to manage stormwater, improve water quality, and plan for coastal flooding and other effects of climate change

Sustainable Fisheries and Aquaculture: Provide technical analyses and training to help expand Maryland's aquaculture, fishing, and seafood industries; advise seafood businesses about food safety and processing technology; build understanding of fisheries science and the economic value of Maryland's fisheries

Effective Environmental Science Education: Promote education, both formal and informal, as the foundation for building communities that understand environmental issues and engage in decision making



SKIP BROWN

PROGRAM HIGHLIGHTS FROM 2015

Building Resilient Communities

Extension specialists help to create a new regional certification for Bay-friendly landscapers ■ The Chesapeake Bay Landscape Professional certification will enhance the pool of highly qualified conservation landscape professionals in the Chesapeake watershed and enhance the marketability of their services.



SANDY RODGERS

Seafood processors and oyster shippers in Maryland receive training to improve food safety ■ Our

Extension program's Seafood Safety Specialist trained 61 industry members to become certified in Hazards Analysis and Critical Control Points (HACCP) procedures to ensure food safety, as required by the federal government. In addition, 12 businesses, or nearly two-thirds

of the state's crab processors, voluntarily participated in the Maryland Crabmeat Quality Assurance Program.

Maryland oyster farmers get technical training and support to start and expand aquaculture businesses ■

Extension specialists provided guidance to help 130 producers learn business skills to run aquaculture operations. In 2015 an Extension specialist helped applicants obtain \$185,000 in new loans for shellfish aquaculture businesses.

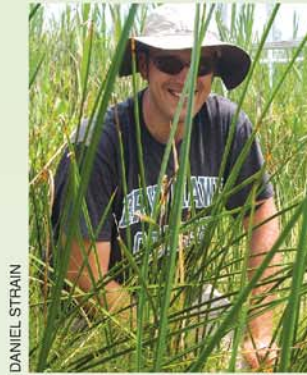
A new coordinator will assist communities and managers to better understand and plan for coastal changes associated with sea level rise and flooding ■ An Extension specialist

hired in 2015 will help partners in the Chesapeake Bay Sentinel Site Cooperative collaborate in using their environmental data collected at seven sites.

Understanding Coastal Ecosystems

Different types of shoreline stabilization techniques in Chesapeake Bay, such as hardened and natural shorelines, are associated with different patterns of local sedimentation, researchers find ■

Resource managers can apply these research findings to improve predictions of the effects of human-driven shoreline modifications on the estuary's water quality and the abundance of submerged aquatic vegetation.



DANIEL STRAIN

threaten to alter local ecosystems and fisheries. The findings indicate that local land use managers may limit future *Phragmites* expansion by limiting nitrogen availability.

Scientists develop a predictive model to help improve the survival of trees planted to restore and conserve riparian forests ■

Conservation groups are planting trees to improve water quality in the Chesapeake Bay. The model can be used to identify tree species suited to survive in floodplains under a variety of hydrological conditions in Maryland, including prolonged inundation.

Elevated levels of nitrogen and carbon dioxide in marshes directly facilitate increased rates of invasion of *Phragmites*, the common reed, a research team discovers ■

Phragmites invasions

Researchers create an easy-to-use decision-support tool to help local planners understand the effects of land use on nutrient loading and ecosystem response in coastal bays on the Delmarva Peninsula ■

Dozens of users have since accessed this sophisticated spreadsheet tool and users' guide.

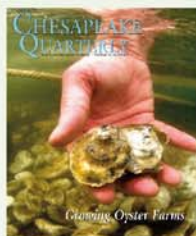
Scientists study winter blooms of a dinoflagellate species in Chesapeake Bay that can play an important role in the food web that supports the estuary's population of striped bass ■

The findings could help to refine management of this fishery.

Communicating Scientific Findings

We launch a new blog, *On the Bay*, that explores science and its use to improve the Bay and inform policy ■

In a separate blog, *Fellowship Experiences*, students supported by Maryland Sea Grant described their scientific work and professional development.



Four issues of our magazine *Chesapeake Quarterly* explore important topics facing the Bay ■

Subjects included stream restoration and the

development of the Bay's oyster aquaculture industry.

Our staff videographer produces eight hours of oral history interviews with former State Senator Bernie Fowler ■

The pioneering advocate for restoring the Chesapeake Bay talked about his role in politics and the decades-long environmental cleanup.



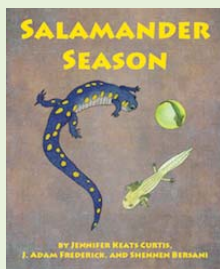
SKY SWANSON

Training and Education

A children's book about salamanders and environmental science wins recognition in a national competition ■

Salamander Season, co-written by Maryland

Sea Grant's assistant director for education, received the AAAS/Subaru SB&F Prize for Excellence in Science Books.



Public schools expand the use of aquaponics as a tool to teach students about science and engineering and using them to solve practical problems ■

Teachers attended a week-long professional development summer workshop run by Maryland Sea Grant staff. We also helped students at Baltimore Polytechnic Institute to build an aquaponics laboratory, the largest such facility in a Baltimore City school.

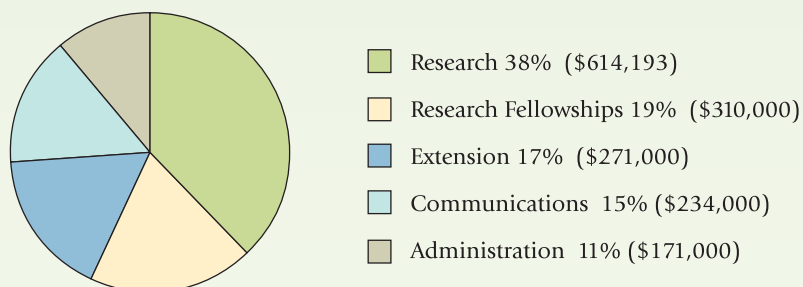
Undergraduates conduct original research about the Chesapeake Bay ■

Maryland Sea Grant supported student research programs in the University of Maryland's Gemstone Honors Program, which serves to meet America's need for a scientifically literate public and a trained workforce. Sea Grant funded four Gemstone undergraduates to travel to Barcelona, Spain, and present their research findings at the Society of Environmental Toxicology and Chemistry (SETAC) meeting.

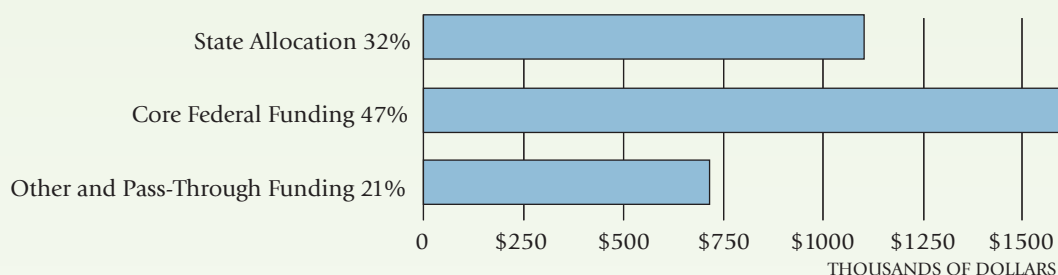
Maryland Sea Grant sponsors highly competitive graduate fellowship programs that support students pursuing research and policy activities important to the Chesapeake Bay ■ During 2015, 12 students were supported to conduct research projects at seven Maryland institutions, and three students were placed in federal offices as Knauss Marine Policy Fellows.

BUDGET OVERVIEW

Core Federal Funding 2015 (Total: \$1,600,193)



All Funding Sources 2015 (Total: \$3,423,804)



MARYLAND SEA GRANT STAFF

Maryland Sea Grant Office

Director's Office

Fredrika Moser, Director

Research and Administration

Mike Allen, Associate
Director for Research and
Administration

Jenna Clark, Program and
Planning Assistant

Kim Cox, Business Manager

Theresa Lee, Grants
Coordinator

Jeannette Connors, Personnel
and Travel Coordinator/
NMEA* National Office
Manager

Information Technology

Dan Jacobs, Information
Technology Manager/
Webmaster

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Adam Frederick, Assistant
Director for Education

Communications

Jeffrey Brainard, Assistant
Director for Communications

Michael W. Fincham,
Writer/Film Producer

Daniel Pendick,
Writer/Editor

Sandy Rodgers,
Art Director/Editor

Maryland Sea Grant Extension Offices

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Mid and Upper Eastern Shore
Watershed Restoration
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Vicky Carrasco,
Coastal Communities
Specialist, College Park, MD

Jennifer Dindinger,
Lower Eastern Shore
Watershed Restoration
Specialist, Cambridge, MD

JENNIFER DINDINGER



Jorge Holzer,
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Seafood Technology Specialist,
Princess Anne, MD

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Aquaculture Specialist,
Cambridge, MD

Matt Parker,
Aquaculture Business
Specialist, Clinton, MD

Amanda Rockler,
Central Maryland Watershed
Restoration Specialist,
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Krisztian Varsa,
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Donald Webster,
Eastern Shore Agent,
Queenstown, MD

Sarah Wilkins, Coordinator,
Chesapeake Bay Sentinel Site
Cooperative, Annapolis, MD

*Maryland Sea Grant hosts the national office for the National Marine Educators Association (NMEA).
For full addresses and contact information for our staff, visit the web at: www.mdsg.umd.edu/our-office.



MARYLAND SEA GRANT

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RESEARCH PROJECTS FUNDED FOR 2015

Projects Led by Faculty

Evaluating the relative impacts of the recreational and commercial sectors of the blue crab fishery in Maryland; Anson H. Hines, Smithsonian Environmental Research Center; *Robert Semmler**

From genes to ecosystems: integrating measures of aquatic biodiversity and ecosystem health within urbanizing Bay watersheds; Robert Hilderbrand, University of Maryland Center for Environmental Science (UMCES) Appalachian Laboratory; *Sarah Laperriere*

Phragmites australis invasion in the Chesapeake Bay: implications of nitrogen pollution, elevated CO₂, and genotypic variation for tidal marsh management; Patrick Megonigal, Smithsonian Environmental Research Center

Retrospective analysis of nutrient and sediment loadings to the Chesapeake Bay: exploration of trends and affecting factors; William P. Ball, Johns Hopkins University

Role of a resilient submersed plant bed in mitigating the effects of increasing river-borne particulate inputs to Chesapeake Bay: nutrient

cycling; W. Michael Kemp, UMCES Horn Point Laboratory; *Cassie Gurbisz*

Role of a resilient submersed plant bed in mitigating the effects of increasing river-borne particulate inputs to Chesapeake Bay: sediment dynamics; Lawrence P. Sanford, UMCES Horn Point Laboratory; *Jia Gao*

Understanding Atlantic menhaden population dynamics through use of data from a large-scale historical tagging study; Michael Wilberg, UMCES Chesapeake Biological Laboratory; *Emily Liljestrang*

Understanding the effectiveness of the watershed stewards academies in Maryland; Dana Fisher, University of Maryland, College Park; *William Yagatich*

Projects Led by Graduate Fellows

Application of an individual-based model to understand the effects of climate change on blue crab, *Callinectes sapidus*, population; *Hillary Lane Glandon*, UMCES Chesapeake Biological Laboratory

Diet and feeding of menhaden using barcoding identification based on Cox1 sequences to enable the linking of primary productivity to fisheries;



DEBBIE HINKLE

Ammar Hanif, UMCES Institute of Marine and Environmental Technology

Exploring the connectivity of sediment transport in upper Chesapeake Bay; *Emily Russ*, UMCES Horn Point Laboratory

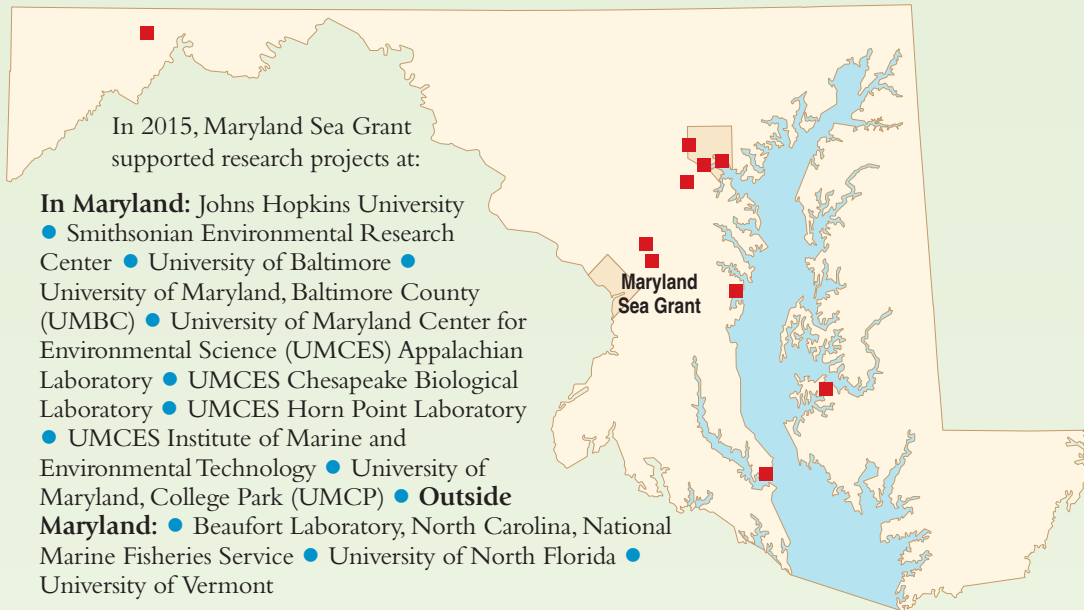
Fate of carbon produced by winter dinoflagellate blooms; *Nicole Millette*, UMCES Horn Point Laboratory

Riparian buffer indicators of eco-hydraulic function for improved watershed management and monitoring; *Molly Van Appledorn*, University of Maryland, Baltimore County

Understanding the complex roles that green infrastructure can play in improving the resilience of coastal urban zones; *Rhea Thompson*, University of Maryland, College Park

**Names of Maryland Sea Grant Graduate Research Fellows who worked on projects are in italic*

RESEARCH PARTNERS



PROGRAM GOVERNANCE

Maryland Sea Grant is administered by the University of Maryland Center for Environmental Science (UMCES).

External Advisory Board (EAB)

Mr. Dave Blazer, Maryland Department of Natural Resources, Fisheries
Mr. Mark Bryer, The Nature Conservancy
Dr. Jana Davis, Chesapeake Bay Trust
Mr. Marty Gary, Potomac River Fisheries Commission
Mr. William Matuszeski, U.S. EPA Chesapeake Bay Program (retired)
Dr. Beth McGee, Chesapeake Bay Foundation
Dr. Thomas Miller, UMCES Chesapeake Biological Laboratory (AAC liaison)
Mr. Adam Ortiz, Prince George's County Department of the Environment
Mr. Eric Schwaab, National Fish and Wildlife Foundation
Ms. Ann Swanson, Chesapeake Bay Commission
Mr. Dave Wilson, Conservation Community Consulting, LLC

Academic Advisory Committee (AAC)

Dr. William Boicourt, UMCES Horn Point Laboratory
Dr. Marie Bundy, NOAA Estuarine Reserves Division
Dr. Maurice Crawford, University of Maryland, Eastern Shore
Dr. Patricia Delgado, Jug Bay Wetlands Sanctuary
Dr. Lynn Fegley, Maryland Department of Natural Resources
Dr. Solange Filoso, UMCES Chesapeake Biological Laboratory
Dr. Amy Freitag, Virginia Sea Grant
Mr. Brent McCloskey, Environmental Finance Center
Dr. Thomas Miller, UMCES Chesapeake Biological Laboratory
Dr. Meredith Muth, NOAA Climate Program Office
Dr. Jay Nelson, Towson University
Dr. Peter Tango, USGS at Chesapeake Bay Program Office

"Maryland Sea Grant Extension brings insight to the subject matter, and their practical experience of conveying information to the public is so wide." — Linda Luke, Village Gardeners, Sykesville, MD, describing the Chesapeake Bay Landscape Professional certification program