

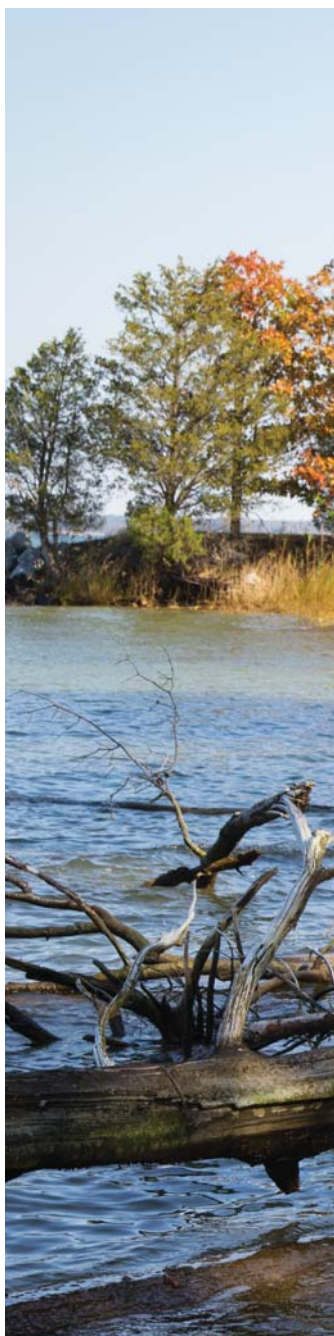
MARYLAND SEA GRANT

*Science Serving
the Chesapeake*



2014 Annual Report

Message from the Director



SKIP BROWN

In 2014, Maryland Sea Grant began pursuing a new, four-year strategic plan, which is guiding our new research, education, and outreach efforts in collaboration with our partners in academia, government, private industry, and the non-profit community.

UMCES/CHERYL NEMAZIE



Together we explored new opportunities to support the restoration and sustainability of the Chesapeake and our coastal bays and watersheds.

This annual report provides a sampling of our efforts and accomplishments. From our university base, we have the unique opportunity to fund scientists' research and synthesize their findings on issues important to preserving Maryland's environment, building our economy, and educating our citizens. This year, we are highlighting our successes in aquaculture research and outreach. Our Extension agents worked with seafood companies and scientists to strengthen oyster aquaculture production in the state's waters. Expanding production has created new jobs and provided locally sourced seafood for our citizens. In addition, our long-running education program Aquaculture in Action reached students and teachers in more schools than ever. By training teachers to use aquaculture systems, our educators create opportunities for hands-on experiential learning in high schools and for innovative, cross-disciplinary science courses that can prepare Maryland students to compete in an economy built on rapidly changing technologies.

Our terrific staff and wonderful collaborators devote their energies to helping Maryland grow a strong economy and continue its long-standing commitment to environmental sustainability. We encourage you to visit our website, www.mdsg.umd.edu, all year long. There you'll find new features such as blog posts by our students and science writers about recent scientific discoveries that are critical to understanding and preserving Maryland's beautiful watersheds and coastal areas. We value your thoughts and comments, so please don't hesitate to contact any of our team.

A handwritten signature in blue ink, which appears to read "Fredrika C. Moser".

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

Program Priorities



Our accomplishments for 2014 reflect priorities from the four focus areas described in our 2014–2017 strategic plan. Here are examples of activities we supported in each area.

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

Understanding Coastal Ecosystems

Innovative model improves our understanding of excess nutrients and sediments in the Chesapeake's major tributaries ■ With partial support from Maryland Sea Grant, researchers refined our understanding of Bay water quality, providing new information to improve watershed management and inform permitting decisions for the Susquehanna River's Conowingo Dam.

Workshop fosters new partnerships to detect and manage harmful algal blooms ■ Scientists, natural resource managers, and officials from four Mid-Atlantic states explored using satellite data to inform effective responses to blooms in the Chesapeake mainstem and tributaries and in the coastal bays. Summertime blooms can shut down beaches and threaten drinking water and aquaculture operations.



Public education campaign warns anglers that live bait worm packaging carries invasive species ■

Extension specialists from Maryland Sea Grant and its partners developed and distributed pamphlets and stickers to fishers and bait shop owners in five Mid-Atlantic states encouraging them to properly dispose of seaweed packaging used to ship blood worms.

Seaweed grown at oyster aquaculture operations brings income and improves water quality ■ Scientists we funded showed that cultivating seaweed (macroalgae) near oyster farms in the Chesapeake offers an economically valuable crop for biofuels or feedstock and sequesters excess nutrients from the water.

Building Resilient Communities



MICHAEL W. FINCHAM

Extension specialist trains seafood processors and shippers to improve food safety ■ Maryland Sea Grant Extension's seafood technology specialist taught courses on how to comply with HACCP (Hazard Analysis and Critical Control Point), as required by the federal government. In addition, the specialist oversaw the Maryland Crabmeat Quality Assurance and Inspection Program. Thirteen businesses — nearly two-thirds of the state's crab processors — participated in this voluntary program to avoid the spread of food-borne illnesses.

Academies train watershed stewards to improve water quality in the Chesapeake Bay and its tributaries

Extension watershed restoration specialists helped start a new watershed stewards academy in Cecil County and supported three existing ones across the state. The academies have prepared more than 320 master watershed stewards — community leaders who have helped to implement stormwater management practices that treated 25,000 square feet of impervious surface and mobilized 4,000 volunteer hours.

Marylanders receive training and loans to set up shellfish aquaculture operations

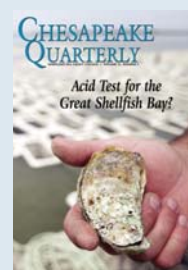
Extension fisheries specialists helped train 31 harvesters to grow oyster seed (spat on shell) in remote setting tank systems and helped these new growers secure more than \$400,000 in loan commitments to start their own oyster-aquaculture businesses.

Communicating Scientific Findings

In-depth project highlights the causes and effects of sea level rise in the Chesapeake Bay region for policy-makers and non-scientists ■ We used our *Chesapeake Quarterly* magazine and an interactive website (www.chesapeakequarterly.net/sealevel) to explain how sea level rise disproportionately affects Maryland's coastal residents and environment. The project, a partnership with *Bay Journal* newspaper, won two national awards and was noted as a best management practice for Sea Grant nationally.

An issue of *Chesapeake Quarterly* magazine about acidification in the Bay spurs concern about the subject from Maryland's state government

As a result of information in the magazine the state created a task force that studied the subject and recommended responses.



Views of Maryland Sea Grant videos on YouTube more than doubled in one year, to 73,000

To expand access to our educational videos, we digitized three VHS-format productions on finfish aquaculture and uploaded them to our YouTube channel. Two were very popular, receiving 32,705 and 10,065 visits in 2014.



Training and Education

Fellowships support 38 students conducting marine research and policy work

■ Maryland Sea Grant supported 16 research fellows at eight Maryland institutions and three Knauss fellows working in federal offices. The summer Research Experiences for Undergraduates program supported 18 students. In addition, we sponsored an undergraduate intern on a NOAA undersea mapping voyage in the North Atlantic.

Maryland Sea Grant becomes the new home of the National Marine Educators Association (NMEA)

■ This 1,100-member group works to advance students' and the public's understanding and protection of freshwater and marine ecosystems.

A long-standing program in ocean literacy, jointly conducted with the University of Gothenburg in Sweden, is revived and expanded

■ The project

works with K-12 school teachers and students to promote marine research.

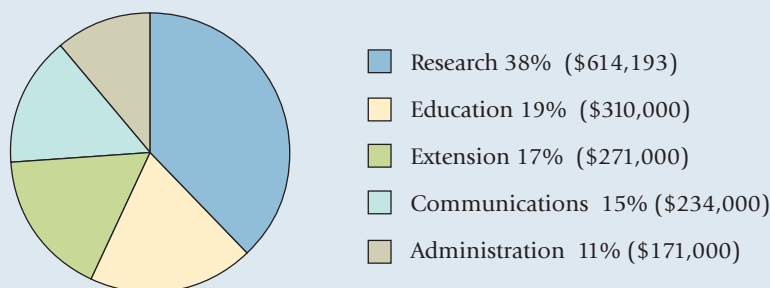
Hispanic students receive increased training opportunities in marine science

■ With funding from the National Science Foundation, we brought students and mentors from Puerto Rico to work with our Maryland-based Research Experiences for Undergraduates (REU) program and begin year-long research projects.

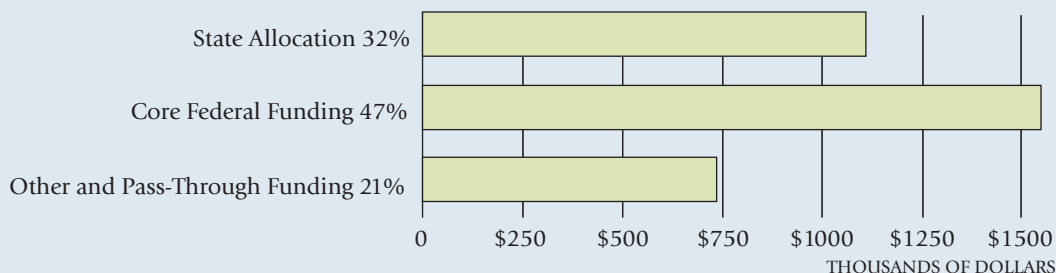


Budget Overview

Core Federal Funding 2014



All Funding Sources 2014



Research Projects Funded for 2014

A biologically-optimized environmental classification of Maryland streams: assessing impacts of stream burial and responses to climate change; Matthew C. Fitzpatrick, UMCES Appalachian Laboratory; *Miriam Johnston**

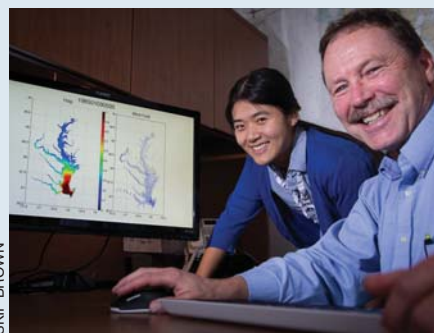
Advancing ecosystem based fisheries management: biological reference points for nutritional status of striped bass (*Morone saxatilis*); Reginal M. Harrell, UMCP; *Will Haus*

Development and evaluation of eco-engineered macroalgae and shellfish multi-trophic aquaculture systems in the Chesapeake Bay; Ji Li, UMCP

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*

Forecasting watershed loading and lagoon response along the Delmarva Peninsula due to changing land use and climate; Lora Harris, UMCES Chesapeake Biological Laboratory; *Jessica Foley*

From genes to ecosystems: integrating measures of aquatic biodiversity and ecosystem health within urbanizing bay watersheds;



Robert Hilderbrand, UMCES Appalachian Laboratory; *Sarah Laperriere*

In situ setting of *Crassostrea virginica* larvae on restored reefs: a complementary method for restoring oyster populations; Cecily Steppe, U.S. Naval Academy

Long-term impacts of different techniques for shoreline stabilization in the Maryland Chesapeake Bay; Lawrence Sanford, UMCES Horn Point Laboratory

Monitoring for outbreaks of a fatal blue crab virus in rivers with soft shell production systems; Eric Schott, Institute of Marine and Environmental Technology, USM; *Emily Flowers*

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; *Justin Meschter*

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*

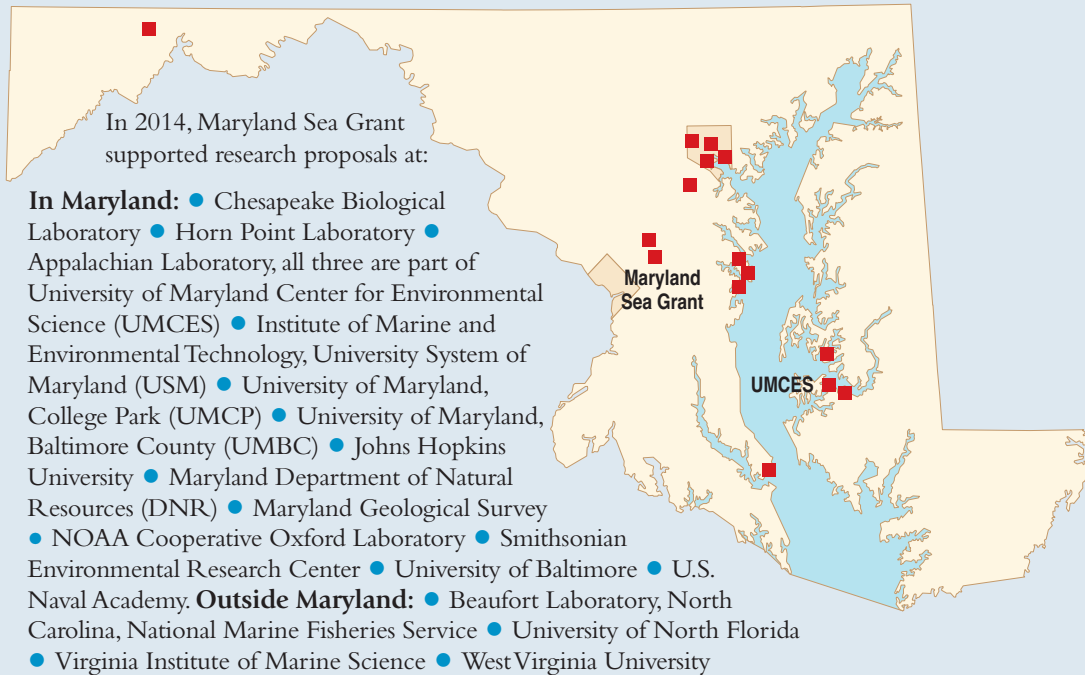
Understanding Atlantic menhaden population dynamics through use of data from a large-scale historical tagging study; Michael Wilberg, UMCES Chesapeake Biological Laboratory; *Emily Liljestrand*

Understanding the effectiveness of the watershed stewards academies in Maryland; Dana Fisher, UMCP; *William Yagatch*

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

In addition to the projects listed above, Maryland Sea Grant funded research projects led by the following graduate fellows: Ammar Hanif, Nicole Millette, Garth Lindner, Molly Van Appledorn, and Qian Zhang

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 Port Administration, Harbor Development Team
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
Mr. Adam Ortiz, Prince George's County Department of the Environment
Mr. Eric Schwaab, National Aquarium
Ms. Ann Swanson, Chesapeake Bay Commission
Mr. Dave Wilson, Maryland Coastal Bays Program

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 Wetland Sanctuary
Dr. Lynn Fegley, MD Dept. of Natural Resources
Dr. Solange Filoso, UMCES Chesapeake Biological Laboratory
Dr. Amy Freitag, Virginia Sea Grant
Mr. Brent McCloskey, Environmental Finance Center
Dr. Meredith Muth, NOAA Climate Program Office
Dr. Jay Nelson, Towson University
Dr. Peter Tango, USGS at Chesapeake Bay Program Office

"[Maryland Sea Grant] was able to give us so much to use in working together as a community to deal with environmental issues of runoff and erosion.... You are surely an asset to us, our county, and state." — Phil Rider, Carderock Springs Citizens Association

Maryland Sea Grant Staff

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Adrienne Hieb, Assistant to
the Director

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Restoration Specialist,
Cockeysville, MD

Donald Webster,
Eastern Shore Agent,
Queenstown, 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*



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