Maryland Sea Grant

2016 Annual Report

Sea Grant Maryland

Science Serving Maryland's Coasts

Message from the Director

Every year I enjoy producing our annual report because it motivates me to pause and reflect on Maryland Sea Grant's terrific staff, valued partners, and critical constituents who, together, make our program so successful. This report illustrates that our success is based on work in research, education, and outreach. We initiated 12 new research projects and supported 20 graduate students, and our Extension faculty worked on many vital projects. They helped with the impressive growth of Maryland's oyster industry, assisted the crab fishery to bring the best blue crabs in the world to consumers, and established a new certification program in sustainable landscaping practices for professionals working in the Chesapeake Bay region.

This year we were excited to join with Virginia Sea Grant and the Chesapeake Research Consortium to award our prestigious Mathias Medal to Dr. Walter Boynton of the Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science. This medal recognizes an individual whose outstanding research and personal commitment to communicating with policy makers strengthened science-based environmental management in the Bay region. Boynton joined a distinguished cohort of scientists. In its 27-year history, the Mathias Medal has been awarded to only six other Chesapeake Bay scientists.

In addition, former Mathias Medal winner and distinguished Johns Hopkins professor, Dr. Grace Brush, authored the newest volume in our *Chesapeake Perspectives* series. The book highlights her seminal research, which revamped our understanding of historical ecological change in the Chesapeake Bay.

Looking ahead, our 2018–2021 Maryland Sea Grant Strategic Plan lays out exciting research, education, and outreach directions. But we face an uncertain future. The National Sea Grant program, which partially supports our program, is eliminated in the Administration's proposed budget for FY2018. Fortunately, our constituents are reaching out to us and to Congress in support of our program. We are grateful for your help, and with it we will continue to pursue our mission toward a bright future with the healthy waters, robust coastal economies, and sustainable resources all Marylanders deserve.

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

About Maryland Sea Grant

We support research, education, extension, and public outreach efforts designed to help restore and preserve the Chesapeake Bay and Maryland's coastal natural resources. Working with leaders from across our state, we help communities respond to our state's coastal environmental challenges and promote a sustainable coastal economy.

Maryland Sea Grant, part of the University System of Maryland, is a partnership between the state of Maryland and the National Oceanic and Atmospheric Administration. Maryland Sea Grant is administered by the University of Maryland Center for Environmental Science (UMCES).

Please support our work by making a donation online at: www.mdsg.umd.edu/donate

2016 Program Highlights

Creating Coastal Jobs

Starting oyster aquaculture businesses

To speed the growth of the state's oyster aquaculture industry, Maryland Sea Grant Extension specialists provided watermen, entrepreneurs, and seafood processors with education and training about innovations in oyster growing techniques and business practices.

- The Oyster Aquaculture Education and Training Program held 22 workshops, short courses, and field demonstrations attended by 485 participants.
- The Remote Setting Training Program trained 45 growers in 2016, up from 12 in 2011. Remote setting systems allow operators to grow oyster larvae on oyster shell. Growers produced 235 million seed oysters for planting.

MARYLAND SEA GRANT EXTENSION trained entrepreneurs to use remote setting training tanks like these to grow oyster seed. *PHOTO BY MICHAEL FINCHAM*

- Since 2010, Extension's aquaculture business specialist has helped entrepreneurs submit 63 loan applications to fund oyster aquaculture operations, resulting in more than $3.9 million in approved loans.

Advancing seafood safety

- Extension's seafood technology specialist trained seafood processors in procedures known as Hazard Analysis and Critical Control Point (HACCP), which are required by federal food safety regulations.
- The seafood technology specialist regularly inspected and tested Maryland seafood processing plants to ensure the safety and quality of fresh-picked and pasteurized crabmeat. This work supported the Maryland Crabmeat Quality Assurance Program.

> "[The Maryland Crabmeat Quality Assurance Program] ensures the quality of our fresh-picked and pasteurized crab meat. And it gives us a competitive edge in the industry selling against other states and foreign crabmeat."
>
> — Morgan Tolley
> *General Manager for A.E. Phillips & Son Inc.*

Training landscape professionals

Maryland Sea Grant Extension helped to launch a new certification program that will improve job training for landscape workers and also benefit water quality in the Chesapeake Bay. The Chesapeake Bay Landscape Professional certifications, issued for the first time in 2016, recognize individuals trained in effective conservation landscaping methods that reduce excess nutrients and sediment flowing into the estuary.

BY THE NUMBERS

Oyster aquaculture

130 new jobs and

60 new businesses in 2016

Seafood safety

83 seafood processing workers received training

Job training

134 individuals received certification in conservation landscaping methods

Supporting Research

Blue crab harvests

In the largest study of its kind, scientists developed new estimates of the number of blue crabs caught every year by recreational fishers in the Chesapeake Bay. The researchers tagged and released crabs and later identified how and where many of them were eventually caught. This information can help resource managers set harvest limits for both recreational and commercial crabbers that ensure the sustainability of the Bay's blue crab population.

RESEARCHERS DEVELOPED NEW FINDINGS about harvests and movements of blue crabs within different areas of the Chesapeake Bay, information that may help resource managers conserve the crab population and important nursery areas. *PHOTO BY KIM RICHIE*

Menhaden harvests

Scientists created the first new quantitative estimates in 50 years of the migratory patterns of Atlantic menhaden, knowledge that is informing the sustainable management of this important commercial fishery in the Chesapeake Bay and Mid-Atlantic region. Researchers also developed a new computer model of the menhaden population that could influence the setting of future harvest limits. The model estimates the effects of fishing and predation and considers fluctuations in the population sizes of predators like striped bass that eat menhaden.

Economic analyses of fisheries

Our Extension specialist for fisheries resource economics provided analyses that assisted fisheries management in the Chesapeake Bay. He provided, for example, advice for a socioeconomic assessment of the commercial menhaden fishery on the Atlantic Coast and the communities it supports.

Conowingo Dam

We funded research projects that provided new insights into options for managing sediment flowing into the Chesapeake Bay through the Conowingo Dam on the Susquehanna River. The reservoir behind this hydroelectric dam has run out of room to trap and store sediments and sediment-bound nutrients, raising concerns about increased downstream pollution. The research findings informed a midpoint review by the Chesapeake Bay Program of a multiyear effort to reduce sediment and nutrient flows to meet water-quality targets.

THE CONOWINGO DAM on the Susquehanna River has become an important focus in the effort to improve the Chesapeake Bay's water quality. The hydroelectric facility is located about 10 miles upriver from where the river flows into the estuary. *PHOTO BY NICOLE LEHMING*

Researchers funded by Maryland Sea Grant used computer modeling tools in novel ways to refine estimates of long-term trends in the accumulation and loss of sediment and nutrients in the reservoir behind the Conowingo Dam and in the Chesapeake's other tributaries.

A separate team of researchers documented the influential role played by the Susquehanna Flats, a bed of underwater grasses in the upper Chesapeake Bay downstream of the dam, in capturing some of the sediments flowing from the river.

Providing Public Outreach

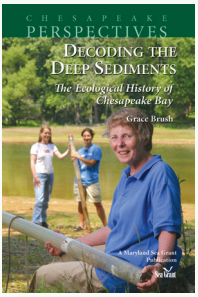
Public workshop on oyster aquaculture methods

Maryland Sea Grant sponsored a one-day meeting to support efforts of the OysterFutures project to promote public consensus about oyster fishing practices and restoration strategies on Maryland's Eastern Shore. Experts from other states described oyster industry practices in their regions, offering insights and examples that might aid Maryland's efforts to expand its fishing and aquaculture industries.

Mathias Medal awarded to Walter Boynton

In partnership with Virginia Sea Grant and Chesapeake Research Consortium, we honored Walter Boynton, an ecologist at the University of Maryland Center for Environmental Science. His groundbreaking research helped establish the role played by excess nutrients in degrading the Chesapeake Bay's water quality and habitats. And his involvement with political leaders and local outreach activities helped create new science-based management policies.

Exploring the ecological history of the Chesapeake Bay



We published a new book, *Decoding the Deep Sediments: The Ecological History of Chesapeake Bay,* in which paleoecologist Grace Brush describes how the deep sediment samples she collected with her colleagues revealed long-term changes caused by human settlement around the Bay. Please visit us at www.mdsg.umd.edu/store to purchase a copy.

Chesapeake Bay Sentinel Site Cooperative

An Extension specialist provided staff support and coordination for this regional cooperative, a project that works to measure the impacts of sea level rise in the Bay, to apply scientific findings produced at sentinel sites, and to help communities prepare for coastal flooding and other effects of changing climate conditions.

Educating the Next Generation

Sharing effective methods in science education

We trained 12 Maryland secondary-school science teachers to use a proven instructional method focused on finfish aquaculture. By raising fish in tanks at schools, students engage in project-based learning and meet educational standards for science education and environmental literacy.

Training volunteers for watershed restoration

Our Extension specialists helped to launch a new Watershed Stewards Academy in St. Mary's County, the fifth in Maryland. The academies have trained more than 340 people to lead local projects to install stormwater management practices that improve water quality in the Chesapeake Bay and its tributaries. This program gives trainees 40-plus hours of classroom and field training.

BY THE NUMBERS

Students assisted in 2016

1,695 K-12 students reached

77 undergraduate students funded

34 graduate students funded

WATERSHED STEWARDS ACADEMY graduates lead local projects to install conservation landscapes like this one. *PHOTO BY AMANDA ROCKLER*

Research Projects Funded in 2016

William P. Ball
Johns Hopkins University
Retrospective Analysis of Nutrient and Sediment Loadings to the Chesapeake Bay: Exploration of Trends and Affecting Factors

Denise Breitburg
Smithsonian Environmental Research Center
Determining the Resiliency of Juvenile Oysters to Estuarine Stressors and Climate Change: Implications for Restoration and Aquaculture Programs

Katharina A. M. Engelhardt
University of Maryland Center for Environmental Science (UMCES) Appalachian Laboratory
Resilience of *Vallisneria americana* in the Chesapeake Bay

Dana Fisher
University of Maryland, College Park
Understanding the Effectiveness of the Watershed Stewards Academies in Maryland

Keryn Gedan
George Washington University
Managing for Biodiversity and Blue Carbon in the Face of Sea-level Rise and Barrier Island Migration

Michael Gonsior
UMCES Chesapeake Biological Laboratory
Tracking Septic System Performance by Using Innovative Mass Spectrometric Approaches and Traditional Nutrient Measurements

Lora A. Harris
UMCES Chesapeake Biological Laboratory
Quantifying Changes to Nutrient Cycling and Nitrogen Removal in an Estuary as a Consequence of Aeration

Robert Hilderbrand
UMCES Appalachian Laboratory
From Genes to Ecosystems: Integrating Measures of Aquatic Biodiversity and Ecosystem Health Within Urbanizing Bay Watersheds

Anson H. Hines
Smithsonian Environmental Research Center
Evaluating the Relative Impacts of the Recreational and Commercial Sectors of the Blue Crab Fishery in Maryland

W. Michael Kemp
UMCES Horn Point Laboratory
Role of a Resilient Submersed Plant Bed in Mitigating the Effects of Increasing River-borne Particulate Inputs to Chesapeake Bay: Nutrient Cycling

Ming Li
UMCES Horn Point Laboratory
Improving Prediction and Visualization of Coastal Inundation on the Eastern Shore of Maryland

David Nelson
UMCES Appalachian Laboratory
Variation in Retention and Export of Atmospheric Nitrate as a Function of Land Use Across the Chesapeake Bay Watershed

Geneviève Nesslage
UMCES Chesapeake Biological Laboratory
Development of a Bayesian Approach for Estimating Ecosystem-based Reference Points for Atlantic Menhaden

Michael Paolisso
University of Maryland, College Park
Integrated Geospatial, Cultural, and Social Assessment of Coastal Resilience to Climate Change

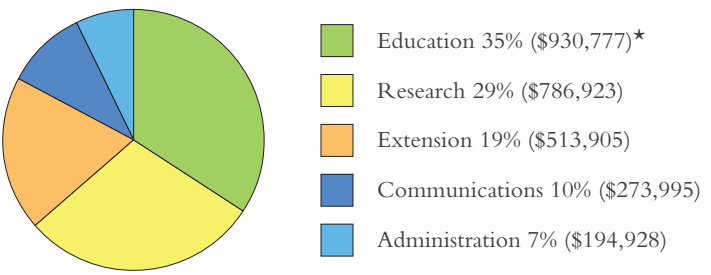
Lawrence P. Sanford
UMCES Horn Point Laboratory
Role of a Resilient Submersed Plant Bed in Mitigating the Effects of Increasing River-borne Particulate Inputs to Chesapeake Bay: Sediment Dynamics

Michael Wilberg
UMCES Chesapeake Biological Laboratory
Understanding Atlantic Menhaden Population Dynamics Through Use of Data from a Large-scale Historical Tagging Study

Ten-Tsao Wong
University of Maryland, Baltimore County
Developing a Technology to Induce Sterility in an Emerging Marine Aquaculture Species, Sablefish, by Disrupting Primordial Germ Cell Development

Budget Overview

Grant Funding 2016 (Total: $2,700,528)



Total funding in 2016, including state funding: $4,760,100

★ Includes funding for research fellows. All percentages are rounded.

Research Partners

Program Governance

External Advisory Board (EAB)

David Blazer
Maryland Department of Natural Resources, Fisheries

Mark Bryer
The Nature Conservancy

Jana Davis
Chesapeake Bay Trust

Martin Gary
Potomac River Fisheries Commission

William Matuszeski
U.S. EPA Chesapeake Bay Program (retired)

Beth McGee
Chesapeake Bay Foundation

Thomas Miller
UMCES Chesapeake Biological Laboratory (AAC liaison)

Adam Ortiz
Prince George's County Department of the Environment

Eric Schwaab
National Fish and Wildlife Foundation

Ann Swanson
Chesapeake Bay Commission

Dave Wilson
Conservation Community Consulting, LLC

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Patricia Delgado
Jug Bay Wetlands Sanctuary

Keith Eshleman
UMCES Appalachian Laboratory

Jay Nelson
Towson University

Ariana Sutton-Grier
University of Maryland, College Park

Peter Tango
U.S. Geological Survey at Chesapeake Bay Program Office

*Visit **www.mdsg.umd.edu/governance** for a full list of Maryland Sea Grant's advisory and governing bodies.*

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** Maryland Sea Grant hosts the national office for the National Marine Educators Association (NMEA).*

*Visit **www.mdsg.umd.edu/our-office** for full addresses and contact information for our staff.*

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