



College of Earth, Ocean,
& Environment

DELAWARE SEA GRANT COLLEGE PROGRAM

REPORTER

2015 Annual Report • Volume 34

Resilient Communities & Economies ➤



Sustainable Fisheries & Aquaculture ➤



Healthy Coastal Ecosystems ➤



Environmental Literacy & Workforce Development ➤



Science Serving the Delaware Coast



James Falk

Dr. Nancy Targett

Dr. Mohsen Badiey



Since its inception in 1966, a strong set of core values has provided a foundation for Sea Grant's work across the U.S. Founded on a belief in the critical importance of university-based research and stakeholder engagement, Sea Grant is able to rapidly identify and capitalize on opportunities and to generate timely, practical solutions to real problems in real places.

Here in our annual public report, we feature our research, outreach and educational programs in the four focus areas that steer our work for the 2014–2017 time frame: resilient communities and economies; healthy coastal ecosystem; sustainable fisheries and aquaculture; and environmental literacy and workforce development. While one of these focus areas calls out “resilience” specifically, elements of resilience and addressing climate change are woven throughout all that we do.

Looking ahead, this year has already been, and will continue to be, a very busy year for Delaware Sea Grant. In addition to business as usual, there are many national Sea Grant priorities for us here in Delaware, including our federal site review in June; annual reporting submissions to Sea Grant's Planning, Implementation, and Evaluation Resources (PIER) system; and our funding proposal for the 2016–2018 time frame.

By the time the Reporter reaches you, you will have undoubtedly heard that our DESG Director Dr. Nancy Targett will serve as Interim President of the University of Delaware, effective July 1, upon the departure of UD President Patrick Harker. Until her return at the hiring of a new President, Dr. Mohsen Badiey, deputy dean of the College of Earth, Ocean, and Environment, will be CEO's Acting Dean and I will serve as Acting Director of Delaware Sea Grant. In addition, Ed Lewandowski, DESG's coastal communities development specialist, serve as Acting Director of our Marine Advisory Service.

Delaware Sea Grant makes a real difference to the State of Delaware, and because of its engagement the University of Delaware is a better place. Though the changes are many this year, we have a strong core of experts who will undoubtedly keep forward momentum. Thank you for your interest in Delaware's coast and Delaware Sea Grant.

Science Serving the Delaware Coast



James M. Falk
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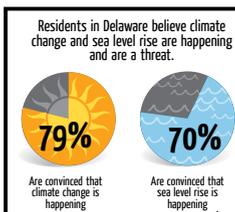
Acting Director, Delaware Sea Grant

Climate Change and Sea Level Rise:

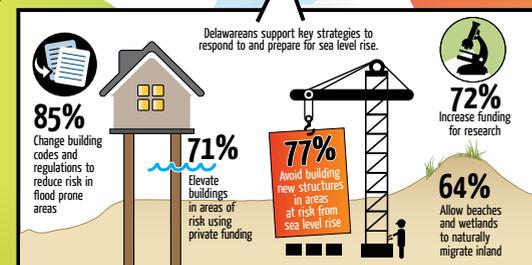
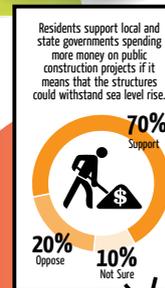
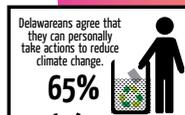
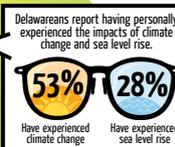
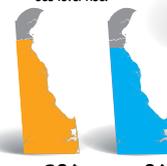
Delawareans say they are convinced and ready to act.



In 2014, Delaware residents were surveyed about their thoughts on climate change and sea level rise. Delawareans believe that climate change and sea level rise are happening and are a threat to our state. They think we should act now and they believe that their own actions make a difference.



Delawareans think immediate action should be taken to reduce the impacts of climate change and sea level rise.



An increasing majority of Delawareans are convinced that climate change and sea level rise are happening, and want immediate action to reduce their impacts, according to a 2014 survey co-funded by Delaware Sea Grant and the Delaware Department of Natural Resources and Environmental Control (DNREC).

Learn more at www.deseagrant.org/news/climate-change-study.

Advisory Council >>

The Delaware Sea Grant Advisory Council—the statewide external advisory body to the Delaware Sea Grant College Program—was created in 1974. Its members hail from marine-oriented business and industry, resource management and engineering firms, state government, public interest groups, the precollege educational sector, and the media. Working within the national priorities identified by the National Sea Grant College Program, the council helps further define priority coastal issues relevant to Delaware.

Jennifer Adkins
Partnership for the Delaware Estuary

Gene Bailey
Diamond State Port Corporation

Bill Baker
Bill's Sports Shop

Chris Bason
Center for the Inland Bays

Ruth Briggs-King
Delaware State Representative

Sarah Cooksey
Delaware Coastal Programs,
Delaware Department of Natural Resources
and Environmental Control

Gerard Esposito
Delaware Sea Grant Advisory Council Chair,
Tidewater Utilities, Inc.

Thomas Fiklin
Delaware River Basin Commission

Todd Fritchman
Envirotech Environmental Consulting, Inc.

Kate Hackett
Delaware Wild Lands, Inc.

Jeanie Harper
Samuels and Son Seafood

A. Richard Heffron
Delaware State Chamber of Commerce

Daniel Leathers
Office of the Delaware State Climatologist,
University of Delaware

Ernesto Lopez
Delaware State Senator

Sharon Lynn
City of Rehoboth Beach

Dyremple Marsh
Delaware State University

David McBride
Delaware State Senator

Tonyea Mead
Delaware Department of Education

William J. Miller, Jr.
Delaware River and Bay Authority (retired)

Christopher Moore
Mid-Atlantic Fishery Management Council

Betsy Reamer
Lewes Chamber of Commerce

Michelle Rodgers
University of Delaware Cooperative Extension

Paul Sample
Samples, Inc.

Dave Saveikis
Division of Fish and Wildlife,
Delaware Department of Natural Resources
and Environmental Control

John Schneider
Division of Water Resources,
Delaware Department of Natural Resources
and Environmental Control

Edward M. Simek
Environmental Resource Management

F. Gary Simpson
Delaware State Senator

Halsey Spruance
Delaware Museum of Natural History

Hilary Valentine
Delaware Technical Community College

Peggy Vavalla
DuPont Company

Katherine Ward
Delaware Press Association

Stuart Widom
Calpine



◀ Reimagining riverfronts

Looking to improve water quality both locally in the river and as part of a regional effort to restore the Chesapeake Bay watershed, the town of Laurel is reimagining its riverfront with help from DESG and UD landscape design faculty and students. DESG specialists led discussions with town leaders, developers, environmental regulators and residents to meet requirements of the Chesapeake Watershed Implementation Plan, and facilitated connections to UD landscape design faculty and students to create a master plan to redevelop the area's waterfront. DESG is working with other Delaware communities in similar planning and facilitation projects.

Resilient Communities & Economies

At its core, Delaware is a coastal state, with no part of the state situated more than eight miles from tidal waters. Economic development that balances the health of the economy with that of the natural world is critical to maintaining vibrant communities. We work with communities to guide the use of comprehensive planning to make informed strategic decisions that sustain human health and ecosystem services, while supporting a robust economy.



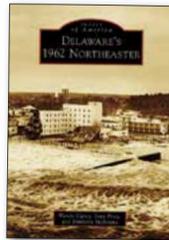
Beach safety

DESG specialists began exploring the connection between beach conditions and injuries several years ago. Special gauges were installed at beaches during the summer of 2014 to measure wave properties and currents, and in a detailed study, the researchers are cross-referencing wave and beach conditions, estimates of water-user populations and injury statistics. Building upon DESG's relationships with Delaware's beach patrols and existing rip current awareness projects, an ultimate goal of the project is to improve public safety by identifying key target audiences for awareness messages.



High water mark data

Delaware experiences anywhere from 10 to 35 significant coastal storms annually. Each storm brings the potential for coastal flooding, one of the most significant natural hazards facing the state today. Working in collaboration with local, county, state and federal constituents, DESG scientists are developing a centralized database and website to capture flood data in order to better understand and document the extent and severity of flooding in Delaware. In particular, the project focuses on data related to high water marks, the maximum level reached by the sea at high tide or by a lake or river at its highest stand.



Delaware's stormy coast

A new book by coastal storm experts from DESG and Delaware Department of Natural Resources and Environmental Control chronicles the unprecedented destruction that resulted from Delaware's devastating 1962 Northeast. In Delaware alone, private and public property damage estimates exceeded \$70 million, equivalent to approximately \$547 million in 2014. Released in 2014, the book includes over 200 vintage photographs, which along with the story, carry a strong message about hazards, risks and the vulnerability of Delaware's communities and environments.

Environmental Literacy & Workforce Development

The complexity of environmental issues calls for an educated public that can understand the link between science and society. DESG partners with the Delaware Department of Education to support strong K-12 science education in formal and informal classrooms. We work to improve public recognition and understanding of the interdependence of society and nature. Our experts serve as advisors for science education, communication and translation.

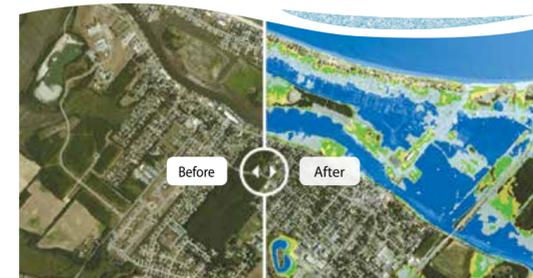


Climate science education

DESG plays a major role in the Maryland and Delaware Climate Change Education Assessment and Research (MADE CLEAR) project. MADE CLEAR aims to make climate change science an integral part of public education in Delaware and Maryland through partnerships among the states' research institutions, federal and state agencies and public schools. Our specialists offer teacher professional development programs, seminars about the science of climate change, and steer both formal and informal education working groups.

Visualizing floods

Working with state and federal partners, DESG created web-based interactive flood risk awareness maps for 10 Sussex County communities, many of which experienced significant bayside flooding in recent years. A slider lets viewers click and drag a flood-depth map over the area expected to flood during a 100-year flood as designated by Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps.



Science communication

Scientists are regularly called upon to communicate research findings to various audiences, including the general public, policy makers, stakeholders and the media. DESG has increased its efforts to work with researchers, extension specialists and graduate students to ensure that scientific information is conveyed in ways that are accessible and meaningful to the broader community. New courses, customized media training and workshops offer our experts the opportunity to practice their written and oral communication skills.



Offshore wind power development

DESG researchers continue to study the social dimensions of offshore wind power development off the Delmarva Peninsula. Understanding residents' perceptions, attitudes and willingness to pay for offshore wind, and how they vary with location and demographics during planning is a proactive way to incorporate public concern or enthusiasm into the process. This research bridges the gap between public attachment to cultural landscapes and attitudes toward development of offshore wind power.



Student support

To build capacity in marine and coastal sciences and policy, DESG provides education, training and support for students pursuing advanced degrees at the masters and doctoral levels. We facilitate fellowship opportunities both locally and nationally which provide additional training opportunities and real world experiences for future coastal leaders.

Watershed investigations

Teachers in the Delmarva region learned more about Chesapeake and Delaware Bay watersheds, how they are used to support the economy, and steps being taken to protect and restore watershed health in a new DESG professional development course titled "Bay to Bay." This multidisciplinary watershed investigation across the Delmarva Peninsula included five days of fieldwork, classroom activities and science content.



Citizen science

The Citizen Monitoring Program is a cornerstone for achieving Delaware Sea Grant's mission of "Science Serving the Delaware Coast." Through training in water quality sampling, analysis and data interpretation, DESG empowers local community volunteers with the skills and knowledge necessary to provide coastal water quality monitoring data for state regulatory and public notification purposes. Twenty five years of support for the program has resulted in strong and diverse volunteer pools, top ratings for water quality for Delaware beaches, and partnerships for harmful algal bloom research.



Sustainable Fisheries & Aquaculture

Delaware Sea Grant research and outreach efforts catalyze new product innovations to keep the U.S. seafood industry financially competitive and environmentally responsible. Our experts develop protocols and training for innovative food safety procedures that reduce risk and enhance consumer knowledge about seafood.

Aquaculture and fish tech 101

Working in the seafood world can mean getting peppered with questions about the health benefits and safety of eating fish and shellfish: Which have the most omega-3s? Who shouldn't eat raw oysters? Is local, farm-raised fish better than imported wild catch? DESG is working with counterparts in Louisiana and Oregon to offer in-service trainings for industry professionals on how to effectively explain these complex issues. Session participants receive training on seafood safety, handling and regulations, as well as insights on global trends and progress in aquaculture.



Inland Bays aquaculture

More than a decade of work guided by DESG, in cooperation with the Delaware Center for the Inland Bays (CIB) and partners, has documented the value and benefit of shellfish aquaculture as a means to improve the quality of the Inland Bays estuary and to enhance local seafood production and economic development. With the development of Delaware shellfish aquaculture regulations in August 2014, DESG continues to support these efforts through workshops, expert testimony, economic impact studies and an effort to brand Inland Bays oysters and shellfish when the product is ready for commercialization.



Celebrating seafood

Coast Day, Delaware Sea Grant's premier outreach event, offers local chefs and culinary fans the opportunity to celebrate seafood, among other activities. In 2014, DESG celebrated the 25th anniversary of the event's popular Coast Day Crab Cake Cook-Off, the longest running Coast Day seafood contest. A commemorative cookbook was produced in honor of the anniversary. Coast Day attendees helped choose the winner of the Seafood Chowder Challenge by tasting the chowders and casting a vote for their favorite. Winners were also honored during the second annual oyster shucking contest.



Thermal infrared imagery

Collecting elevation data in a soft marshy environment is challenging for scientists. To overcome this challenge, DESG researchers have turned to using infrared imagery instead of traditional surveying methods by watercraft, walking or a land vehicle. The result is estimates of tidal-flat elevations that are accurate to within two centimeters of the ground truth elevations obtained using a sled-mounted global positioning survey system. The technology is being used to survey flow patterns within natural and man-made channels in the marsh.



Zooplankton in the Delaware Bay

Zooplankton contain the larvae of commercially important species, including oysters, crabs, shrimp and various finfish, and are considered an important measure of fishery sustainability. Despite their ecological importance, zooplankton have been understudied in the Delaware region. DESG researchers are using a new technology called Zooscan, a waterproof optical scanning system, to identify and characterize the zooplankton species present in the Delaware Bay. The work builds on an earlier study conducted in the 1950s by



Joanne Daiber, UD's first female marine biologist. The scientists plan to compare their results to Daiber's original data in order to understand the biological changes that have occurred in Delaware Bay over the past half-century.



2015 Readership Survey

Complete and mail this brief survey or enter online at www.deseagrant.org/survey.
Respond by Dec. 31, 2015 to be entered into a drawing for our coast-inspired prize package.

Name _____

Address _____

City _____ State _____ Zip _____

Daytime Telephone _____

Email _____

- I would like to subscribe to Delaware Sea Grant's e-newsletter. (Provide email address above.)

1. Do you use Delaware's bays, beaches or coastal areas for recreation or pleasure? Yes No

2. When compared to 10 years ago, do you think the health of our coastal and marine resources are:

- | | |
|--|---|
| <input type="checkbox"/> Much better | <input type="checkbox"/> Somewhat worse |
| <input type="checkbox"/> Somewhat better | <input type="checkbox"/> Much worse |
| <input type="checkbox"/> About the same | <input type="checkbox"/> Don't know |

3. Which broad issues affecting Delaware's coast are most important to you? (Check your top three choices.)

- Safe and sustainable seafood supplies
 Vibrant and economically sustainable coastal communities
 Communities resilient to coastal storms and hazards
 Healthy coastal ecosystems
 Climate change
 Environmental literacy for all age groups

4. If Delaware Sea Grant could help to solve one major coastal problem in Delaware, what should it be?

5. After reading this issue of *Reporter*, which actions, if any, do you plan to take within the next six months? (Check all that apply.)

- Read more about environmental issues
 Attend UD's Coast Day
 Take part in a Sea Grant workshop, lecture or seminar
 Visit www.deseagrant.org
 Visit Delaware Sea Grant on YouTube, Facebook, Instagram or Twitter
 Other (Please specify): _____

6. How would you rate the overall quality of this report?

- Excellent Very Good Average Good Poor

Comments or suggestions:

7. How would you prefer to receive future issues of this report?

- Print Printable PDF Website Online video digest

8. What is your age? Under 20 20-29 30-39 40-49
 50-59 60-69 70 +

9. Is your occupation directly/indirectly related to Delaware's coastal environment? Yes No

10. May we contact you about future Delaware Sea Grant activities?

- Yes, by mail Yes, by email Yes, by phone No thanks

11. Other comments or suggestions:

MOISTEN HERE TO SEAL

Separate from report along perforation, fold in half, moisten glue strip and mail.

Win a Coastal Prize Package!

Complete our readership survey on the reverse side and be entered to win a coast-inspired prize package valued at over \$200.



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UNIVERSITY OF DELAWARE | College of Earth, Ocean, & Environment

DELAWARE SEA GRANT COLLEGE PROGRAM REPORTER

The Delaware Sea Grant College Program helps people wisely use, manage and conserve our nation's valuable marine and coastal resources. We do this through an integrated program of excellence in research, education and outreach built upon active partnerships with state and federal agencies, the private sector and citizens.

Science Serving the Delaware Coast

Resilient Communities & Economies

Healthy Coastal Ecosystems

Environmental Literacy & Workforce Development

Sustainable Fisheries & Aquaculture

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Contributing photographers: Doug Baker, Tammy Beeson (cover), Leah Dodd, Evan Krape, Lane McLaughlin, Teresa Messmore (cover), Chris Petrone, Lisa Tossey (cover), Katie Wilson, Joanna York (cover)

JOIN US FOR

2015 Coast Day
39th Annual

SUNDAY, Oct 4, 2015
11 A.M. to 5 P.M.

Our free, family-friendly celebration of the sea includes a crab cake cook-off, children's activities, research demonstrations and much more!

www.decoastday.org

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