



DELAWARE SEA GRANT COLLEGE PROGRAM
REPORTER

2014 Annual Report • Volume 33

Hazard
Resilient
Coastal
Communities

Healthy
Coastal
Ecosystems

Sustainable
Coastal
Development

A Safe and
Sustainable
Food Supply

*Science Serving
the Delaware Coast*

"Never doubt that a small group of thoughtful committed citizens can change the world."

— Margaret Mead

When I hear this widely circulated quote by Margaret Mead, I can't help but think of our small state of Delaware and how our close partnerships and working relationships mean that we can maximize our timely response to the environmental challenges of today.

Here, in our annual report, we provide you with a snapshot of the work that we conduct as we look at the health of coastal ecosystems, sustainable coastal development, a safe and sustainable seafood supply and hazard resilient coastal communities. And while these four focus areas drive our research, education and outreach, we ensure that addressing issues of climate and environmental literacy are woven through all that we do.

From Wilmington to Fenwick Island, the Delaware Sea Grant College Program is working with communities throughout the state to provide them with the data, tools and training needed to maintain vibrant economies and sustainable ecosystems.

This year, we embark on a new strategic plan for 2014-2017, developed in large part through the input of our coastal stakeholders and in alignment with the National Sea Grant Strategic Plan. In it, we renew our commitment to providing sound scientific information and policy analysis on issues related to our coast and coastal economics and to translating that science into applications that have a positive impact on our fellow citizens.

It is the goal of Delaware Sea Grant that society benefits from the sea—today and in the future. It is our hope that through reading this report and by learning more from our website—www.deseagrant.org—you are inspired to join us pursuing that endeavor.

Nancy M. Targett

Dr. Nancy M. Targett

Director, Delaware Sea Grant
Dean, University of Delaware
College of Earth, Ocean, and Environment



**Nancy Targett, Director of
the Delaware Sea Grant
College Program**

Delaware Sea Grant Advisory Council

Sea Grant relies on a multidisciplinary group of advisors to ensure that our services meet the needs of Delawareans. Our Advisory Council provides critical input on Delaware Sea Grant strategic planning efforts as well as research, outreach and education projects.



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Partnership for the Delaware Estuary

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Bill Baker
Bill's Sports Shop

Chris Bason
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Katherine Ward
Delaware Press Association

Stuart Widom
Calpine

* Delaware Sea Grant Advisory Council Chairman

Healthy Coastal Ecosystems

Environmental challenges, if left unchecked, can impact public health, economic stability and the overall quality of life in Delaware's coastal communities. The work of Delaware Sea Grant researchers supports the responsible management of valuable marine resources.

Sustainable solutions sought for urban estuaries

Paving over wetlands, deepening rivers and other estuary alterations help port cities meet societal needs—but can disrupt natural systems. Building upon years of Delaware Sea Grant research, scientists are studying the changing shape of urban estuaries over time. In partnership with social scientists, the team will form a picture of human-environment interactions in the past and how management decisions may affect the future. The researchers intend to work with policy professionals at local, regional and federal levels.

Measuring manganese in the environment

Manganese is an essential nutrient for most organisms and helps plants produce oxygen. Delaware Sea Grant supported the development of a technique to differentiate between various forms of the element in the

environment. The result was a new discovery: An often-overlooked form of manganese is far more prevalent than previously known. The findings, published by University of Delaware researchers in the influential journal *Science*, improve understanding of the chemistry that moves manganese and other elements, like oxygen and carbon, through the natural world.

New projects focus on ecosystem health

Delaware Sea Grant kicked off six new research projects in 2014 that focus on healthy coastal ecosystems. This promising work is poised to shed light on groundwater nutrients, remote sensing, carbon sequestration, wetland inundation, environmental sensors and zooplankton analysis.

11 funded research projects for 2014-2016, six focus on healthy coastal ecosystems

Scientific equipment shown (left) extracts sediment sample (right) from the seafloor.



Sea Grant funded researcher Jonathan Cohen will develop a zooplankton analysis system for Delaware Bay.



Sustainable Coastal Development

From engaging communities in development planning to advancing green energy, Delaware Sea Grant supports research and outreach that enhance economic activity along the waterfront.

Planning for growth in historically maritime communities

As populations shift to coastal areas, growth and development driven by tourism and new housing are exerting pressure on traditional maritime communities, or “working waterfronts.” Delaware Sea Grant assists these communities in their planning efforts by fostering an environment in which economic growth, environmental protection and preservation of water-dependent businesses are viewed as mutually compatible activities—and not conflicting ones.

Education and outreach on wind energy

Wind power has the potential to provide breezy coastal regions with clean, renewable electricity. Delaware Sea Grant addresses various aspects of the industry in ongoing education and research efforts. In tandem with a science curriculum kit called “Catching the Wind” that

◀ Sea Grant coastal communities specialist Ed Lewandowski uses a “weTable” to demonstrate sustainable coastal development.

is used in Delaware schools, Sea Grant educators offered a pilot field trip for 100 elementary school students to visit



the University of Delaware’s Hugh R. Sharp Campus to learn about wind turbines and harnessing energy from wind. Researchers continue to study public perceptions about wind energy and turbine placement, while also determining the potential effects of offshore turbines on coastal tourism.

Research fuels solutions to pollution control

A hardy algae species is showing promise in both reducing power plant pollution and making biofuel, based on new research funded by Delaware Sea Grant. The microscopic algae *Heterosigma akashiwo* grows rapidly on a gas mixture that has the same carbon dioxide and nitric oxide content as emissions released from a power plant. The algae also make large amounts of carbohydrates, which can be converted into bioethanol to fuel vehicles. The findings could have industrial applications as a cost-effective way to cut greenhouse gas pollution when paired with biofuel production.



Sea Grant helps community visioning

When senior citizens in Lewes were interested in forming a “community village,” Delaware Sea Grant was there to assist. As a member of the UD Sustainable Coastal Communities Initiative, Sea Grant helped develop a general interest survey that was distributed to 1,500 residents over the age of 55 to help determine the service needs of senior members of the community. A 20 percent return from survey recipients provided solid results that a village concept was needed in the community and that aging residents would join such a venture. The results have been used to help the group attain non-profit 501(c)(3) status and apply for grant support. As the initiative grows, members will receive numerous support services and programs to allow them to live independently and safely in their homes as they grow older, while remaining engaged in a variety of social, educational and cultural activities.

◀ Barbara Vaughan, a former Lewes city councilwoman was instrumental in forming the Greater Lewes Community Village, a non-profit, volunteer group to offer services and support to seniors aging in place.

20%
response returned for the
“community village” survey





A Safe and Sustainable Food Supply

With the consumption of seafood on a downward trend, but interest in supporting local economies on the rise, Delaware Sea Grant plays a vital role in supporting the food, fisheries and aquaculture industries. Sea Grant's team advances knowledge of the availability and health of Delaware seafood, all while integrating sound coastal management.

Aquaculture and fisheries technology

A successful U.S. seafood industry depends on economically sound fisheries and aquaculture operations that can supply consumers with safe, wholesome and sustainable products. Delaware Sea Grant experts joined partners around the country to offer three regional workshops on aquaculture and fisheries technologies for food and health educators, seafood professionals and communicators.



◀ Sea Grant extension specialists demonstrate healthy seafood recipes at a workshop.

Alternative eel and conch bait recipe uses $\frac{1}{16}$ of a horseshoe crab.



Sustainable bait

Research and development supported by Delaware Sea Grant has resulted in a freely available, practical alternative recipe for eel and conch bait that uses $\frac{1}{16}$ of the amount of horseshoe crab tissue needed previously. In addition to the publication of the bait recipe, LaMonica Fine Foods in Millville, New Jersey, scaled up production using a proprietary fish attractant for a commercial product made available to the public in 2013.



Inland bays aquaculture

Delaware Sea Grant research and extension activities, as well as partnerships with environmental and seafood entities throughout the state, helped to lay the groundwork for the passage of Delaware House Bill 160, permitting shellfish aquaculture in Delaware's Inland Bays. This initiative's benefits are twofold: looking to shellfish to significantly improve water quality through natural nutrient removal and generating revenue for the local economy. Delaware Sea Grant plans to take the lead on educating prospective aquaculturists on all aspects of starting an aquaculture business.

Hazard Resilient Coastal Communities

Living and working along the coast comes at both a cost and a benefit. As populations flock to popular waterfront areas, visitors, residents and supporting decision-makers must consider hazards to people and property. Delaware Sea Grant serves as a catalyst, working throughout the State of Delaware to help communities better prepare for risks and respond to emergencies.



Beach injuries

Injuries to people swimming at the beach are more common and severe than previously documented, according to a recent study by Delaware Sea Grant, Beebe Healthcare and Delaware Department of Natural Resources and Environmental Control. Researchers merged data from emergency department visits over three summers from patients hurt by ocean waves with environmental data to see if there is a link between water, ocean and beach conditions and a swimmer's injuries. Ultimately, the project's objective is to reduce injury occurrence—through targeted education and outreach, improved surf zone forecasts or by encouraging beach visitors to communicate with on-duty lifeguards about ocean conditions and possible surf zone hazards.

Economic activity along Delaware's coast generates **\$6.9** billion annually



Coast Day

"Building Resilient Coastal Communities" was the theme of the 37th annual Coast Day celebration, which drew over 9,000 visitors who explored ways to keep the coast thriving. A showcase exhibit highlighted hurricane preparedness, coastal planning and research on topics like groundwater safety and wave dynamics. UD researchers explained how they track weather conditions to inform emergency responders, and visitors were instructed how to take proper precautions to secure their homes during storms and flooding. Fifth graders submitted essays for judging in the annual Coast Day essay contest, in which they were asked to describe what they learned in the months since Hurricane Sandy and how they can best prepare for future coastal hazards such as hurricanes, flooding and sea level rise. In keeping with the building theme, new in 2013 was a special exhibit of ships made out of Lego blocks, called TEACH FLEET.

▼ In 2013, Coast Day hosted a special exhibit—TEACH FLEET—for over 9,000 visitors.



Preparing for natural hazards

With Hurricane Sandy still in the not so distant past, communities continue to seek assistance planning for natural hazards like hurricanes and flooding. Delaware Sea Grant continues to work with local governments, emergency managers, land use planners and others to do just that. Sea Grant resilience experts serve as a vital resource, offering workshops, tool kits and handbooks and connecting communities to the most current state and federal resources.



2014 Readership Survey

Complete and mail this brief survey or save a stamp—go to **www.deseagrant.org/survey** and complete it online. **Respond by Dec. 31, 2014** to be entered into a drawing for our Coastal 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. May we contact you about future Delaware Sea Grant activities?

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

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

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

- | | |
|--|---|
| ☐ Much better | ☐ Somewhat worse |
| ☐ Somewhat better | ☐ Much worse |
| ☐ About the same | ☐ Don't know |

4. 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

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

6. 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 or Twitter
☐ Other *(Please specify):* _____

7. How would you rate the quality of this report?

- ☐ Excellent ☐ Very Good ☐ Average ☐ Good ☐ Poor

Comments or suggestions:

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

- ☐ Print ☐ Printable PDF ☐ Website ☐ Online video digest

9. What is your age? ☐ Under 20 ☐ 20-29 ☐ 30-39 ☐ 40-49

☐ 50-59 ☐ 60-69 ☐ 70 +

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

11. Other comments or suggestions:

MOISTEN HERE TO SEAL

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

Your chance to win our Coastal Prize Package



**Complete the survey
and send it in today!**

**Complete our readership survey on the reverse side
and be entered to win a package of prizes including
a stay at UD's Virden Center in Lewes and more!**

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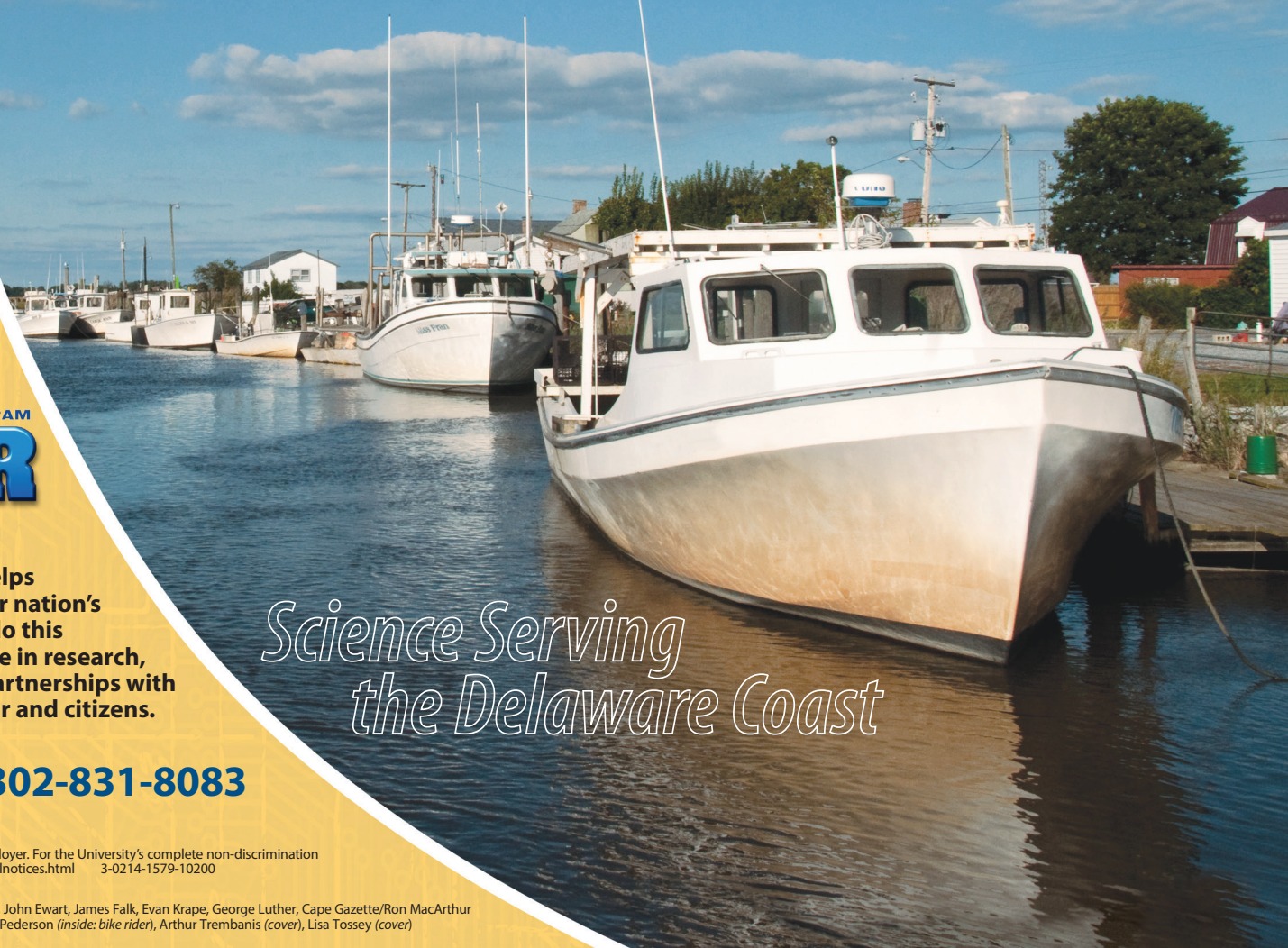
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The Delaware Sea Grant College Program helps people wisely use, manage and conserve our nation's valuable marine and coastal resources. We do this through an integrated program of excellence in research, education and outreach built upon active partnerships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

www.deseagrant.org | 302-831-8083

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*Science Serving
the Delaware Coast*

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US
FOR

2014
**Coast
Day**
38th Annual

**Sunday, Oct. 5, 2014
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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