

DELAWARE SEA GRANT COLLEGE PROGRAM
REPORTER

Science Serving the Delaware Coast

What's inside:

Our
coastal
economy



Preparing
a resilient
coast



Studying
pollutants





Nancy Targett, director of the Delaware Sea Grant College Program



Savannah Road flooded in Lewes, Del., following Hurricane Sandy in October 2012.

When Hurricane Sandy tracked toward Delaware, the storm threatened residents, infrastructure, and economic interests statewide. The damage in Delaware, while not as severe as that experienced further north, highlighted the delicate balance between people and the environment in our coastal region.

The Delaware Sea Grant College Program works to improve understanding of these interconnections through scientific research, education, and outreach. We are helping the state prepare for natural hazards, consider future impacts of climate change, and develop smart plans for growth.

A recent Sea Grant study showed that economic activity along Delaware's ocean coastline

generates nearly \$7 billion annually and represents one-tenth of the state's total employment. The jobs are largely reliant on resilient communities, clean beaches, and healthy ecosystems that help attract visitors and year-round residents alike.

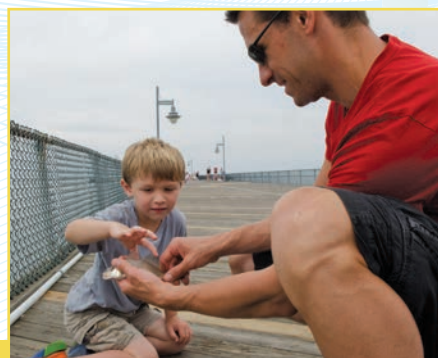
Delaware Sea Grant promotes the wise use, conservation, and management of marine and coastal resources while also supporting economic growth. Part of a national network of 33 university-based programs, our researchers and outreach specialists offer sound scientific information on issues impacting our state.

This report gives an update on how we are using science to serve Delaware's coast and improve the quality of life in our state. We invite you to visit our website—www.deseagrants.org—to learn more.

Nancy M. Targett

Dr. Nancy M. Targett
Director, Delaware Sea Grant
Dean, University of Delaware
College of Earth, Ocean, and Environment

**Fishing in Cape
Henlopen State Park.**



Sea Grant relies on a diverse 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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Our coastal economy

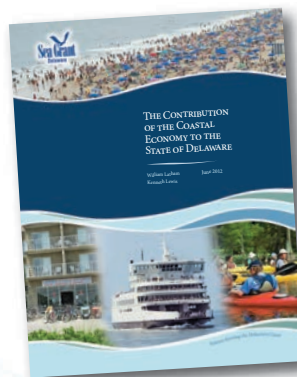
Delaware Sea Grant applies science to inform decisions that sustain a dynamic coastal economy, which is anchored by a healthy environment. We reach out to the community at-large, businesses, and decision makers to foster communication and contribute insights benefiting land use planning, coastal resilience, and seafood consumers and handlers.

Economic report used to help track trends of coastal economy

The Delaware coastal economy is a diverse and interconnected web of sectors. It includes the traditional beach resort activities, but also a growing retirement population and communities with linkages to the health care industry, outdoor recreation, retail, food services, and local farmers markets.

Recently, Sea Grant documented the economic impact of Delaware's ocean coast on the state at \$6.9 billion annually. Beach communities and surrounding areas support 59,000 jobs and \$711 million in tax revenue, ranking the coast-related economy on par with agriculture among the state's top industries. The full report is available at <http://bit.ly/Wx4krV>.

These findings were the subject of a Sea Grant seminar, "Focus on the Delaware Coast,"



The latest technology improves collaborative land use planning

New technologies based on the Nintendo Wii video game console add a hands-on component to local land use planning meetings for mapping out regional development and environmental impacts. Attendees can make edits to maps and draft plans while viewing their input and suggestions regarding transportation,

a public forum that provides relevant science-based information to inform and support local decision-making. In addition, business and community leaders shared their perspectives on issues, opportunities, and challenges.

Using a Nintendo Wii, light pen, and other equipment, community planners and local residents can explore different land development scenarios.

housing, agriculture, open space, and recreation in real-time. The weTable has proven successful in designing plans looking up to 25 years into the future, with an eye toward sustainable development. Delaware Sea Grant's Ed Lewandowski provided the weTable and his support to help shape the Bridgeville-Greenwood Master Plan. The weTable's popularity is on the rise and Sea Grant's collaboration has also inspired state planners to put the cutting-edge tool into practice.

Seafood safety training

Delaware's seafood industry has a long tradition of providing a healthy diet staple that also draws visitors to the state. Dining in Delaware has always been associated with enjoying fresh fish and shellfish. Doris Hicks of Delaware Sea Grant works to ensure that local fresh seafood handlers and suppliers are properly trained to deliver safe seafood to your table. She recently partnered with Maryland Sea Grant to host a seafood safety class that met training requirements of the Food and Drug Administration and state health departments.



Doris Hicks helps seafood handlers prepare their products safely.

Innovating win-win alternatives to support industry and natural resources

Horseshoe crabs are used as bait to catch eel and conch. Delaware Sea Grant's Nancy Targett and team have been exploring bait alternatives to reduce harvest pressure while sustaining local fisheries.

Targett's lab developed an artificial bait made from alginates (compounds found in brown seaweeds and kelp), a small amount of coarsely ground horseshoe crab, and several food-grade ingredients. When mixed together, these ingredients form a quick-set gelatin that keeps for up to four days. The artificial bait uses only 1/8th to 1/16th of the horseshoe crab and fishes as effectively as the 1/2 female horseshoe crab currently allowed under Delaware's fishing regulations.

LaMonica Fine Foods in Millville, N.J., has started producing the bait commercially. Field tests in Delaware Bay with local conch fishermen have been successful and requests for the bait have been pouring in.

"Our hope is that this new bait will meet the fishing community's needs while at the same time protect the horseshoe crab," Targett said.



A recently developed bait alternative poses a new option for eel and conch fishermen.

Preparing a resilient coast

More than 80 major storms have threatened Delaware's coast over the past three decades, putting lives and property at risk. Delaware Sea Grant helps residents get ready for natural hazards such as coastal storms and flooding by providing real-time weather data, making recommendations on how to secure homes and businesses, and tracking environmental changes along the coastline.

Handbook explains how to protect homes from storms

Hurricane Sandy's heavy rainfall, high tides, and floodwaters underscored the importance of having family emergency response plans and resilient buildings in place. The new *Delaware Homeowners Handbook to Prepare for Natural Hazards* can help Delawareans brace for the next big storm. The book provides practical measures to keep people safe and minimize property damage.

"This guide enables homeowners to understand the risks and make smart decisions about how to deal with the next weather hazard—well before it strikes," said Delaware Sea Grant's Wendy Carey. The handbook was prepared as a collaborative effort by Delaware Sea Grant, the Delaware Emergency Management Agency, and the Delaware Department of Natural Resources and Environmental Control.

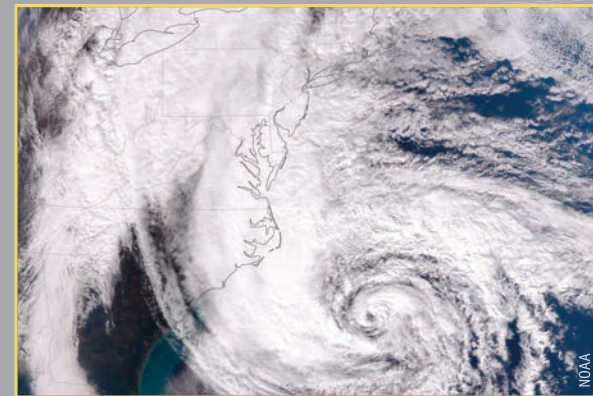


A new handbook is helping Delaware homeowners minimize damage caused by northeasters, hurricanes, and other coastal storms.



Satellite data assists in Hurricane Sandy response

When Hurricane Sandy approached Delaware's coast in October 2012, University of Delaware scientists followed the storm's progress with satellites and other remote sensing equipment. The monitoring system is supported by Sea Grant to effectively follow environmental changes in the Mid-Atlantic. Scientists worked with regional officials to provide up-to-date information from satellites and interpret that data. After the storm, they were able to identify raw sewage entering the ocean near New Jersey from damaged treatment plants. These kinds of rapid response efforts help keep the public safe.



Satellite data and other remote sensing equipment, supported by Delaware Sea Grant, informed regional officials during Hurricane Sandy.

Providing public education on storm and tidal flooding

As rain and floodwaters drenched Delaware's coast during Hurricane Sandy, Sea Grant documented the impact. Marine Advisory Service staff set up a waterproof camera in Lewes to capture footage of the storm tide flooding over three days and create a time-lapse video, illustrating the importance of homeowners being prepared, especially with regard to flood risk, as well as evacuation planning and procedures. We traveled in the field to photograph damage to Delaware beaches and bays, sharing images through social media feeds and University of Delaware communication channels. The material is now available for use in workshops and educational programs to demonstrate the



results of storms and coastal flooding. Check the Delaware StormSmart Coast website at de.stormsmart.org for the latest information on how to protect communities from weather and climate hazards.

The cost of shifting sands along the coast

Shorelines in Delaware retreat and are rebuilt about 3 feet each year, with sand moving north toward Cape Henlopen at the mouth of Delaware Bay. Large storm events increase the rate of transport. To make up for the lost sand, state and federal agencies coordinate beach nourishment projects at an annual cost of millions of dollars. Sea Grant researchers studied the natural processes at play that cause this shift in the sand, using a sophisticated GPS system to map the shape of the beach and the amount of sediment present. The findings can improve knowledge of shoreline dynamics in this area and the effect on communities and wildlife.



Sea Grant scientists use GPS technology to map the changing shape of the coast.



Studying environmental pollutants

Coastal communities rely on clean water and a healthy environment to thrive. Delaware Sea Grant helps monitor and protect the state's valuable natural resources today and for future generations.

Taking a close look at radioactive medical waste in waterways

Delaware Sea Grant scientists recently discovered that trace amounts of radioactive iodine, which is used to treat people with thyroid cancer, are entering the Delaware River through sewage treatment plants. They found the medicine in the Delaware River near six facilities between Philadelphia, Pa., and Wilmington, Del. The concentrations are so low that they do not pose a threat to humans or the environment, according to the Environmental Protection Agency, but scientists seek to know more about where the radioactive iodine ends up. This study provides a new tool for tracking how



Christopher Sommerfield looks at sediment to trace where radioactive medical waste travels in the Delaware River.

pharmaceuticals and other substances travel through rivers and possibly into the ocean. "This is a really interesting convergence of medicine, public health, and environmental science," researcher Christopher Sommerfield said.

Tracking bacteria levels in coastal waters

Checking the state's water quality is a big job, requiring year-round testing of numerous sites. Delaware Sea Grant works with state officials and a team of volunteers from the UD Citizen Water Quality Monitoring Program to collect and analyze water from the Inland Bays and their tributaries. Our scientists recently improved these efforts by developing high throughput sequencing techniques to differentiate between human, seagull, and animal fecal contamination. The data can improve identification of how unwanted bacteria enter the water and, in turn, help protect public health. A new website is being developed to provide educational content on these issues.

Ed Whereat, Joe Farrell, and Muns Farestad collect samples to monitor bacteria levels in the Inland Bays and their tributaries.



Examining groundwater pollution

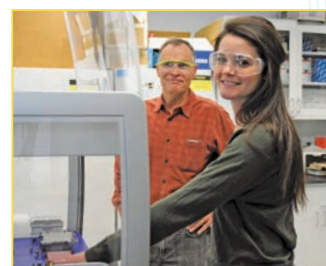
Groundwater is an important natural resource serving homes and businesses in our region and providing freshwater to coastal water bodies. With partners in Maryland and Virginia, Delaware Sea Grant's Joanna York is examining how different types of land use affect water flowing underground. The team is testing groundwater in areas that utilize a range of practices from corn and soybean crops to poultry production to determine the impact of these activities on groundwater quality. Data from this work will be included in a model that allows planners to see how different land use types may impact water delivered to estuaries.



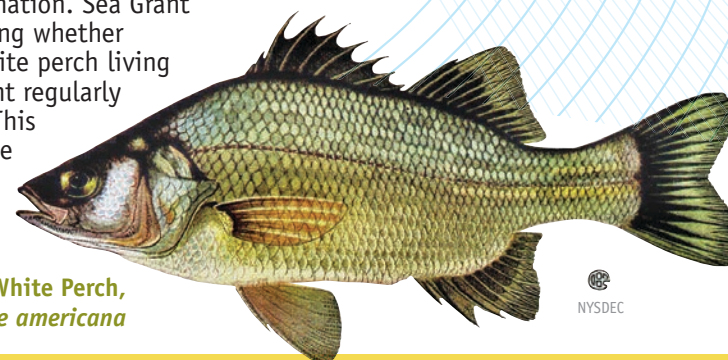
Joanna York is testing groundwater samples to understand how land use affects water quality.

Research underway to identify healthy white perch populations

White perch are a popular catch for commercial and recreational fishermen in the Delaware River and Delaware Bay. Yet when toxin levels found in the fish are too high, white perch can be unsafe to eat—which is why regulators frequently monitor them for contamination. Sea Grant researchers are investigating whether distinct populations of white perch living in less polluted areas might regularly be safe for consumption. This information could make the warning system more accurate and specific to certain locations.



Patrick Gaffney and University of Delaware student Megan Shaffer are examining white perch populations for toxin levels.



White Perch, *Morone americana*

2013 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, 2013** to be entered into a drawing for our Coastal Prize Package.

Name _____

Address _____

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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 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. What 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 would 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

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Complete the
survey and send
it in today!



Complete our readership survey 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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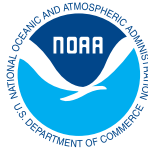
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REPORTER

UNIVERSITY OF DELAWARE

NEWARK, DELAWARE 19716-3530



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Science Serving the Delaware Coast

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.

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