Volume 27

2008 Annual Report

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LAWARE SEA GRANT COLLEGE PROGRAM

Enhancing our waterways



Nancy Targett, director of the Delaware Sea Grant College Program, aboard the University of Delaware research vessel R/V Hugh R. Sharp.

Increasing what we know about the coastal environment...and ensuring the wise use of Delaware's coastal treasures

From Brandywine Creek's lush banks to Fenwick Island's quiet beaches, Delaware has an abundance of coastal treasures. We have a top port, world-class beaches, vibrant marshes, plentiful marine life, and communities rich with maritime heritage.

Our oceans and their productive coastal environments are important to our state and nation, affecting the lives of coastal as well as inland residents. These treasures benefit our health, support our economy, and provide for our everyday needs.

The very things that make our coast so appealing also put it under increasing pressure. We like to live at or visit the beach, eat seafood, and enjoy the natural beauty of the coast. But increased human populations in coastal areas are affecting water guality, seafood safety, and marine habitat integrity. Balancing our natural resources with these competing demands is a challenge.

Delaware Sea Grant, which is housed at the University of Delaware's College of Marine and Earth Studies, is working to find solutions to such coastal challenges. Since its creation in 1976, the program has greatly increased our understanding of Delaware's coastal environment. Sea Grant researchers, outreach specialists, and students are discovering innovative ways for society to benefit from the sea today and in the future.

Coastal Solutions This report highlights several efforts sponsored by Delaware Sea Grant over the past year. It identifies some of the pressing challenges facing our coast and discusses what we are doing to help solve these problems.

We can't do it alone, however...

Delaware Sea Grant is built on partnerships. Every day, we work with state and federal agencies, businesses, environmental organizations, and citizens to tackle our coastal challenges. The following pages highlight just a few of the many partners who team with us to better understand our coastal environment and the ways we can work together to ensure that coastal waters remain clean, healthy, and economically viable for our children and grandchildren.

I invite you to read this report and to go online at www.deseagrant.org/getinvolved to consider how you too might partner with us in finding solutions to our coastal challenges.

Nancy m Gargets

Dr. Nancy M. Targett Director, Delaware Sea Grant College Program Dean, University of Delaware College of Marine and Earth Studies

ADVISORY GROUP MEMBERS GUIDE SEA GRANT EFFORTS

The Delaware Sea Grant Advisory Council (SGAC) consists of members of the Delaware General Assembly and representatives from state and local government agencies, industry, nongovernmental organizations, and the education sector. Members serve staggered two-year renewable terms.

The SGAC provides valuable input on Delaware Sea Grant's research, outreach, and education projects. It is also a critical partner in the development of Delaware Sea Grant's strategic and implementation plans. When the SGAC reaches consensus regarding coastal priorities, it represents a strong mandate because of the diversity of constituents it represents.

The SGAC also facilitates partnerships and alliances for Delaware Sea Grant researchers, outreach specialists, and educators throughout the state and region.



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Using Natural Resources Wisely

As cities and towns grow, so do opportunities to ensure a clean and healthy Delaware

Survey studies alternative energy and tourism

Wind power might be a cost-effective renewable energy resource, but if the state erected an offshore wind farm, how would it affect beach tourism?

Delaware Sea Grant marine policy experts Jeremy Firestone and Willett Kempton recently surveyed 1,000 out-of-state visitors at Delaware beaches to find out. The survey will help determine what types of tourists a wind farm would deter, what types it would attract, and whether possibilities exist for economic development surrounding the tall white turbines. The team plans to publish preliminary results later this year.

> "We want to know if there's a wind farm, would visitors still go to the same beach and would they take a boat tour of it," Firestone said. "There's a lot of speculation out there about the effects on tourism, but there's not a lot of good data."

Efforts help manage a growing population

Growth of Delaware's coastal communities is going to happen, says Jim Falk, director of Delaware Sea Grant's Marine Advisory Service. Sussex County alone is set to grow 62 percent by 2030. But by taking action, the state and its residents can limit impacts on the natural resources we all cherish.

To help mitigate impacts from growth which range from loss of wildlife habitat to decreased water quality — Falk has joined a team of national Sea Grant colleagues working to set the nation's outreach and research priorities on the topic. In 2007 he also teamed up with colleagues from two UD colleges to form the Coastal Community Enhancement Initiative (CCEI). The initiative is conducting workshops and seminars and funding research projects on topics such as development impacts on Sussex County's heritage resources.



Dennis Forney, chair of the Greater Lewes Foundation

The Greater Lewes Foundation (GLF) supports community members' efforts to improve the quality of life in the region. As its chair, Dennis Forney often finds himself working with Delaware Sea Grant on projects related to sound growth and development — doing things like getting community members together to discuss their vision for the greater Lewes area of the future. Working together, Sea Grant and GLF have advanced the community's dialogue on growth, said Forney, also the publisher of the *Cape Gazette*.

"Sustainability arises out of an engaged and informed public," he said.

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Increasing Coastal Flood and Storm Awareness

Citizens learn to prepare for northeasters and hurricanes

Scientists work to predict storms, save lives

A powerful northeaster could bring 30-foot waves and a 9.5-foot storm surge to coastal Delaware. A project by Delaware Sea Grant researchers Fengyan Shi and Jim Kirby will help state officials predict storm surge and flooding, with the goal of saving lives and reducing damage during such a storm.

The scientists are working to integrate numerical models that predict wind, storm surge, surface waves, and flooding during a storm. Existing models make predictions about only one category, such as flooding, but don't take all four components into account like theirs will.

"After Hurricane Katrina, the prediction of storm surge and coastal inundation became one of the country's priorities," Shi explained. "We hope Delaware can use our model.'

Know your flood risk!

Do you know the flood risk of your home and neighborhood? Wendy Carey, coastal processes specialist with Delaware Sea Grant, is working to see that Delaware residents do.

Carey provides seminars across the state for homeowners, community groups, elected officials, and building code officials to help them understand the steps they can take to mitigate flood and wind damage from coastal storms. A special 2007 event she co-hosted with the Delaware Department of Natural Resources and Environmental Control (DNREC) featured a screening of a film about the deadly 1962 storm that wrecked Delaware's coastline. A new initiative also has her working with DNREC and others to enhance communities' preparedness, response, and recovery to coastal hazards.

"I try to highlight the fact that a severe coastal storm will hit Delaware again," she said. "And that there are steps you can take to prepare yourself."

Photos taken after Delaware's historic 1962 northeaster (left and below) capture the devastation that a strong coastal storm can cause. The photo at right, taken in May 2008, shows that similar storms can ppen anvtime



Mary Pat Kyle, Fenwick Island historian

Mary Pat Kyle has seen firsthand the destruction that a powerful coastal storm can cause. The historic

1962 storm that claimed lives and damaged Delaware's coastline

destroyed her family's beach house. The Fenwick Island resident also has seen ocean tide levels surge and wash across Delaware Route 1 multiple times.

Kyle, former president of Fenwick Island Society of Homeowners (FISH), has collaborated with Delaware Sea Grant to remind members of that group and others that even non-major storms can pose a threat.

"We all have to share the knowledge that we have because when the ocean decides it's coming, it's coming," she said.





Pollutant-absorbing plants restore marshes

up the marshy soil.

Educating the seafood industry

Helping the seafood industry control Listeria monocytogenes is just one of Doris Hicks' goals as a seafood technology specialist with Delaware Sea Grant. Hicks works to help seafood distributors and processors implement food safety and regulatory measures dealing with all types of issues, including chemical and biological hazards.

She has provided training programs on seafood safety across the country, and a quick look at her most recent work shows a broad range of projects that benefit the industry. In 2007 she surveyed consumers to learn about their knowledge of seafood safety and handling. She also reviewed Food and Drug Administration (FDA) guidelines for the seafood industry.

Hicks, whose efforts also promote public seafood consumption, said that working with both the FDA and the industry members allows her to facilitate communication between the two groups.





Jeanie Harper, owner of Wilmington-based Dawson's Sea Food Inc.

As the owner of a fourth-generation seafood distribution company, Jeanie Harper has reflected a lot on what makes healthy, safe seafood. Her thoughts? The more information people in her industry have, and the more participation and enthusiasm from the public, the better.

Harper, who serves on the Delaware Sea Grant Advisory Council (see inside flap), said she's excited to be a part of Delaware Sea Grant because of its work on projects that encourage safe seafood handling and that help people understand the implications of marine- and ocean-related research.

"There are many components of our fisheries," Harper said, "and Delaware Sea Grant is one very important aspect of them.

Making Seafood Safe

Consumers rely on fish for a healthy diet

Researchers develop antimicrobial seafood packaging

Listeria monocytogenes is a hardy bacterium that can survive in a variety of environments and even at refrigerated temperatures.

"It's very difficult to eliminate contamination of ready-to-eat seafood by this pathogen," said Delaware Sea Grant food scientist Haigiang Chen, explaining that *L. monocytogenes* can cause severe illness or death in humans.



Food scientist Haiqiang Chen with doctoral student Hudaa Neetoo working on antimicrobial packaging.

But Chen, Delaware Sea Grant researcher Dallas Hoover, and Seafood Technology Specialist Doris Hicks are developing new antimicrobial food packaging to protect seafood consumers from the bacterium. Working in partnership with the National Fisheries Institute, they're using chitosan (kahy-tuh-san)-coated plastic films to control this pathogen in ready-to-eat foods like smoked salmon and ham. Using chitosan, a substance derived from shrimp and crab shells, the team has been able to control the growth of *L. monocytogenes* for at least eight weeks in smoked salmon, versus just one week without it.

Conserving Our Biological Resources

Native plants and animals support healthy coastal ecosystems

Plants in coastal wetlands act as green filters for estuaries, pulling carbon dioxide from the air and excess nutrients and contaminants from the water. Their seasonal growth, death, and decomposition serve to build

But these diverse ecosystems are under siege. In many places, rising sea levels are outpacing wetland plants' ability to build up the soil. As they drown, their natural filtering action is lost. As a result, nutrient concentrations increase so much that they fuel an overgrowth of algae, which robs bays and estuaries of oxygen and threatens marine life.

Delaware Sea Grant botanists Jack Gallagher and Denise Seliskar are working with doctoral student Tracy Elsey to arm these wetlands with better fighters. Their research is helping identify the best varieties of four native plant species to take on the rising, nutrient-laden waters.

> Tracy Elsey (far left), Denise Seliskar, and Jack Gallagher at work in a marsh in Lewes.

Oyster gardens grow, boost bay health

Oysters are finding unconventional homes in Delaware. Although native populations have dwindled, new generations are being raised by volunteers in the maze of lagoons that empty into the state's inland bays.

The young oysters spend their vulnerable years in floating oyster trays attached to docks. The filter-feeding bivalves help clean the surrounding water and provide valuable habitat for dozens of aquatic species. Delaware Sea Grant Aquaculture Specialist John Ewart is working cooperatively with the Delaware Center for the Inland Bays, Delaware State University, and citizen volunteers to document oyster performance and the diversity of marine organisms attracted to the floating habitats. Once the oysters mature, they're planted at other inland bay sites, where they continue to provide habitat for grass shrimp, juvenile fish, and other marine life.

> Delaware Sea Grant's John Ewart and Gary Richards of the U.S. Department of Agriculture study oysters



Delaware Sea Grant volunteer

Buzz Henifin tends his oyster garden, which is part of a Delaware Sea Grant program designed to enhance aquatic health.

Buzz Henifin has always been close to the water. The former naval submarine commander served 29 years before retiring to the Sussex County coast.

These days Henifin is busy collecting water guality data for the UD Citizen Monitoring Program and raising oysters for the Oyster Gardening Program. Both are initiatives that Delaware Sea Grant helps oversee, along with the Delaware Center for the Inland Bays and several other partners.

The second s

"I may not live to see cleaner water here," Henifin says. "But I hope to leave it cleaner for my grandchildren."

tion?

Visit



UD Citizen Monitoring Program Coordinator Ed Whereat talks with Jeanie Harper about water quality issues.

Enhancing Our Waterways

Ensuring clean water requires prevention, monitoring, and teamwork

Researchers discover new ways to monitor Delaware waters

Certain land-use practices, increased development, and other factors are believed to be responsible for the occasional occurrence of some disease-causing bacteria in Delaware's coastal waters. State and local officials need to know when enough of these bacteria are present to pose potential human health hazards. Unfortunately, traditional monitoring techniques are slow and often fail to identify all harmful bacteria species in the water.

Delaware Sea Grant researchers David Kirchman and Barbara Campbell and graduate student Katrina Twing are working on techniques that will more quickly and completely identify harmful bacteria in coastal waters. They are testing the tools in different aquatic habitats, including beach and bay waters and their underlying sediments. With such methods at their disposal, government officials will be better positioned to ensure that the state's waterways remain safe for boaters and swimmers.



elaware Sea Grant helps ensure clean water for recreational and other coastal activities.



Treasuring Our Coastal Species

Better tools are needed to bolster conservation efforts in Delaware

Calculating the economic value of migratory shorebirds

Delaware is a vital rest stop for weary shorebirds as they trek from South America to Canadian breeding grounds each spring. Their visit coincides with the spawning of horseshoe crabs along Delaware Bay's sandy shores, allowing the birds to gobble up nutritious eggs that fuel the remainder of their journey.

Flocks of tourists also come to witness the annual event, and Delaware Sea Grant economist George Parsons and graduate student Kelley Appleman have been researching their economic impact. They are analyzing the value of shorebirds to local economies as well as the impact of horseshoe crab conservation efforts — useful information for those seeking to help conserve birds that face the prospect of serious decline.

Annual census tracks horseshoe crab numbers

Eighteen years is a blip in the timeline of horseshoe crabs, who have lived on Earth for more than 300 million years. But it's significant in horseshoe crab research: that's how long volunteers have counted the spawning crabs on Delaware Bay beaches each spring.

The census got its start in 1990, when resource managers were looking for better data to manage a declining horseshoe crab population. Now there appears to be a stable but lower population of mature adults and a growing population of juveniles.

> Delaware Sea Grant Education Specialist Bill Hall has overseen the census since its inception. Even though he officially retired in 2007, he plans to continue leading volunteers to observe the crabs' ancient ritual in an effort to ensure it continues for many years to come.

> > g/getinx

Bill Hall performing a horseshoe crab census.



PART OF

Many of Marina Joyce's students dream of becoming the next Jacques Cousteau. But Joyce, who developed an aquatic biology course from scratch, urges them to look beyond the glamour associated with the famed explorer.

With the help of Delaware Sea Grant publications, she teaches students about everything from the depths of the ocean to horseshoe crabs to sharks. She also encourages them to attend Coast Day, the annual event highlighting UD's coastal and ocean research. There, students see the vast range of topics ready for exploration by young minds.



Teamwork is key to preventing water pollution

In the Broadkill watershed in eastern Sussex County, residential development has increased more than 40 percent since 1992. As with other fast-growing areas, environmental impacts are being felt. Monitoring by the state indicates that the Broadkill River and several of its tributaries are now impaired by pollution.

Training events and workshops educate residents, business owners, and others about water quality issues throughout the year.

To deal with this problem, Delaware Sea Grant's Joe Farrell teamed with the Delaware Department of Natural Resources and Environmental Control (DNREC) and several other partners to create the Broadkill Tributary Action Team, a group representing watershed residents, local businesses, government agencies, and educational institutions. Through public forums, educational workshops, and other activities, the team laid the groundwork for creating a pollution-control strategy in the watershed. It also raised residents' awareness about the environmental issues facing their communities.



Katherine Bunting-Howarth, acting director of the Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Water Resources

DNREC is responsible for reducing pollution in the Broadkill River and its tributaries. However, noted Katherine Bunting-Howarth, success requires a group effort. When DNREC recognized the need for local communities to understand, identify, and support any pollution-control strategies for the watershed, it asked Delaware Sea Grant to facilitate the effort.

"Delaware Sea Grant helps me build bridges with and within the community," said Bunting-Howarth. "Sea Grant helps translate scientific information to the public and thus assists in the formation of sound, balanced environmental policy."



students to learn inside and outside

the classroom.

Be Part of the Coastal solution – Get The Coasta

self-guided tour. The garden, shown above, left, is located at the entrance to Cannon Lab on the UD Hugh R. Sharp Campus. Call 302-645-4346 for more information. For more on native plants, visit www.deseagrant.org/nativeplantgarden.

At Sea E-Newsletter

We hope you're inspired by

Delaware Sea Grant's efforts

to confront the state's coastal

research and outreach projects

- so inspired that you'll want

to be part of the coastal solution

too. Learning more about the

issues and getting involved are

two great ways to do just that.

getinvolved to find out how to

get started, and read on for a

few opportunities that can get

you going right now.

Visit www.deseagrant.org/

challenges with innovative

Get more information on the latest research. educational activities, and public events at Delaware Sea Grant and the UD College of Marine and Earth Studies — subscribe to our free e-newsletter. At Sea!

Subscribe online today at www.deseagrant.org/atsea or e-mail your request to MarineCom@udel.edu.

Marine Lab Tours

Free guided tours of UD's marine research complex in Lewes are available to the public, thanks to dedicated volunteers. Annually they lead more than 1,000 people on walking tours and highlight the work of UD marine scientists in Delaware's coastal waters and throughout the world. To learn more, call 302-645-4346.

that educate, inform, and entertain

Whether you're a teacher looking for classroom materials or a cook in search of new seafood recipes, we have something for you. Our colorful horseshoe crab and dogfish shark models are great educational tools for school or home. Our Coast Day Crab Cake Cook-Off Cookbook is filled with recipes from each of the competition's first 17 years. For a copy of our publications catalog, please contact us at MarineCom@udel.edu or 302-831-8083.

Lectures, seminars, and workshops

Delaware Sea Grant offers a variety of events throughout the year that provide educational information on topics ranging from safe seafood preparation to coastal storms to the health of Delaware Bay. For a listing of events, visit www.ocean.udel.edu and click on the Workshops link at the bottom.



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Complete the survey and send it in today!



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	 After reading this issue of <i>Reporter</i>, which actions, if any, do you plan to take to help protect Delaware's coastal resources? Visit www.deseagrant.org/getinvolved to learn more and to take part in our programs. Participate in water quality monitoring efforts Learn more about healthy communities Take part in the Delaware Bay horseshoe crab census Find out how to prepare my home or business for coastal storms Learn more about properly storing and preparing seafood Attend UD's Coast Day, October 5, 2008 Order Delaware Sea Grant publications Take part in a Delaware Sea Grant workshop, lecture, or semin Visit www.deseagrant.org Other (Please specify): 				
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Sunday, October 5 Waasto 5 p.m.

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Join us for ...

Last year, more than 13,000 people participated in UD's annual celebration of the sea. Coast Day, winner of state and national awards, includes a crab cake cook-off, children's activities, research demonstrations, lectures, and much more.

Fun educational event for the whole family!

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