

# UNIVERSITY OF DELAWARE SEA GRANT REPORTER



Volume 24, No. 1 — 2005 Annual Report

## Exploring

### the Ocean We Treasure with An Eye to the Future

Kathy Atkinson



Welcome to the 2005 edition of the *University of Delaware Sea Grant Reporter*! The goal of this publication is to share with you some of the research and educational activities that are being conducted by the University of Delaware Sea Grant College Program and to seek your input on coastal issues that concern you.

Based in the UD College of Marine Studies, Delaware Sea Grant is a statewide program that receives funding from the National Oceanic and Atmospheric Administration (NOAA), the State of Delaware, and the University to pursue high-priority research and outreach initiatives that will foster the wise use, conservation, and management of Delaware's marine resources.

Currently, among our major objectives, Delaware Sea Grant is leading the development of the Delaware Bay Observing System, a network of sensors, deployed from Fourteen Foot Bank Lighthouse, that will help us determine the path of pollutants such as oil, forecast coastal storms, and predict the annual population of blue crabs and other fisheries. By exploring the bay with a set of new, high-tech "eyes," we can provide new insights into the state of Delaware's marine environment, which is so critical to our quality of life.

As you read on, I encourage you to get involved in our programs, activities, and events. We look forward to seeing you soon!

*Nancy M. Targett*

Dr. Nancy Targett

Interim Director, UD Sea Grant College Program  
Interim Dean, UD College of Marine Studies



Duane Perry



- Left, Fourteen Foot Bank Lighthouse is the base of operations for the Delaware Bay Observing System. Meteorological instruments aboard it and underwater sensors deployed from it continuously collect weather and oceanographic data and relay the information to the UD College of Marine Studies.
- Above, scientists prepare to deploy a sensor attached to a tripod in the Delaware Bay near Fourteen Foot Bank Lighthouse.

## What's Inside

Take a closer look at our marine research and educational programs, and see how you can get involved. Be sure to take this year's survey!



Sea Grant



Learn more about Sea Grant's bold, new research in the age of "ocean observing."



Dive in to a bounty of programs, Web sites, and more — offered by our outreach team.



Enter the drawing for the **Great Coastal Gift Package!** Fill out the survey inside to enter.

Visit our world at [www.ocean.udel.edu](http://www.ocean.udel.edu)

# Delaware Bay Observing System

WILMINGTON

NEWARK

The Delaware Bay Observing System — a network of sensors being developed by University of Delaware marine scientists — will operate continuously in the bay, collecting and reporting up-to-the-minute data relating to sea and weather conditions. This information will be made available to the public through a Web site, as well as feed into regional and national ocean observing systems that are being established along the U.S. coastline.



Steven Billups



▲ This small buoy, or float, in Delaware Bay will mark the location of an Acoustic Doppler Current Profiler (ADCP), which measures the speed and direction of the currents.

## Modeler Working on Forecasting Tool

As a research investigator on tsunamis in the Indian Ocean, coastal engineer Jim Kirby (right) is well aware of the potential benefits of ocean observing systems in protecting the public from coastal hazards.



David Barczak

In a Sea Grant study at the UD Center for Applied Coastal Research in Newark, Kirby is using data from the Delaware Bay Observing System to test a computer model for predicting wave conditions. "Hindcast" experiments, in which the model's performance is evaluated against data taken by wave gauges temporarily deployed near Fourteen Foot Bank Lighthouse, are now being conducted.

According to Kirby, the wave data currently available for Delaware Bay is actually recorded by buoys located miles offshore near the Gulf Stream. He says an accurate forecast of wave conditions in the bay and along nearby ocean beaches could result in several benefits.

"Besides increasing the safety of boaters and fishermen, such a tool could help coastal communities prepare for storm surges and aid search-and-rescue missions at sea, among other applications," he says.

DELAWARE BAY

The Delaware Bay Observing System's many applications will range from pollution monitoring to population assessments of major fisheries such as the blue crab.



MONITORING STATION

CAPE MAY

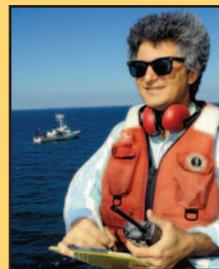
LEWES



▲ Data from Fourteen Foot Bank Lighthouse will be transmitted to the UD College of Marine Studies in Lewes. UD's new 146-foot research vessel, the *R/V Hugh R. Sharp*, is now being built and is set for delivery to Delaware this fall. It will aid scientists in deploying buoys and other scientific equipment for the system. The new vessel will replace the 120-foot *Cape Henlopen*, which has served the U.S. oceanographic community for nearly 30 years.

## A New Way of Looking at the Bay

UD marine scientist Mohsen Badiey (right) is leading the scientific team that has outfitted Fourteen Foot Bank Lighthouse, located in Delaware Bay, as a novel base for collecting oceanographic and weather data. An anemometer and thermometer on the lighthouse continuously record air temperature, wind speed, and direction. On the seafloor, a current meter measures the speed and direction of the currents, and three sensors called CTDs record water temperature, salinity, and depth. At the sea surface, a surf-rider wave gauge is temporarily deployed to gather data on wave conditions.



All the sensors, which are solar-powered, are cabled to a computer aboard the lighthouse that automatically relays the information to the UD College of Marine Studies in Lewes. From there, the data are transmitted to Badiey's lab at the Newark campus and uploaded to the Delaware Bay Observing System Web site at <http://www.udel.edu/dbos>.

"This is an exciting project that will give us the capability to track environmental changes as they are occurring, and on a long-term basis," Badiey says. "This information will expand our knowledge of Delaware Bay and help us better understand the exchange processes between the bay and ocean."

Badiey says the research has application to fisheries management, shipping, oil spill response, storm preparedness, Homeland Security, and many other issues.

"The public also will be able to use the data to plan recreational activities such as boating, and teachers can integrate the data into science lessons on the bay," he notes.

In the future, the scientists plan to expand the system beyond the bay and into the ocean, with the installation of high-frequency radar for collecting wave data. Delaware's information will be integrated into a regional observing system spanning the coast from Cape Cod to Cape Hatteras.

## Lighthouse Serves As Research Base

With permission from the U.S. Coast Guard, University of Delaware marine scientists are using Fourteen Foot Bank Lighthouse as a research platform for deploying meteorological and oceanographic sensors that continuously record environmental data for the Delaware Bay Observing System. Solar panels on the lighthouse, visible in this photo, power instruments and data transmission system.



Duane Perry

Made of cast iron and first lit in 1888, Fourteen Foot Bank Lighthouse was the first "submarine" lighthouse built in the United States. In this construction method, which helped lighthouses withstand the pressure of flowing ice, a double-bottomed caisson — a hollow, cast-iron cylinder — was sunk

up to 33 feet into the seabed. Air was then pumped in to force seawater out of the caisson's bottom so that workers could continue to excavate and prepare the foundation underwater.

Although it is closed to the public, this Delaware sentinel continues to aid mariners. Its beacon and foghorn were automated in 1972.

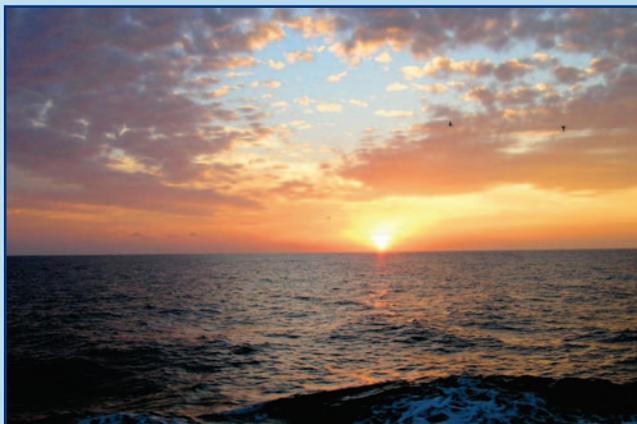
# USING HIGH-TECH "EYES" TO MONITOR THE SEA

**A**long the U.S. coastline, ocean observing systems — networks of sensors that continuously collect data on the sea all around us — are coming on-line, marking a new age of oceanographic research.

The goal of these systems is to expand our knowledge of the ocean, a resource that covers more than 70% of the Earth, by providing up-to-the-minute information that can contribute to a range of societal, environmental, and economic benefits.

According to the final report of the presidentially appointed U.S. Commission on Ocean Policy, issued in 2004, implementing an Integrated Ocean Observing System along the U.S. coastline will save the nation an estimated \$1 billion a year through enhanced weather forecasts, improved resource management, and safer, more efficient marine transportation.

Currently, this national system comprises 11 regional observing associations, involving academic institutions, industries, resource management agencies, and other representatives from the public and private sectors. These data users are working to design, implement, and sustain the operation of these high-tech systems.



The University of Delaware is making important contributions to the effort. UD recently organized the Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA). Spanning the coast from Cape Cod to Cape Hatteras, it includes representatives from nine states and the District of Columbia. Its sub-regions include the bays of Massachusetts and Connecticut, Long Island Sound, New York Bight, Delaware Bay, and Chesapeake Bay.

Scientists at the UD College of Marine Studies, supported by Delaware Sea Grant, are advancing the Delaware Bay Observing System. They are working with scientists in the UD Geography Department who are developing the Delaware Environmental Observing System to provide real-time weather, stream flow, and tidal information.

Recent headlines — from a proposal to establish a liquefied natural gas plant in Delaware waters to one of the largest oil spills in the Delaware River's history — underscore the need for timely, objective information to address environmental issues and respond to crises, protect the marine resources we depend on, and safeguard human lives in their interaction with the sea. As the Delaware Bay Observing System and companion networks evolve, Delawareans will gain a new vantage point from which to plan and realize their vision of the coast — a resource critical to us all.

Robert Cohen



Improved data on wind and currents from ocean observing systems would aid resource managers in tracking the transport of fish larvae in and out of bays and better predict year-to-year variations in fish stocks.



Delaware River ports handle over 70 million tons of cargo a year, including 85% of the East Coast's oil imports. Improved wave forecasts from ocean observing systems would increase shipping efficiency and safety.

Robert Cohen



Delaware's beaches attract over 6 million visitors each year. Ocean observing systems would increase public safety by helping to predict coastal storms and rip currents.

## Buoy to Moor Sensors

George Luther (left in photo), a marine chemist at the UD College of Marine Studies, and doctoral student Tommy Moore are shown with the buoy that will moor their scientific instruments in Delaware Bay for the first tests in their research to establish a real-time chemical monitoring system in the estuary.

When deployed this summer, the buoy's payload will include the state-of-the-art chemical sensor that Luther and adjunct professor Don Nuzzio created and a device called the CTD, which measures seawater salinity, temperature, and depth.

Luther's goal is to operate the sensors in the bay right from his office at the UD Lewes campus using wireless communications technology.

The buoy was customized for the project with the assistance of Tim Deering on the UD Marine Operations staff. The yellow part will be above the water line. Three 12-volt batteries in the brown well at the bottom of the unit will power the scientific instruments. The batteries will be recharged by solar energy. Holding the buoy in place at sea will be two railroad wheels that will serve as anchors on the ocean floor.



Steven Billups

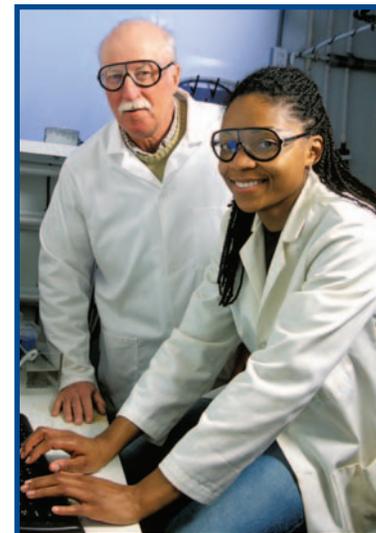
## Predicting the Supply of Blue Crabs

The blue crab's Latin name, *Callinectes sapidus*, means "beautiful, savory swimmer" — a description with which many a seafood lover would agree. So when there's talk about a shortage of blue crabs, local gourmands get, well, nervous.

The population of young, juvenile crabs in any given year is a key determinant of the size of the harvestable, adult population. UD marine scientist Charles Epifanio and Ph.D. student Letise Houser (right) have worked with physical oceanographers Richard Garvine and Charles Tilburg to develop a mathematical model that can predict general trends in the size of the juvenile blue crab population over time.

But to make more detailed year-to-year population forecasts, Epifanio says they need more data on when blue crab eggs hatch in the bay.

If you live near the Delaware Bay or Delaware's Inland Bays, you can help the scientists collect egg-bearing female crabs. The crabs will not be harmed. From June through September, daytime collections will be made using a seine net at Lewes Beach, while night-shift volunteers will use dip nets from the fishing pier at Cape Henlopen State Park. To learn more, call the College of Marine Studies at (302) 645-4279.



Steven Billups

Doctoral student Letise Houser and her adviser, Charles Epifanio, are refining a mathematical model that can predict the population size of the blue crab fishery.

## An Out-of-This-World View of the Ocean

Underwater sensors aren't the only instruments that collect ocean data. Satellites orbiting the Earth also constantly record information.

The novelty of studying the ocean from space lured Brian Dzwonkowski — the 2005 recipient of the Delaware Sea Grant Student Award — to the UD College of Marine Studies two years ago.

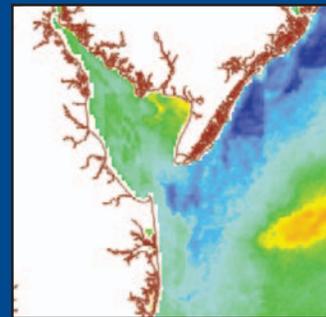
"I never realized you could make quantitative assessments of the marine environment through space-based means until I began looking into pursuing my graduate degree," he says. "Having grown up near the coast, that really intrigued me."

The 28-year-old native of Red Bank, New Jersey, earned his master's degree in marine studies at UD and is now working on his doctorate. Currently, he is assisting his adviser, Xiao-Hai Yan, co-director of the Center for Remote Sensing, in developing new techniques for analyzing satellite data that will help scientists quantify the



Doctoral student Brian Dzwonkowski (left) and his adviser, Xiao-Hai Yan, examine a satellite image of Delaware Bay in UD's Center for Remote Sensing.

John Cox



The dark blue color (cooler water) shown in this satellite sea-surface temperature image from April 14, 2003, identifies upwelling zones. They occur when warmer surface water is transported offshore, and cooler water is raised to the surface.

complex physical and biological processes that are occurring in Delaware Bay.

For example, sea-surface temperature data from satellites can reveal the location of coastal "upwelling" — in which warmer surface water is transported offshore by wind and waves, and cooler water is raised to the surface. Two summers ago, beachgoers along the Atlantic coast experienced the chills and thrills of this phenomenon when they went to take a dip in the ocean and found the water a lot colder than they expected.

Coastal upwelling also can have a range of impacts on fisheries, Dzwonkowski says.

"It's been estimated that over half the world's fish supply is produced in coastal upwelling zones," he says. "Scientists here at UD have shown that upwelling events also are important to the transport of blue crab larvae and their recruitment to adults. Conversely," he notes, "if upwelling centers form and recur over and over again, they can generate a surplus of nutrients that rob the water of oxygen and stress fish."

After he completes his Ph.D., Dzwonkowski says he has two major goals. "I'd like to continue my research at an academic institution or a government agency," he says, "and never live more than 15 minutes from the beach."

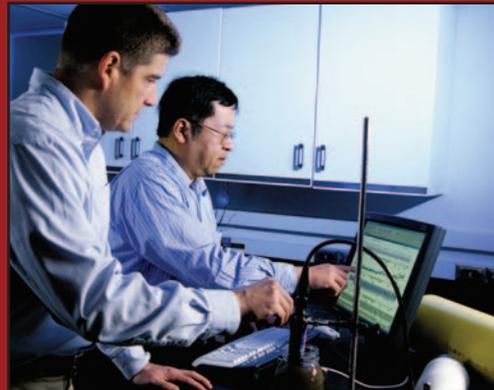
## Getting to the Bottom of Bay Sediments

With over a million tons of sediment entering the Delaware Estuary each year, it seems like an impossible task to sort out where all those mud and sand particles are coming from, how they get moved around, and where they eventually land on the seafloor. And why should we care anyway?

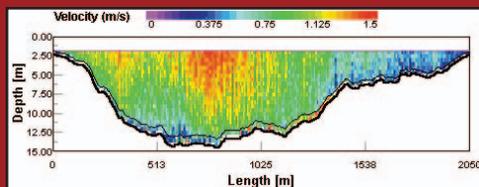
The answer, UD geological oceanographer Chris Sommerfield (left in photo) says, is important to a number of complex management issues in the waterway.

"Fine-grained sediments are at the heart of issues ranging from maintenance dredging to toxic contamination in the estuary," he notes. "However, before we can predict patterns and rates of sediment deposition and erosion, we need a fundamental understanding of sediment transport mechanisms."

River runoff, tides, and winds are the primary "movers and shakers" of sediments in the estuary, according to Sommerfield. He and Kuo-Chuin Wong (above), a physical oceanographer at the UD College of Marine Studies, are working to assess the magnitude of each of these forces on daily and seasonal time scales. Recently, they began research to determine how much sediment is coming into the estuary north of Wilmington — a high-flow area — compared to the amount delivered south of it. The scientists have deployed current profilers and other sensors in the waters off New Castle, Artificial Island, and Bombay Hook to begin gathering data. The two-year project will be conducted in partnership with the Delaware River Basin Commission.



Steven Billups



This figure shows the velocity of the currents in the Delaware Estuary from Reedy Island, Delaware (starting at left), east to New Jersey. You can see how the current varies in the channel, from top-to-bottom and from shore-to-shore. The most intense currents are in red.

## Web Site Informs Public about Oil Spill

On Friday, November 26, 2004, at approximately 9:15 p.m., the 750-foot, single-hull tanker *Athos I*, registered under the flag of Cyprus, was reported to be leaking oil into the Delaware River en route to an asphalt refinery in Paulsboro, New Jersey. Two punctures in the tanker's hull, believed to be caused by a submerged pipe on the river bottom, later were confirmed by Coast Guard divers.

Soon after the oil spill occurred, Delaware Sea Grant began receiving calls from the media and the public for information. Where would the oil go? What wildlife would be affected? Would seafood from Delaware Bay be safe to eat?

Sea Grant outreach staff in the UD Marine Public Education Office and the Marine Advisory Service joined forces with researchers to develop a Web site at <http://www.ocean.udel.edu/oilspill/> to provide answers. Since it went on-line in early December, it has served as a resource for the public, state and federal agencies and organizations, and media ranging from the *National Herald* for Greek Americans to National Geographic.

Of special note, a U.S. policy specialist in Iraq is using the Web site as a resource in his quest to provide the country's constitution writers and politicians with information in developing environmental laws for their coastal communities.

Estimated at 265,000 gallons, the *Athos I* oil spill ranks as one of the largest oil spills in the Delaware River's history, and its damages are still being assessed. The Web site will continue to be updated as new information becomes available.



Visit our world at [www.ocean.udel.edu](http://www.ocean.udel.edu)

## O U T R E A C H

Sea Grant's outreach team — the Marine Advisory Service and Marine Public Education Office — relays research-based information to the public in support of coastal stewardship, science education, economic development, and public safety.

Based at UD's Lewes campus, the Marine Advisory Service assists Delawareans with issues relating to water quality, aquaculture and fisheries, seafood technology, marine education, marine business and transportation, coastal hazards, and tourism.

Marine Public Education, based at UD's Newark campus, translates complex scientific information and presents it in award-winning publications, "SeaTalk" radio announcements, on-line expeditions, exhibits, and Web sites.

This page highlights only a few of our activities. For more information, visit Sea Grant on the Web at <http://www.ocean.udel.edu> or contact the Marine Advisory Service at (302) 645-4346 or Marine Public Education at (302) 831-8083.

Bob Bowden

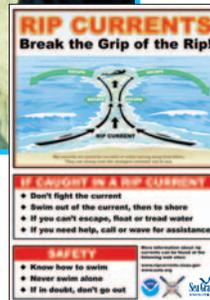


### Break the Grip of the Rip™

If you got caught in a rip current, would you know what to do? Each year in the United States, more than 100 people drown in these powerful currents.

Sea Grant coastal processes specialist Wendy Carey (second from right) assisted NOAA and the U.S. Lifesaving Association last year in launching "Break the Grip of the Rip™" a national safety campaign reaching millions. She also has been working with Delaware's beach communities and beach patrols to increase public awareness about rip currents.

"If you get caught in a rip current, don't panic," she says. "Swim parallel to shore to get out of the current, or float or tread water and call or wave for help if you need it." For more information, call Carey at (302) 645-4258 or visit <http://www.ocean.udel.edu/ripcurrents/>.



Bob Bowden



### Delaware NEMO Program Launched

Joe Farrell (left), Sea Grant marine resource management specialist, is coordinating Non-Point Education for Municipal Officials (NEMO) — a statewide network of educators, resource managers, and planners that is providing communities with educational programs and materials to help them plan where and how to develop while protecting their natural resources.

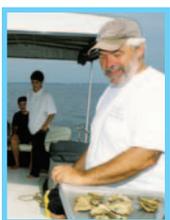
During the past year, Delaware NEMO hosted community workshops on topics ranging from stormwater pond maintenance to developing riparian buffer ordinances. A program brochure has been published, and a guide to natural resource-based planning will be available later this year. To learn more, contact Farrell at (302) 645-4250.

A charter member of the National NEMO Network, Delaware NEMO is funded primarily by Delaware Coastal Programs and Delaware Sea Grant.

### How Does Your Oyster Garden Grow?

For the past two years, Sea Grant aquaculture specialist John Ewart (right) has been coordinating a pilot oyster gardening program in Delaware's Inland Bays, initiated by the Center for the Inland Bays through a grant from the U.S. Fish and Wildlife Foundation. Fifteen volunteers have been growing baby oysters, or "spat," in small floats attached to their backyard docks. The spat then have been planted on the James Farm Oyster Reef in Indian River Bay.

"These efforts have demonstrated that oyster growth is excellent in all three Inland Bays — Rehoboth, Indian River, and Little Assawoman," Ewart says. "The baskets of oysters on the reef provide great habitat for grass shrimp, juvenile fish, and other life." For more details, see Ewart's Web page at <http://darc.cms.udel.edu/>.

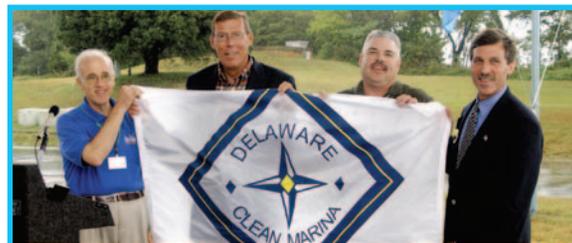


Bob Bowden

### Boost Your Seafood IQ!

Food educators in the region, from nutritionists to home economists, have a unique opportunity to learn more about seafood, thanks to a hands-on program offered by Delaware Sea Grant's seafood technology specialist, Doris Hicks (right), and her colleagues at Pennsylvania Sea Grant and Penn State Cooperative Extension.

The two-day workshops — "Seafood Sense: Fisheries Technology for Educators" — provide participants with information on commercial fishing practices, buying, handling, and preserving seafood, and seafood composition and nutrition. The next program is set for November 1–3, 2005, at UD's Lewes campus. For information, call Hicks at (302) 645-4297.



Kathy Atkinson

### State's First "Clean Marina" Recognized

Last September, Indian River Marina in Delaware Seashore State Park became Delaware's first certified "clean marina." Displaying the flag at the recognition ceremony were, from left, Sea Grant marine transportation specialist David Chapman, John Hughes, secretary of the Delaware Department of Natural Resources and Environmental Control (DNREC); Gary King, manager of Indian River Marina; and Lt. Governor John Carney.

Chapman coordinates the Delaware Clean Marina Program, a voluntary effort that enlists marinas — and the boaters that use them — in helping to reduce pollution of the state's waterways by adopting environmentally friendly practices, from spill-proof fueling methods to oil recycling. The program is a partnership involving Delaware Sea Grant, DNREC, the Center for the Inland Bays, Boat U.S. Foundation, and the U.S. Coast Guard Auxiliary.

So far, 20 of the state's 100 marinas have taken the Clean Marina pledge, which is the first step in the certification process. For more information, call Chapman at (302) 645-4268.

### Students Explore the Deep Frontier

What's it like diving to the bottom of the deep blue sea? Nearly 55,000 middle- and high-school students from 49 U.S. states and eight foreign countries, including Austria, Canada, Iran, Mexico, New Zealand, Turkey, the United Kingdom, and Uzbekistan found out as participants in "Extreme 2004: Exploring the Deep Frontier," a 21-day virtual field trip to hydrothermal vents, hosted by the UD Marine Public Education Office in December.

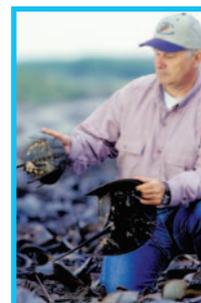
The award-winning program connected students with UD marine scientist Craig Cary and his team working aboard the submersible *Alvin* and research vessel *Atlantis* in the Pacific Ocean. Photos, video clips, and journals were posted daily to <http://www.ocean.udel.edu/extreme2004/>, an interactive Web site that includes a virtual tour of the seafloor, a 3-D Pompeii worm (Earth's most heat-tolerant animal), and more. The program was sponsored by the National Science Foundation, NOAA Sea Grant, WHY-TV, and the University of Waikato, New Zealand.



### Horseshoe Crabs Count!

It's 1:00 a.m. at Bowers Beach, and Sea Grant marine education specialist Bill Hall has just completed an interview about horseshoe crabs for the British Broadcasting Company. Over the years, Hall (right), an expert on Delaware's state marine animal, has been interviewed by media around the world.

Due to concerns about declining crab populations, each spring since 1990, Hall has coordinated a bi-state census of spawning female horseshoe crabs on 13 key beaches in Delaware and 11 in New Jersey. The largest numbers of crabs come ashore to spawn at night under cover of darkness so that's when Hall and his volunteers begin their work. To learn more, see Sea Grant's horseshoe crab Web site at <http://www.ocean.udel.edu/horseshoecrab/>.



Robert Cohen

### Coastal Tourism Efforts Honored

Jim Falk (right), director of the Delaware Sea Grant Marine Advisory Service, was honored with the 2004 Southern Delaware Tourism Award in November.

In addition to managing a staff of six marine specialists who assist Delaware residents with coastal challenges, Falk has years of experience in marine recreation and tourism and has helped organize several "smart growth" seminar programs in the county to help communities retain their small-town character, heritage, and high quality of life while balancing future growth.



## 2005 Sea Grant Advisory Council

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# Sea Grant Catch the Wave

## Get involved in learning about the coast!

Want to learn more about the ocean and have fun in the process? Look no further. Delaware Sea Grant has a bounty of activities to offer — from assisting marine scientists with research on blue crabs to meeting a dogfish shark at our award-winning Coast Day festival.

In addition to the activities listed here, be sure to check out our Web site at <http://www.ocean.udel.edu>, where you can download many of our publications, listen to our *SeaTalk* radio series, take a virtual tour of the seafloor in a submersible, watch video clips of our research, and more! For a copy of our publications catalog, please contact the UD Marine Public Education Office at (302) 831-8083.

## 2005 Coast Day

UD's annual sea celebration, the winner of state and national awards for marine education, is set for Sunday, October 2. If your company would like to help support Coast Day, please contact the Sea Grant Marine Advisory Service at (302) 645-4346.



Bob Bowden

### Water-Quality Monitoring

Volunteers are needed to collect and analyze water samples in the Broadkill River watershed. You'll learn a lot and contribute data useful to state resource managers. Training is provided. For more details, call the Sea Grant Marine Advisory Service at (302) 645-4346.

### Horseshoe Crab Census

Horseshoe crab eggs supply shorebirds and fish with food. The crab's blood, removed with no apparent harm, is the basis of a pharmacological test to ensure that intravenous medications are bacteria free. A horseshoe crab census is held on Delaware Bay beaches each spring. If your organization would like to assist, call the Sea Grant Marine Advisory Service at (302) 645-4346.



### Blue Crab Research

Help researchers learn more about blue crabs in Delaware Bay. Volunteers are needed to help collect female, egg-bearing crabs twice a week, during the daytime, at Lewes Beach using seine nets. Nighttime sampling will be done at high tide, with dip nets, from the fishing pier at Cape Henlopen State Park. The crabs will not be harmed. For more details, call (302) 645-4279.



Help researchers learn more about blue crabs in Delaware Bay. Volunteers are needed to help collect female, egg-bearing crabs twice a week, during the daytime, at Lewes Beach using seine nets. Nighttime sampling will be done at high tide, with dip nets, from the fishing pier at Cape Henlopen State Park. The crabs will not be harmed. For more details, call (302) 645-4279.



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Kathy Atkinson

### Marine Tour Program

Guided tours of UD's marine research complex in Lewes are available to the public, thanks to dedicated volunteers from the local community. They lead over 1,000 people annually on hour-long walking tours of our labs. To learn how you can join the program, please contact the Sea Grant Marine Advisory Service at (302) 645-4346.

## Events & Activities

**Ocean Currents Lecture Series in Lewes.** UD marine scientists present free public lectures the third Thursday of each month, April through September, at 7:00 p.m., UD Hugh R. Sharp Campus, 700 Pilottown Rd., Lewes. Reservations required. Contact: (302) 645-4279.

**Wilmington Lunch & Lecture Series.** Held periodically from November to April, this series highlights the latest UD marine research over lunch at the four-star Hotel du Pont. 11:30 a.m. – 1 p.m. Cost: \$15. Reservations required. Contact: (302) 831-8083.



Bob Bowden

**Coast Day — Sunday, Oct. 2, Lewes Campus.** 11 a.m. to 5 p.m. Free admission; \$2 parking. Have an ocean of fun learning about the coast at this award-winning event. Sea seminars, exhibits, ship tours, marine critter touch tanks, children's activities, 16th annual crab cake cook-off, and more! Contact: (302) 831-8083.

**Free Marine Science Tours.** Guides lead hour-long walking tours of the UD College of Marine Studies in Lewes throughout the year. From June through August, tours are offered every Friday, starting at 10:30 a.m. Reservations required. Contact: (302) 645-4346.

**Native Plant Garden Tours.** Learn about plants native to the Delaware coast on this self-guided tour. The garden is located at the entrance to Cannon Lab at the UD College of Marine Studies, 700 Pilottown Road, Lewes. Contact: (302) 645-4346.



SEA GRANT COLLEGE PROGRAM  
University of Delaware  
Newark, DE 19716-3530

## Stay Connected to the Coast

Sign up for our free e-newsletter, *At Sea!* It contains the latest news about the research, activities, and events offered by the UD College of Marine Studies and Delaware Sea Grant. Subscribe on-line at <http://www.ocean.udel.edu/atsea> or e-mail your request to the UD Marine Public Education Office at [MarineCom@udel.edu](mailto:MarineCom@udel.edu).

The Sea Grant Web site contains a treasure trove of information on topics ranging from rip currents to seafood, aquaculture to marine careers. Dive in to <http://www.ocean.udel.edu/> today, and explore the world at our shores!

